

Bioconversion of agri-food residues into lactic acid

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Published in:

The 15th International Symposium Prospects for me

Publication date:

2016

Document Version

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for pulished version (APA):

Venus, J., & Pleißner, D. (2016). Bioconversion of agri-food residues into lactic acid. In D. C. Vondnar (Ed.), *The 15th International Symposium Prospects for me: Book of Abstracts* (pp. 125). (University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca; No. 3/2016). University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. <http://www.usamvcluj.ro/simpo/Book%20of%20abstract%202016.pdf>

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THE 15TH INTERNATIONAL SYMPOSIUM
**PROSPECTS FOR THE
3rd MILLENNIUM
AGRICULTURE**

29th September - 1st October 2016, Cluj-Napoca, Romania



BOOK OF ABSTRACTS

No. 3/2016



IMPRESSUM

Published by University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

Editor in chief Lect. Dan C. VODNAR, PhD

Printed by AcademicPres (EAP),
3-5 Manastur Street, Cluj-Napoca, 400372
Romania

Web page **<http://symposium.usamvcluj.ro>**

IMPRESSUM

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

in collaboration with

University of Natural Resources and Applied Life Sciences, BOKU (Austria)
University of Liege (Belgium)
EuCheMS – Division of Food Chemistry

under the patronage of Romanian

Ministry of National Education and Scientific Research
Ministry of Agriculture and Rural Development
Academy of Agricultural and Forestry Sciences
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THE 15th INTERNATIONAL SYMPOSIUM

“PROSPECTS FOR THE 3rd MILLENNIUM AGRICULTURE”

29th September – 1st October 2016
Cluj-Napoca, Romania

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WELCOME MESSAGE

We are pleased to welcome you at the University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca, Romania to share our scientific performance and progress during this special scientific event.

The University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca, recently classified in the first category of “advanced research” universities of Romania, place also confirmed by the European University Association (EUA). The University becomes nowadays one of the most prestigious academic institutions from Romania.

The 15th International Symposium "Prospects for the 3rd Millennium Agriculture", is a dynamic forum of exchanges for scientific experiences, innovative ideas and concepts, future prospects in agriculture, plant and animal science, food science and technology, biotechnology, veterinary medicine, as well in other interdisciplinary and transdisciplinary areas.

The 15th International Symposium "Prospects for the 3rd Millennium Agriculture" includes invited conferences, presented by known international and national personalities, oral and poster presentations, as well round tables and exhibitions, where recent advanced scientific and technical results can be seen, especially now, in the context of the new European Research Program “Horizon 2020” and of the national Research – Technological Development and Innovation Program, related to Life Sciences.

The symposium program will consist of ten main sections:

1. Agriculture
2. Environmental Protection and Sustainable Development
3. Food Science and Technology
4. Horticulture and Forestry
5. Economics and Rural Development
6. Animal Science
7. Biotechnology
8. Veterinary Medicine - Fundamental and preclinical sciences
9. Veterinary Medicine - Clinical sciences
10. Land Measurement, Natural and Humanistic Sciences

The participants registered to our symposium have the opportunity not only to present their results, published as summary in the “Book of Abstracts” but also to publish in extenso their contributions. The oral presentations, after a previous peer review process, can be published in the journal Bulletin of UASVM-CN nr. 73(2)/2016 – Agriculture, Horticulture, Animal Science-Biotechnology, Veterinary Medicine and Food Science and Technology.

This proceedings’ “Book of Abstracts” contain 457 abstracts submitted by participants from different countries. We wish to thank all participants and organizers for making this meeting possible. We do hope that you will find during the 15th International Symposium an interesting program and a great opportunity to interact with colleagues and friends from Romania.

With best wishes,

Prof. Cornel CĂTOI, PhD, Rector

Lect. Dan VODNAR, PhD, Vice-rector for Research

ANNOTATION

**The abstracts and contact information are submitted by the main authors.
Each author explicitly confirms that the abstract meets the ethical standards for authors
and coauthors.**

SYMPOSIUM PROGRAM

Thursday, 29 th September 2016		
08:00 – 13:00	Registration of participants	Hall of Aula Magna “Mihai Serban”, UASVM Cluj-Napoca
08:00 – 18:00	Poster Display	Hall of Institute of Life Sciences
09:00 – 10:15	<i>Doctor Honoris Causa Award Ceremony</i> Fred SINOWATZ, Germania	Aula Magna “Mihai Serban”
<i>10:15 – 10:30</i>	<i>Coffee break</i>	
10:30 - 10:45	Opening ceremony Rector, Prof. Cornel Cătoi, PhD Vice - Rector, Lect. Dan Vodnar, PhD	Aula Magna “Mihai Serban”
10:45 – 12:50	Plenary Session (Aula Magna “Mihai Serban”) Chairmen: Oscar VICENTE, Dan VODNAR	
10:45 – 11:10	A PRELIMINARY STUDY ON AGRONOMIC POTENTIAL OF <i>POCHONIA CHLAMYDOSPORIA</i> IN SUSTAINABLE AND ORGANIC AGRICULTURE	Michele SELLITTO, Italy
11:10 – 11:35	MECHANISMS OF DROUGHT AND SALT TOLERANCE IN PLANTS: INSIGHTS FROM COMPARATIVE ANALYSES OF STRESS RESPONSES IN GENETICALLY RELATED TAXA	Oscar VICENTE, Spain
11:35 – 12:00	EMERGING TRENDS AND CHALLENGES IN SILKWORM RESEARCH	Nirmal S. KUMAR, India
12:00 – 12:25	EVALUATION OF CRURAL RELEASE AND ISCHIAL OSTEOTOMY FOR RELIEF OF TENSION IN THE REPAIR OF LARGE SEGMENTAL URETHRAL DEFECTS IN MALE CATS	Orly ZEMER, Israel
12:25 – 12:50	GLUCOSINOLATES: FROM DAILY VEGETABLES TO THIOFUNCTIONAL CHEMISTRY	Patrick ROLLIN, France
<i>13:00 – 14:20</i>	<i>Lunch (Biodiversity Institute)</i>	
14:30 – 18:00	Oral Sessions (sections I-X)	
<i>19:00 – 24:00</i>	<i>Banquet (Napoca Restaurant)</i>	
Friday, 30 th September 2016		
10:00 – 11:30	Oral Sessions (sections I-X)	
<i>11:30 – 12:00</i>	<i>Coffee break</i>	
12:00 – 13:00	Oral Sessions (sections I-X)	
<i>13.00 – 14:50</i>	<i>Lunch (Biodiversity Institute)</i>	
15:00 – 17:00	Poster presentations and evaluation (sections I-X)	Hall of Institute of Life Sciences
18:00	Closing ceremony	Aula Magna “Mihai Serban”
Saturday, 1 st October 2016		
08:30 – 21:00	Transylvania tour – optional (35 EURO or 150 lei)	

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A PRELIMINARY STUDY ON AGRONOMIC POTENTIAL OF *POCHONIA CHLAMYDOSPORIA* IN SUSTAINABLE AND ORGANIC AGRICULTURE

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Keywords: *biocontrol, microorganisms, root endophyte, root-knot nematodes*

Introduction: Root-knot nematodes (RKNs) cause significant yield losses on many economically important plant species. Restrictions on the use of chemicals have increased the need for new methods of managing plant-parasitic nematodes, including biological control through useful microorganisms. Several antagonistic microorganisms are suitable, including the nematophagous hyphomycete *Pochonia chlamydosporia* that parasitizes eggs. *P. chlamydosporia* has a complex biology and can act as a biological control agent of nematodes, as a plant growth promoter or as a soil saprotroph. *P. chlamydosporia* is also a root endophyte known to promote plants growth. Currently, a commercial product (POCHAR) was developed by Microspore based on *P. chlamydosporia* that can be applied through irrigation.

Aim: The study aimed at testing POCHAR's efficacy against RKNs in comparison to some chemicals products. Furthermore the endophytic relation, phosphate solubilization and IAA production was tested.

Materials and Methods: Four different chemicals were evaluated in pot experiments in controlled conditions against a RKN population. Moreover, total and endophytic root colonization of *P. chlamydosporia* isolates were measured and evaluated through light microscopy, culturing and quantitative PCR techniques.

Results: POCHAR showed the best control according to nematode root scale and plant growth. The *P. chlamydosporia* isolates tested confirmed endophytic colonization of the root system and moreover were able to solubilize mineral phosphate.

Conclusions: Results support *P. chlamydosporia* as a nematophagous fungus with plant growth promoting capabilities of potential agronomical value.

CONSERVATION SOIL TILLAGE AND ENVIRONMENTAL ISSUES

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Key words: *soil tillage systems, soil moisture, energy efficiency, soil respiration.*

Introduction: Along with the positive factors of the conservation tillage system, it impose the use of pesticides in greater quantities, which affects negatively soil microbiological activity and affects the agricultural environment. Within SAUM (The department of Soil Science and Agroecology) were highlighted several positive aspects of conservation tillage implementation, less were investigated environmental aspects and imposed problems. In the sustainable agriculture, the efficiency of conservation tillage system should be based on energy inputs evaluation, along with the characteristics of soil vitality.

Aims: Comparative agroecological research of conventional and conservation soil tillage systems by evaluating energy efficiency, soil respiration and cellulolytic activity.

Materials and Method: The research (2005-2016) was carried out in long field experience, on carbonate chernozem with loamy texture. During 2014-2015 years have been studied the energy structure and efficiency of basic cereal crops production: winter wheat and corn in the conventional - plowing and conservation - No-tillage variants, DES Chetrosu - SAUM, Chisinau.

The energy efficiency of cereal crops agroecosystems was performed based on the determination of energy indices: net energy, energy efficiency and specific energy (energy consumption per kg production). Indices were calculated based on energy conversion inputs and outputs - crops yield. Soil respiration was determined according to the Ștatnov V. method, and cellulolytic activity by incorporating linen tissue in soil.

Results: Energy efficiency evaluation for winter wheat crop showed that in conservation system net energy (average for 2014-2015 years) was greater with 69,5%, energy efficiency increased by one unit or 42,2%, and specific energy (energy consumption per kg production) decreased by 30%, compared with conventional system. There was established a higher energy efficiency in No-tillage system, mainly caused by yield level that was higher by 38.2%, comparative with conventional variant. There were obtained data and diagnosed some regularities of carbon chernozem soil respiration and cellulolytic activity.

Conclusion: Conservation soil tillage system - No-tillage in the early years of implementation, comparative with conventional, ensured a higher energy efficiency in winter wheat and corn agroecosystems. Previous research, and that realized in 2016 year showed that soil cellulolytic activity in winter wheat agroecosystems under conservation system is less with 20%, comparative with plowing variant. Chernozem soil respiration research established that parameter is directly influenced by soil moisture, and it is higher in favorable climatic years. It was established that year of herbicides application inhibits soil respiration, and during the second year of applying soil respiration decreases on the all variants, comparative with corn. In the single corn system (30 years) soil respiration is less than in crop rotation.

Acknowledgements: This paper was published under projects: 15.817.05.27A; 16.80013.5007.03/Ro.

INFLUENCE OF CLIMATE FACTORS AND PLANT VARIETIES ON THE HAY TECHNOLOGY (FIBROUS FEED)

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Keywords: *meadow plots, mowing, scattering, gathering.*

Introduction: Research has taken place on the meadow of the Research and Didactic al Station Jucu located with GPS coordinates: N 46 50 ' and E 23 45 '. The study tracked the average temperatures, wind, rain, soil type (physical and chemical characteristics) and varieties of spontaneous vegetation or cultivated plots on the meadow. Then those plots were harvested with mechanical machinery (tractor U 445 + mower GMD 44 and tractor U 445 + rotary rake GRS 24).

Materials and Methods: We conducted our experiments on two plots named: “experimental plot” sown with *Festuca arundinacea* with a production of 28.5 to/ha and “witness plot” a spontaneous vegetation plot (*Dactylis glomerata* 70%, *Alopecurus pratensis* 10% *Festuca* sp. 6%, *Trifolium repens* 5% other plants 9%), with a production of 50.6 to/ha. Were determined different work qualitative indexes (working width, the quality and uniformity of the stubble plant, windrow profile for the mower; gathering and scattering windrow profile, feed losses at furrows gathering for rotary rake) and were establishing the fuel consumption and effective productivity of aggregates.

Results: Few results of our work are:

- To harvesting work (mowing) we use two gear of U-445 tractor and the speed for “experimental plot” were between 6,54 – 8,18 km/h with fuel consumption between 4,48 – 6,84 l/ha and effective productivity were 0,78 – 0,98 ha/h; for “witness plot” speed were 3,67– 7,48 km/h, fuel consumption were 5,41 – 10,31 l/ha and productivity 0,41 – 0,83 ha/h.
- To scattering work we use also two gear of tractor U-445 and for “experimental plot” the speed were between 7,0 – 8,9 fuel consumption were 1,18 – 1,28 l/ha and effective productivity were 2.09 – 2,15 ha/h; for “witness plot” speed was between 4,74 – 10,3 km/h, fuel 1,04 – 2,04 l/ha and productivity 1,05 – 2,23 ha/h.
- To gathering work for “experimental plot” the speed was between 6,37 – 6,84 km/h, fuel was 1,53 - 1,57 l/ha, productivity 1,71 – 1,78 ha/h; for “witness plot” speed 5,91 – 8,15 km/h, fuel 1,50 – 3,64 l/ha and productivity 1,13 – 1,78 ha/h.

Conclusion: Witness plot with greater plant production has led to higher fuel costs and low productivity as well as influencing the speed of movement of the aggregate, probably was a late period of harvest.

ASSIMILATION AND SOME ELEMENTS OF PRODUCTIVITY OF THE SOYBEANS, TREATED WITH FOLIAR FERTILIZER IN CENTRAL TRANSYLVANIA

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Keywords: corn, soy, foliar fertilizer, production, quality indices

Introduction: Metabolic processes that take place in the plants use solar energy which is afterwards used for the conversion of CO₂ from the atmosphere in the presence of water into organic compounds (1). Determining plant physiological processes of assimilation of plants treated with foliar fertilizer is essential for their growth and development as table vegetable, as well as for their quality and production (2).

Aims: By using the foliar fertilizer AGRO ARGENTUM FORTE in the years 2014 and 2015 we planned to study the influence of parameters of assimilation in order to increase soybean productivity elements in Turda area.

Materials and Methods: The research was conducted between 2014 and 2015 at the Agricultural Research and Development Station Turda, soy variety Felix, being treated with the fertilizer AgroArgentumForte in two different concentrations of 0.3% and 0.4%, applied in two treatments at 14 day time. The research method used was not destructive (leaves were not detached from the plant) and it was based on the use of foliar gas analyzer CIRAS-3. Assimilation measurements were made when the crops were fully formed, mature in July and August.

Results: At the soybean crop from 2014 there were noticed some differences between untreated variant and variants treated with different concentrations of fertilizer, assimilation had values between 12.5 and 23.5 $\mu\text{mol m}^{-2}\text{s}^{-1}$ at fertilization variant of 0.3% the assimilation was 18.6 $\mu\text{mol m}^{-2}\text{s}^{-1}$ and at the variant of 0.4% it had values between 18-23.5 $\mu\text{mol m}^{-2}\text{s}^{-1}$, the distinct value being statistically significant. In 2015, the values were slightly lower than in 2014 but the values were close. The percentage of protein, oil, starch and MMB between variants treated with different concentrations of fertilizer compared to control variants in 2014 and 2015 had statistically the same differences, distinctively significant.

Conclusion: Comparing with the production values obtained in 2014 there were double productions in all variants, between the witness and the variants where foliar fertilizer was applied.

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GENETIC DIVERSITY OF SWEET CHERRY CULTIVARS BASED ON MOLECULAR MARKERS

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Keywords: molecular markers, *Prunus avium*, RAPD

Introduction: Sweet cherry (*Prunus avium*), originated around the Caspian and Black Sea, is

an important fruit tree species of economic interest, for improvement and for conservation. (Ghidra *et.al.*, 2004). Genetic analysis at the molecular level can be used effectively to study molecular polymorphism existing between intraspecific and interspecific tree species and phylogenetic relationships between them and their hybrids (Lisek *et.al.* 2006).

Aims. The purpose of this project was to study and characterize cherry native genotypes belonging to SCDP Bistrița, Romania, using RAPD markers, for conservation of the native fruit trees. And to eliminate the existence of possible synonyms from national Romanian collection, we collect four hibrids of Van, from four different national collection.

Materials and Methods. And for molecular analysis of the 16 local varieties of cherry were considered 14 RAPD primers selected from the literature. They were later used to determine the genetic variability at the molecular level using analysis program PAST.

Results. The quantity and quality of the DNA obtained was suitable to achieve PCR amplification step (between 196.8-789.7ng/μl). We use 14 primers RAPD, to analyse the genetic diversity of sweet cherry. Following amplification of the 14 primers, only seven primers have generate polymorphic bands. The rest of seven was monomorphic.

Conclusion. In the present research work, we analyse the genetic distance between cherry native genotypes using the Jaccard coefficient. RAPD primers generated a high level of polymorphism and base on this cherry varieties were divided into two groups according to their genetic origin.

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THE INFLUENCE OF ROTATION AND FERTILIZATION ON WEED OCCURENCE IN MAIZE CULTURES

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Keywords: *strain, herbicides, nutrients, statistics*

Introduction. Among most practiced weed management techniques in maize cultures we must mention rotation of cultures and at last but not at least the appropriate fertilization. By adopting these techniques an appropriate weed control may be practiced. According to literature, the suitable applications of crop rotation and correct soil fertilization with appropriate nutrients, may lead to decrease of weed attack severity.

Aims. Testing the influence of rotation and fertilization on weed occurrence in maize cultures within specific climatic conditons of Transylvania was the aim of our study.

Materials and Methods. The research was carried out on an experimental plot cultivated with maize, in conditions of previous application of the rotation of cultures (experimental), in the mean time, on a control plot cultivared with the same maize strain, but in context of lack of rotation of cultures (control), while the same type and dosis of fertilizers and herbicides were applied for both plots (control and experimental). The qualitative weed occurrence was recorded, and weed attack was quantified. Data were pstatistically processed.

Results. As expected, the best results were obtained in experimental plot where rotation of cultures was practiced, previously to maize culture installation. Even the same weed species were identified in both plots (with and without rotation), in plot where rotation was practiced, the weed attack was lower compared to control, the differences being statistically assured at statistical threshold of 0.1%.

Conclusion. The current practice of culture rotations, in conditions of appropriate fertilization and herbicidation supplying, contributes to enhace maize crom quality and quantity, by reducing the weed attack, and also reducing crop mainataining costs with herbicidation.

CRITICAL METALS RECOVERY USING BIOTECHNOLOGICAL METHODS

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Keywords: *critical metals, bioleaching, microbial communities, metals recovery*

Introduction: Critical metals are metals whose availability is essential for high-technology in medical and electronics industry, defense applications, but vulnerable to politically or economically driven fluctuations in supply, mainly due to their uneven geographical distribution. Nowadays, in order to meet the current challenges of sustainability, an innovative and modern approach to the extraction, use and recovery of these metals must be developed.

Aims: The aim of the research is to extend Europe's effective resource base for critical metals from primary and secondary resources for critical metals, thus transforming waste into a valuable raw material. This study is intended to be an overview of potential applications of microorganisms in critical metal recovery

Materials and Methods: This article explores and details the potential application of microbial biotechnology methods for the recovery of critical metals. The methods used include engineering of microbe-metal interactions for recovering scarce and critical metals such as rare earth elements, platinum group metals, beryllium (Be), chromium (Cr), cobalt (Co), gallium (Ga), indium (In), lithium (Li), niobium (Nb), and tungsten (W).

Results: Laboratory experimental studies demonstrated that there is a real possibility to further develop and improve the process of bioleaching, designed for bioremediation of heavy metals and pollutants, optimising its application within a circular economy approach for critical metals recovery.

Conclusion: This study provides an overview of the current research in the area of critical metals recovery by different methods and their application to mine wastes. Scientific research regarding the potential responses of microbial consortia to specific critical metals and novel possible microorganisms with biotechnological potential for the recovery of critical metals from various sources, is essential for determining the role of microbial communities in the achievement of new sources for critical metals.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CCCDI – UEFISCDI, project number 18/2016, within PNCDI III.

THE INFLUENCE OF CYTOPLASMIC DIVERSIFICATION ON SOME PLANT CHARACTERS IN MAIZE (*ZEAMAYS*)

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Keywords: *cytoplasm, isoline, maize, nucleus, testers.*

Introduction: Cytoplasmic male sterility discovery has led to new studies regarding the cytoplasmic diversification in maize and the importance of genetic basis improvement. Cytoplasmic uniformity can cause the appearance of new sensibility to pests and diseases, the same as the *Helminthosporium maydis* race T epidemic back in 1969-1970.

Aims: Given the risk raised by the use of a single type of cytoplasm, at the Agricultural Research and Development Station Turda it was started the isoline program in order to diversify the genetic basis, but also to clarify if the cytoplasm has any influence on some maize characters, and how they are inherited in hybrids. On this paper we focused on some plant characters: plant height, cob height, number of leaves, leaf length, leaf width and leaf area.

Materials and Methods: Using the backcross 10 times, the nucleus of five inbred lines (TC 209, TC 316, TC 243, TB 367 and D 105) was transferred into four different cytoplasms (T 248, TB 329, TC 177 and TC 221). The five original lines and the 20 isolines obtained were crossed with four testers: TA 367, TC 344, TC 385A and TE 356. Biometrics were performed in two experimental years (2013 and 2014) on the resulting hybrids.

Results: Using a different cytoplasm, compared to the original one, led to significant differences regarding the cob height, leaf length and leaf area. For some hybrids using maternal isoline there were differences up to 11.9 cm for plant height, 12.7 cm for cob height, 3.9 cm for leaf length and 62.7 cm² for leaf area, when compared to the hybrid using the original maternal inbred line.

Conclusion: Using isolines as maternal genotype caused significant positive or negative differences for all analyzed characters. Some cytoplasms had a significant influence for all hybrids, but for some, the significant differences were recorded due to the interaction between the cytoplasm, nucleus and tester.

ALLELOPATHIC EFFECTS PRODUCED BY XANTHIUM STRUMARIUM EXTRACTS ON DOWNY MILDEW IN TOMATOES

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Keywords: *allelopathy, extract, control, downy mildew, tomato.*

Introduction: Tomatoes represent the host plant for the pathogen *Phytophthora infestans*. Together, as plant and pathogen, create a system named by A.R.ROBINSON (1976) patho-system. The plants are known as producers of many metabolites such as terpenes, alkaloids, flavonoids and amino acids. From this point of view naturally occurring substances present in different plants can represent a continuous resource of biological agents. Late blight of potato (*Phytophthora infestans* Mont. de Bary) is a serious threat to potato production all over the world which not only causes severe crop damages but also contributes to considerable monetary losses due to excessive use of fungicides for its control.

Aims: The objective of this study is to evaluate the effects of the extracts obtained from *Xanthium strumarium* on downy mildew in tomatoes.

Material and methods: In order to accomplish the study the extracts were prepared using sun dried leaves of *Xanthium strumarium*. The extract was applied with a sprayer at first symptom occurrence, followed by 7 days treatment intervals. The assessments were conducted 7 dat., 14 dat. and 21 dat.

Results: in every assessment, disease incidence in plots treated with plant extracts was lower than control. The lowest attack degree was recorded at 7 dat (6.93 %) then followed by 14 dat values 21,33 % and following raining period the highest value was recorded at 21 dat 53,93 % related to control (73.93 %).

Conclusions: application of extracts lowered disease severity level which corresponded at 7 and

14 dat. Due to heavy rainfall (70 mm) and optimal temperature (16-18°C), the experimental site provides ideal and conducive environments for downy mildew pathogen (*P. infestans*)

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EFFECT OF COLD STORAGE ON ANTIOXIDANTS FROM MINIMALLY PROCESSED HERBS

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Keywords: ascorbic acid, dill, lovage, parsley, phenols

Introduction. Herbs are rich in antioxidants, but processing - even minimal - and storage reduce the content of bioactive compounds. Vitamin C and total polyphenols are quality markers used to assess the effect of treatments and storage on foodstuffs. Although, the effect of other conventional shelf-extension method is well established, refrigeration was taken for granted and rather neglected.

Aims. The present study aims to describe the influence of refrigeration and prolonged storage on the content of vitamin C and total polyphenols of three minimally processed herbs: parsley, dill and lovage.

Materials and Methods. Minimally processed parsley (*Petroselinum crispum*), dill (*Anethum graveolens*) and lovage (*Levisticum officinale*) were stored at 4°C for 12 days. Every 3-4 days samples were taken for analyses. The content of ascorbic acid and total polyphenols was determined on methanolic extracts. Ascorbic acid was separated, identified and dosed using HPLC coupled with an UV-VIS detector. Total polyphenols were determined spectrophotometrically, following Folin-Ciocalteu method. That results were all reported to the fresh weight of the herbs. Statistical analyses were performed using ANOVA ($p < 0.05$), Fisher (LSD, $\alpha = 5\%$), Pearson correlation coefficient.

Results. On the first day of storage, the content of vitamin C was above 170 mg/100 FW for the three herbs: dill had the highest content (204.53 ± 5.06 mg ascorbic acid/100g fresh weight), followed by parsley (179.75 ± 5.92 mg ascorbic acid/100g fresh weight) and lovage (173.49 ± 3.37 mg ascorbic acid/100g fresh weight), statistically similar. During the 12 days of storage, the content of vitamin C decreased by 18% for parsley, by 8% for lovage and by 3% for dill. At the beginning of the study, dill had the highest content of total phenols (417.43 ± 6.37 mg GAE/100g fresh weight) followed by parsley (281.36 ± 7.55 mg GAE/100g fresh weight) and dill (246.42 ± 11.26 mg GAE/100g fresh weight). On day 5 of storage, the content increased, reaching the maximum values for the three herbs and then it decreased below the levels of the first day. It was noted that during the 12 days of study, the evolution of total polyphenols at refrigeration temperature was given by a function of second degree.

Conclusion. Thus, the present study confirms that vitamin C can be successfully used as a quality marker for herbs due to its low stability during storage. The evolution of total phenols is polynomial, reaching its peak during the shelf-life of herbs.

STUDY OF WINTER WHEAT YIELD QUALITY ANALYSIS AT ARDS TURDA

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Keywords: *Winter wheat, yield, quality, climate condition*

Introduction: Wheat is one of the most important food plants, food accounted for 35-40 % of world population. Wheat quality is phenotypic expression of genotype interaction with environmental conditions and crop technology. (Săulescu, 1984; Kadar et al., 1999, 2002). The value of a variety of winter wheat is given by its high capacity production associated with the best quality, but a very important factor is the stability of production especially in terms of adverse climatic factors. (Ionut Racz et al., 2014). Choosing genotypes depending on the area or climatic conditions associated with applied technology are critical factors in the success of the wheat crop both in terms of production and quality (Ceclan si colab., 2015)

Aims: The purpose of this research is studying the potential for production and quality of winter wheat genotypes in terms pedological and climate condition and applied technology, from ARDS Turda

Materials and Methods: The research was conducted in the experimental field of the Winter wheat breeding Laboratory from ARDS TURDA. Biological material used in the experiments was composed by winter wheat genotypes. The conducted experiments were using the method of quadratic railing rocked with repeated scheme bases in six repetitions, with two levels of fertilization. The obtained data were statistically analyzed through a series of statistical parameters, commonly used in agricultural research,

Results: The obtained results showed increases of production when additional fertilizer was applied in all studied varieties. Moreover, application of fertilizers contribute decisively in terms of quality, there is a strong correlation between the amount of fertilizer and protein content, gluten, respectively, the index Zeleny

Conclusion: From the results it is found that all the tested varieties react favourably to fertilization through increases of yield so that there are differences between varieties reaction to fertilization.

Low yields and poor crop quality are often the result of poor quality technology and insufficient of fertilization, crop rotation failure and not least for the inappropriate use of genotypes for the area that are cultivated.

THE REACTION OF SOME WINTER WHEAT VARIETY AT CULTIVATION IN THE CONSERVATIVE SYSTEM IN THE TRANSYLVANIAN PLAIN AREA

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Keywords: *climatic conditions, conservative system, quality, yield, wheat.*

Introduction: Wheat is one of the most important cultivated plants, with great nutritional weight. The wide surfaces on which it is seeded, as well as people's concern regarding the wheat cultivation, are due to certain factors: the high level of the grains in carbon hydrates and proteins; the long conservation of the grains; the big ecological plasticity, being cultivated in areas with very different climates and soils; the possibility of integral mechanization of the crop, etc.

Material and Method: The research took place over the period of time 2014-2015, at SCDA Turda, situated in the Transylvanian Plain. The experiment done is of polifactorial type, organized according to the method of the subdivided lots, the surface of an experimental lot being of 48 m².

Results: The reaction of grain crops to the application of various technological measures and not only is known to be a positive one; the determination of the main qualitative parameters (gluten, protein) seeks for the response of the wheat plants in the experiment in rendering the values of these parameters as compared to the technological factors applied.

Conclusion: Through the experiment done at SCDA Turda, we are following the behaviour of certain inland autumn wheat varieties, in comparison to varieties of foreign origin, in order to make certain recommendations regarding their pretability to various soil tillage systems and levels of fertilization in the region of the Transylvanian Plain.

Acknowledgments: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0884.

CHARACTERIZATION PHYTO-SOCIO-ECOLOGICAL OF *AGROSTIS CAPILLARIS* L. GRASSLANDS

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Keywords: *Agrostis capillaris* L., natural grassland, pastoral value

Introduction: Floristic composition of the pastures is a mirror action practical factors applied Station and management (maintenance + how to use).

Over time, the plant species have adapted to specific conditions specific communities forming the stationary bearing footprint ecological factors Păcurar and Rotar, (2014).

Aims: The purpose of this research is to assess the state of the biodiversity and pastoral value for *Agrostis capillaris* L. grasslands from the mountain area. Also, there has been analyzed the floristic composition and a series of ecological indexes, respectively humidity, soil reaction, temperature and nitrogen. Other aspects taken in account were the agronomical and anthropogenic specters.

Materials and Methods: In this study, we examined how estimated species diversity patterns changed with varying survey intensity from Băișoara village, Cluj County, Romania, on a *Agrostis capillaris* L. grasslands. The experiment was performed in 2015. The vegetation observations were made on 29 plots. The floristic composition was interpreted using an improved Braun-Blanquet scale with subdivisions Păcurar and Rotar, (2014).

Results: In this descriptive plot been identified type of grassland *Agrostis capillaris*, described in boreal at altitudes between 850 and 1200, generally starting on exhibitions east until the south (90° - 180 °), land with an average slope of about 10 degrees sometimes reaching up to a maximum inclination of 40 °. Of the total weight of the 50 studies (relevée) this type was found in 29 locations, representing 58% of grasslands studied.

Conclusion: The floristic composition of the *Agrostis capillaris* grasslands from the studied area is influenced by the local conditions and the intensity of the exploitation, these surfaces being under-exploited.

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PRELIMINARY RESEARCH ON THE WHEAT PESTS AND ON THEIR INTEGRATED CONTROL DURING 2015-2016, IN TRANSYLVANIA

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Key words: wheat pests, thrips, aphids, leafhoppers, sunbugs, wheat flies

Introduction: The evolution of wheat insect pests in Transylvania is strongly influenced by the ecotechnological conditions, by climate change and current technology (Malschi, 2009 Malschi et al., 2015).

Objectives: This paper presents the dynamics and importance of the main pests of wheat (thrips, aphids, leafhoppers, wheat flies, cereals sunbugs, investigated under the integrated pest control system suitable of the area.

Material and Methods: The investigations were conducted at the ARDS Turda, during 2015-2016, from the wheat no tillage cultural system and the cereal rotation of three years, applying all zonal recommendations of technology and phytosanitary complex. Pest monitoring was performed based on the samples collected with entomological net, by decadal 100 sweep-net catches/sample.

Results: Data of studies carried out show the danger of the attack of abundant populations of species of wheat flies (*Phorbia securis*, *Delia coarctata*, *Opomyza florum*, *Oscinella frit* etc.; wheat fleas (*Chaetocnema aridula*) and cereal leaf beetle (*Oulema melanopa*); leafhoppers (*Psamotettix alienus*, *Javesella pellucida*, *Macrosteles laevis*); aphids (*Sitobion avenae*, *Schizaphis graminum*, *Rhopalosiphum padi*); thrips (*Haplothrips tritici*), sunbugs (*Eurygaster maura*, *Aelia acuminata*) etc., and the necessity of applying insecticide treatments on the vegetation.

Conclusions: Since 2015, a stronger impact of global warming on the wheat pests structure (%) are found. This change began on the ten years. The importance of cereal sunbugs is increasing, well as the importance of the wheat flies, aphids and leafhoppers, which requires professional study on the pest dynamics and adequate integrated control of wheat pests.

STUDIES CONCERNING THE QUALITY OF FELIX SOYBEAN BREED

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Keywords: *soybean, quality, fertilization.*

Introduction: Soy protein is the most inexpensive source of high-nutritional quality protein and therefore is the world's predominant commercially available vegetable protein. In order to keep this levels of fat and proteins at higher standards studies need to be develop in order to highlight the factors affecting soybean quality.

Aims: The aim of our research was to analyse the variations in soybean protein and fat content and thru this to highlight the optimum management of nutrients for achieving high quality soy products.

Materials and Methods: The experimental field was placed in the Agricultural Research Development Turda (ARDS) in 2013. The biological material consists in a genotype of soybean created at ARDS Turda – Felix variety. The experimental plots were installed after the subdivided parcel method and were fertilized with mineral (P1-0 kg/ha P₂O₅, P2- 50 kg/ha P₂O₅, P3- 100 kg/ha P₂O₅) and organic fertilizers (G1-0 t/ha gulle; G2-5 t/ha gulle, G3-10 t/ha gulle, g4-15 t/ha gulle) in 4 different doses. In order to accomplish our goal we followed soy content in protein and fat under the influence of the inputs applied.

Results: Analysing the data recorded we observed a low influence of the experimental factors on soybean seeds content in fat substances (negative influence of mineral fertilizers and an insignificantly influence of fertilization with gulle). In the same time the protein content varies significantly under the influence of the technological inputs applied. The highest increases in protein content are achieved when organic fertilizer is applied.

Conclusion: The results showed an interesting evolution of soybean chemical content under the influence of differentiated fertilization.

RESEARCHES REGARDING QUALITY OPERATION INDEXES FOR NEW NOZZLES

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Keywords: *coverage degree, operating pressure, spray angle, spray drift.*

Introduction: Agricultural pest control needs phytosanitary treatments that are correctly effectuated during the optimal period and with appropriate operation indexes. Nozzles mounted on spraying machines are responsible of high efficiency treatments and contributes to the achievement of best working parameters.

Aims: In the experimental research of this paper were determined, for a number of five nozzles, variation of flow angle at the tip of the nozzle and coverage degree, depending on working pressure.

Materials and Methods: In order to determine the flow for the five nozzles using different pressures a special stand was used. The nozzle flow was measured by collecting in a graduated vessel the liquid for one minute. The flow rate was determined for each of the four nozzles at four pressures (1.5, 3, 4.5 and 6). Coverage degree was determined using water sensitive paper. The spraying machine was adjusted to deliver 200 l / ha.

Results: Analysing data regarding the flow variation for the tested nozzles, there can be seen an increasing of the flow, but growth is not uniform. The increase of the flow is higher for the standard nozzle and for the AD -90 nozzle the growth is lower. Four times increased pressure (1.5-6 bar) increases the cone angle at the tip of the spray 17 to 77%. There is a higher increase of the angle when the pressure is changed from 1,5 bar to 3 bar, afterwards from 3 bar to 6 bar the angle increases in a much smaller manner. It has been found that the flow of the front jet is greater than the rear jet in the interval ranging from 14 to 18%. Vertically and on the back side there is an increase of the coverage ratio for IDTA nozzle due to asymmetric flow. Based on the analysis of experimental results we can say that the nozzle IDTA achieved the best coverage degree on both the horizontal and vertical plans. IDTA nozzle has a complicated construction and therefore a higher cost price, but given that it has ceramic tips, the duration of use increases.

Conclusion: The quality and effectiveness of phytosanitary treatments are greatly influenced by the type of nozzle used.

RESEARCH ON ASSESING THE POTENTIAL FOR ORGANIC CERTIFICATION GROUP OF VILLAGE BELIS, COUNTY CLUJ

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Keywords: *conformity, I.D.E.R.I.C.A, organic certification group.*

Introduction: Belis agricultural potential can be expressed in terms of financial growth in different ways to increase added value of specific products area, and in this paper study that we report it is on the potential of organic certification.

Aims: The work is based on objective assessment of socio-spatial and ecological, the agricultural potential of the locality Belis, Cluj county in adding value approach to regional food products, after a possible environmental certifications group of the village.

Materials and Methods: IDERICA method is the method used to analyze the ecological potential of the product and the area which sets environmental impact, socio-territorial agricultural activity in the geographical area, otherwise limited only to a village.

Evaluation of socio-territorial indicators (I.S.T.): direct selling; turning products into farm; the existence of a quality approach (AE; DOP; IGP; TSG); agrotourism; equipment used jointly by several farmers; groups of employers; perennial farm.

Results: Grid computing have been used in environmental certification at Belis locality, it took into account different environmental indicators and socio-territorial corresponding method I.D.E.R.I.C.A. Farms studied with these specific indicators falls within the required characteristics of a correct assessment socio-economic territorial. There are farms that have not integrated these indicators, for various reasons not related to the study, although on the whole area would recommend these agroecological and social practices.

Conclusion: In the present research work, the location area represented by the potential of the area and the product, may allow a group certification. In the village in order to accomplish this task, a control system must be installed at group local level agriculture. Farms fall into technical conditions characteristic organic group certification, because specificity is that the farm family, family farm is characterized by preserving local tradition, authentic products and their quality.

PRINCIPAL COMPONENTS & CLASSIFICATION ANALYSIS – TOOL FOR *FESTUCA RUPICOLA* BIODYNAMIC ESTIMATION DEPENDING ON GRASSLAND FERTILISATION

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Keywords: fertilisation, forages, grass, ecosystem, multivariate analysis.

Introduction: The grassland forages must be monitored related to the quantitative and qualitative parameters. *Festuca rupicola* is one of the grass desired in grassland forages. It is necessary to have accessible statistical tools to monitor the *Festuca rupicola* biodynamic.

Aims: The objective of the present research was to study that multivariate analysis technique Principal Components & Classification Analysis (PC&CA) can be used as a statistical tool for the estimation of *Festuca rupicola* biodynamic dependent of the fertilisation.

Materials and Methods: The experimental results for *Festuca rupicola* cutting were collected in June and August 2009 from the hill permanent grassland ecosystem, of which substances flow was anthropic influenced by application of mineral and organic (sheep manure) fertilisers. The hill permanent grassland was situated in Banat, Romania, on a Calcic Luvisol. The experimental trials were organized on the complete randomized block design with 5 replications. Each trial has 25 m² surface. The experimental results were analyzed by Principal Components & Classification Analysis (PC&CA), with the help of StatSoft - STATISTICA VERSION 10. It was used 8 trials as PC&CA cases, the *Festuca rupicola* biodynamic data as supplementary variables, and as active variables the fertilisation data and ecological soil parameters.

Results: The correlation coefficients of *Festuca rupicola* biodynamic parameters (Fr1 and Fr2) were positively in mineral fertilisation case and negatively for sheep manure application. The *Festuca rupicola* biodynamic in June 2009 was high positive correlated with the *Festuca rupicola* biodynamic in August 2009 (around 0.835).

Conclusion: The statistical data performed in the present study have shown that the multivariate analysis technique PC&CA can be used as a statistical tool for the estimation of *Festuca rupicola* biodynamic dependent of the mineral and/or organic fertilisation of hill grassland ecosystem.

FOREST HABITATS IN THE NATURE RESERVE ROSCI 0032 RUDARIEI GORGES

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Keywords: forest habitats, Nature Reserve, Rudariei Gorges

Introduction: The Rudăriei Gorges, named after the Rudărica rivulet, is close to the Eftimie Murgu village, also known by the name of Rudăria. It is located in south-west Romania, in the Caras-Severin County, in the Almajului Depression. It is known both in Romania and abroad less for its flora, fauna and landscape features and most for its mill reserve, where water mills are still used by the natives. The first comprehensive study of flora and vegetation were carried out by Peia in 1978. Studies later obtained highlights the existence of modifying, occurring over time (Nicolin *et al.*, 2007, Imbrea *et al.*, 2014). At present, the reserve is also a Natura 2000 Site: ROSCI 0032 Cheile Rudăriei (by OM 1.964/2007) with an area of 300 ha.

Aims: The paper has as purpose, establishment of forest habitats in the area of research. At the same time the work wants to clarify inconsistencies on the types of forest habitats reported to be present in accordance with the Standard Form and habitats found in the field.

Materials and Methods: Plant associations have been described based on specific methodology (J. Braun - Blanquet, 1926; Borza Al., Boșcaiu N., 1965). Framing habitats and their description was based on specific textbooks (Interpretation Manual of Natura 2000 Habitats in România, coord. Gafta D. & Mounford O., 2008 and Habitats from România, Doniță *et al.*, 2005).

Results: Field studies (during vegetation, March-October) show that the vegetation in the area is mosaic-like, which hindered habitat mapping. Moreover, we have noticed differences between the habitats mentioned for the area (Standard Form) and the field habitats. Thus, the Standard Form of ROSCI 0032 Cheile Rudăriei mentions as existing in the area the habitat

91K0 - *Illyrian Fagus sylvatica forests (Aremonio-Fagion) but in the field there are no species representative for this type of habitat. According to our studies, the beech forests in the Rudăriei Gorges are part of the Habitat 9110 - Luzulo-Fagetum beech forests. Other new habitats described in the area and not mentioned in the Standard Form are 91E0 - Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae); 91M0 – Pannonian-Balkan turkey oak – sessile oak forests. The habitat 9180* - Tilio-Acerion forests of slopes, scree and ravines, mentioned in the Standard Form was confirmed in the field.*

Conclusion: In the present research work, we described new forest habitats, not mentioned in the Standard Form and explained the absence of some habitats mentioned to be present, clarifying things in this regard.

COPPER TOXICITY ON *TRITICUM AESTIVUM* L AND *LACTUCA SATIVA* L: EFFECTS OF GERMINATION AND GROWTH

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Keywords: *copper sulphate, seed germination, seedlings*

Introduction: Copper is an essential micronutrient for plant growth and development. In high concentrations in soil, it affects plant tissues and it can cause deficiencies in other essential nutrients due to antagonistic interaction (Kabata-Pendias and Pendias, 2002). Copper sulphate is used as an antifungal agent that is used in many pesticides (Almeida et al., 2002). Long-term applied fungicides allow the accumulation of copper in soil. That is why it does not migrate over long distances in soil. This metal pollution is a problem caused by the penetration of metal into the structure of the food chains.

Aims: This test aims the effects of seeds immersion in various concentrations of copper sulphate, in the two tested species.

Materials and Methods: The experiments were performed on *Triticum aestivum* L and *Lactuca sativa* L. The wheat caryopses and lettuce seeds were immersed in solutions of various concentrations of copper sulphate (V1-0.05 g/L; V2-0.1 g/L; V3-0.5 g/L and V4-1g/L) for 24 hours. The growth of the vegetative organs was appreciated after 14 days. The biometric measurements were considered as benchmarks.

Results: The result of the metabolic disturbances induced by treatment with heavy metals has been the inhibition of the vegetative growth of seedlings in a dose-dependent manner. In the experimental variants - the V3 and V4 - the roots were necrosed, and that did not allow seedling development. Reduced root growth versus the control denotes a stress induced by the tested substance. Impairment of vegetative organs has determined the decrease of plant biomass. **Conclusion:** In the present research work we have demonstrated that immersing seeds in solutions of copper sulphate concentration of 0.5g/l and 1g/l affected seed germination, growth and development of vegetative organs.

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THE EVOLUTION OF A FORAGE MIXTURE WITH RED CLOVER AMONG FOURTH EXPERIMENTAL YEARS

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Keywords: *forage, mixture, red clover, fertilization.*

Introduction: *Grassland productivity is a complex attribute defined by a series of interdependent indices with important role in the characterization of one grassland culture productivity. Among this the most important are the soil-climatic conditions, the technology applied, floristic composition, forage quality, etc.*

Aims: The present paper aims to follow the behaviour of a forage mixture with red clover among fourth experimental year.

Materials and Methods: We followed the behaviour of a complex mixture consisting of *Trifolium pratense* (15%), *Lolium perenne* (20%), *Festulolium* (25%), *Festuca arundinacea* (25%) and *Phleum pratense* (15%) under the influence of mineral fertilization in the climatic conditions specific Plateau of Transylvania, Romania. Experience was installed in the spring of 2012 in experimental fields located inside the Agricultural Research and Development Station Turda. The experimental area is characterized by an average annual temperature of 10.4⁰C C and average annual rainfall of 523.2 mm. Soil type is faeoziom vertic clay. The mixture was sown on 12.5 cm and 25 cm distances between rows and they were fertilized in early March with complex NPK and ammonium nitrate (33.3%) in four different doses: V1 control variant, unfertilized, V2-N50P60K80, V3- N75P60K80 and V4-N100P60K80. The experimental parcels were mowed 3 times /year.

Results: Analysing the complex forage mixture we observed an interesting evolution among the fourth experimental years. Fertilization with medium amounts of nitrogen seemed to have a favourable influence on forage mixture productivity.

Conclusion: The results showed that the forage mixture studied can generate high productivity and quality if adequate technology is applied.

MEASURES TO PREVENT AND COMBAT PEAR SCAB (*VENTURIA PIRENE*) IN THE CLIMATE CONDITIONS OF LAPUSEL

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Keywords: *fungicides, scab, variant, warning*

Introduction: Pear, from the assortment of fruit trees, is important because of its nutritional fruit value and taste (Zlati and Gradinaru, 2010). Scab is one of the damaging diseases due to *Venturia pirina* aggressive fungus, in case it has favorable conditions for its development (Lefter and Minoiu, 1990).

Aims: The purpose of the study was to highlight the sensitivity and resistance of some varieties to fungus attack, as well as testing 7 pesticides, remarking the product with higher biological efficiency.

Materials and Methods: The research was conducted in the years 2013-2014 at the company from Maramures county. The frequency, intensity and attack degree were calculated for the varieties Olivier de Serres and Bergamotte Crassane. The data were recorded using the AgroExpert system.

Results: Scab had growing conditions in 2013. The *Olivier de Serres* variety was remarked for its resistance to fungus attack, with a frequency of 0.2-1.3% on fruits and 1% on leaves. *Bergamotte Crassane* was affected at a frequency of 3% on fruits and 2.5-3.5% on leaves. The infections decreased in 2014, due to unfavorable climate conditions. Good results has been proved for three products: Alcupral 50PU, StrobyDF and Chorus 50WG. The efficiency of the first two products is 76.9 to 81.5% for the *Bergamotte Crassane* variety. The efficiency of Chorus 50WG was 94.8%, for the *Olivier de Serres* variety. The values for all three variants were below the values of the untreated control, in 2014.

Conclusion: The *Olivier de Serres* variety, as the most resistant one, has been recommended for the new plantations.

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FINITE ELEMENT METHOD STUDY ON STRESS STATE IN SOIL INDUCED BY AGRICULTURAL TRAFFIC

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Keywords: *agricultural traffic, Finite Element Method, soil compaction, soil induced stresses*

Introduction: In general, when a tyre is running on a deformable soil, the soil compaction will occur not only on surface layers, but also on soil profile, in deeper layers. This leads to a series of negative effects not only on physical and mechanical properties of soil, but also influences the crops growth and the crop yield. For these reasons, currently are needed solutions to reduce soil compaction, caused mainly by agricultural implements passing on the soil surface in order to apply the specific crop production technologies.

Aims: This paper analyses the status of stress state in the soil, induced by external loads caused by agricultural traffic on deformable soils, that are studied based on Finite Element Method.

Materials and Methods: This paper analyses the possibility to use finite element method (FEM) to predict the induced stresses on soil profile by a given load cases. In order to simulate the agricultural traffic effect on soil stress state it was used the PLAXIS software. In this method, to characterize the various soil types, there are used the following physical soil properties: soil weight, Young's modulus, elastic shear modulus, Poisson's ratio, permeability, cohesion, friction angle, oedometer modulus, dilatancy angle.

Results: From the simulations several conclusions can be drawn: the soil stresses decreased with depth; the soil displacements magnitude increased with soil water content due to lower friction forces between soil particles; decreasing rate for soil displacement is influenced by load magnitude and tyre inflation pressure; the soil particles moved in vertical plane from the top to the bottom, but also in horizontal direction, from the center to the edge in cross section and in longitudinal direction.

Conclusion: In this paper the agricultural traffic and its influence on stress state in soil, it was used a software application based on Finite Element Method, that has been proved to be a useful tool for soil compaction assessment in order to find the right decisions for a proper field traffic management.

BIOCHEMICAL PARAMETERS ASSESSMENT AFTER SELENIUM TREATMENT ON SUNFLOWER SPROUTS

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Keywords: *sunflower sprout, selenium, vitamin C, chlorophyll, carotene, xanthophylls, antiradical activity.*

Introduction: Literature studies show that the Europe's soils are relatively poor in selenium, so it is necessary to supplement selenium in various forms (Frias et al, 2010). The researchers have reported that selenium supplementation determines an increasing of chlorophyll's pigments on rucola (Pennanen et al., (2002) quoted by Khattab, 2004), on wheat (Yao și col., 2008), lettuce (Hawrylak și col., 2007). The increase in carotenoids, consecutive to selenium treatment was reported in wheat (Hawrylak et al., 2007, Yao et al., 2008), rucola (Khattab, 2004), carrot (Wang et al., 2005). The level of vitamin C increased significantly in green tea (Xu et al., 2003), lettuce (Qingmao et al., 1998, Hu et al., 2001), wheat (Lintschinger et al., 2000, Duma, 2010), clover, sunflower (Lintschinger et al., 2000), barley and oats (Duma, 2010). Antiradical activity improved after treatment with selenium of rape (Hasanuzzaman et al., 2010), lupine (Frias et al. 2009), clover (Zielinski et al., 2008, de la Luz et al., 2008), garden cress (Frias, et al 2010), sunflower (Pająk et al, 2014).

Aim: In this paper we present some of the consequences of the selenium treatment on sunflower sprout. We determined: vitamin C, antiradical activity (AA), chlorophyll pigments, xanthophylls and carotens.

Materials and Methods: Sunflower sprouts were obtained by sunflower seeds germination in presence of sodium selenite (5 and 10 ppm Se) – experimental group, and water – control group. The methods used in our study were: Vitamin C – by iodometric method, AA – by DPPH method, chlorophyll pigments, xanthophylls and carotens – by spectrophotometric method.

Results: The selenium treatment has led to increasing all of these parameters in experimental group, comparing to control group.

Conclusion: The selenium treatment of sunflower seeds improves the nutritive quality of sunflower sprouts with beneficial effect on the human consumption.

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EFFICIENCY OF CHEMICAL WEEDS CONTROL FOR CARROT CROPS IN SIRET VALLEY

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Keywords: *control weeds, efficiency, carrot crops.*

Introduction: Carrot culture is demanding of soil, prefers silty-clay or silty soil with high permeability and clean of weeds (Stana and Vârban, 2011; Indrea et al., 2012). The weeds control is a very important part of production technology for plants. Chemical weed control method has some advantages. The advantages are that it reduces the demand for labor, increases labor productivity, reduce the number of passes on farmland and increase production (Guş et al., 2004).

Aims: The main purpose of this paper is to provide the most efficiently solution for weeds control, using chemical methods in the carrot crops. To improve chemical methods and to offer the solution for control weeds in conditions of soil and climatic from Siret Valley.

Materials and Methods: The experience was placed in Corocăieşti, Siret Valley and Suceava County. Field experience has been placed after randomized block method on one line and the total area was 5.7 ha. It was a monofactorial experience, were studied six variants, in four repetitions, placed on a Preluvosoil molic. The average annual temperature was 7.9C and the average annual rainfall is between 550-600 mm. The variants that were studied are follows: V1 (witness) - weren't applied herbicides; V2 - Stomp 330 EC (*pedimetalin* 330 g/l), 5 l/ha; V3 – Kerb 50 WP (*propizamid* 50%), 4 kg/ha; V4 - Fusilade Forte (*fluazifop-p-butyl* 150 g/l), 1.5 l/ha + Afalon 50 SC (*linuron* 450g/l), 1.5 l/ha; V5 -Dual Gold 960 EC (*s-metolacolor* 960g/l), 1 l/ha + Linurex 50 SC (*linuron* 500 g/l), 1.5 l/ha; V6 -Stomp 330 EC (*pedimetalin* 330 g/l), 5 l/ha + manual weeding. It sowed Syrian F1 hybrid, is the type Nantes and has a short growing season, 100-120 days. Following the measurements, studies and observations made in the experience. We used numerical methods for established the infestation degree with weeds, determined in 3 repetitions, on a 0.25 m² area. We used gravimetric methods to measure the production. The results were analyzed using analysis of variance methods.

Results: The main weeds identified in the experience were: *Anagallis arvensis*, *Polygonum persicaria*, *Rahanus raphanistrum*, *Atriplex patula*, *Chenopodium album*, *Amaranthus retroflexus*, *Galinsoga parviflora*, *Capsella bursa-pastoris*, *Convolvulus arvensis*, *Equisetum arvense*, *Agropyron repens*, *Phragmites communis*. The best results was in V6 where combated 94.9% from weeds. Here were applied Stomp 330 EC and manual weeding. The worst results were obtained in V2, where were removed only 82%. The herbicide was applied Kerb 50 WP.

Conclusion: After this study the most efficiently is to combine the chemical with mechanical methods. The best results were given by herbicide Stomp 330 EC.

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**CYDALIMA PERSPECTALIS WALKER (LEPIDOPTERA,
CRAMBIDAE) A NEW DANGEROUS PEST REPORT ON *BUXUS*
SEMPERVIRENS IN CLUJ AREA**

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Keywords: *Cydalima perspectalis*, damage level, *Buxus sempervirens*, biological cycle

Introduction *Cydalima perspectalis* Walk. it is a pest of buxus plants. The species originated in the East Asian (Japan, Korea, China) from where it was introduced with the infected biological material to other areas. In Europe, the species was first reported in 2007 in Germany (Krüger, 2008). From here it spread quickly to other European countries: Switzerland, England, Holland, France (2008), Austria (2009), Belgium (2010), Croatia (2012), Hungary (2011), Slovenia (2012), etc.

In Romania it was first reported in 2011 (Szekely et al. 2011). The adult has a the wingspan of up to 40 mm, the larvae body has a length of about 40 mm and pupa is about 20 mm long. Larva is an defoliator of buxus plants.

Aims: In Cluj area, in 2016, *Cydalima perspectalis* attacked buxus plants extremely strong, in some areas the attack degree being 100%; it has reported the drying out of the plants. This year was started monitoring actions of specie, studying the biological cycle and pest control methods.

Materials and Methods: The observations on the biology of the species have been made both in laboratory conditions (the larvae were monitored in growth cage), and in the field.

Results: The biological material collected in the field was taken in the laboratory in cages growth. The first pupas were observed since 16 May and after 11 days were reported first adult (on 27 May). In growth cages, from the adults obtained from biological material collected, 68% presented specific color (white wings with brown edges), and 32% had brown wings. In field condition adults occurred in June 10th. The larvae of the first generation have been reported since June 25th.

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A SHORT REVIEW ABOUT USING MICRORESP METHOD FOR THE ASSESSMENT OF COMMUNITY LEVEL PHYSIOLOGICAL PROFILE IN AGRICULTURAL SOILS

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Keywords: *community level physiological profile, MicroResp, soil, functional diversity.*

Introduction: MicroResp is a colorimetric method developed by Campbell et al (2003), used for assessing the physiological profile of the microbial community. This method is important because uses the whole-soil to assess the microbial catabolic activity and in this way eliminate the discrimination of slower growing microorganisms while using the deep well microplates system. However, MicroResp also can be used to assess soil health, pollution induces community tolerance, also for toxicity testing, pesticide degradation profiles, bioremediation evaluation and water ecology and toxicity.

Aims: The aim of the present review is to assess the results of reviewed papers and the importance and efficiency of the MicroResp method in determining the physiological profile of the microbial community, its advantages and also its limitations. We focused on agricultural soil in order to deepen our understanding about changes of microbial community induced by agricultural practices.

Materials and Methods: To achieve this goal, academic literature was analyzed using Google Scholar. There were set a total of six keywords, used to make a search algorithm, achieving five search terms. For each search, the first four articles of interest were chosen to be reviewed.

Results: Following the searches for each of the search terms, between 72 and 210 articles were found, 20 of them being chosen for final evaluation. The articles that did not contain MicroResp as work method for the evaluation of the microbial community physiological profile were excluded.

Conclusion: Following the undertaken research, it can be stated that MicroResp method is an important tool to the physiological profiling of the microbial community, featuring a series of advantages that place it ahead of other competing methods.

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Acknowledgement: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-2490

ECOLOGICAL AND AGRONOMICAL VALUE OF *FESTUCA RUPICOLA-BOTHRIOCHLOA ISCHAEMUM* GRASSLANDS

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Keywords: biodiversity, Cluj County, *Festuca rupicola-Bothriochloa ischaemum*, Hill area

Introduction: Traditional upland livestock grazing is declining worldwide, leading to concerns about possible impacts on biodiversity (Pollock *et al.*, 2013). In Romania most of semi-natural grassland are used as grazing pastures. The problem they will face is the growing number of small animals that grazed the grasslands, resulting in slowly abandoned grasslands.

Aims: The purpose of this research is to assess the state of the biodiversity and pastoral value for *Festuca rupicola- Bothriochloa ischaemum* grasslands from the hill area.

Materials and Methods: We analyzed the floristic composition and a series of ecological indexes, respectively humidity, soil reaction, temperature and nitrogen on a *Festuca rupicola-Bothriochloa ischaemum* grassland from the hill area. Other aspects taken in account were the agronomical and anthropogenic specters. The analyzed grasslands are placed in the perimeter of the localities: Gilău, Aiton. Jucu and Frata, all from Cluj County.

Results: *Festuca rupicola-Bothriochloa ischaemum* appears on downhill, dry land with a neutral reaction and poor trophicity. Maintenance work is hardly and seldom implemented, the proof being the presence of molehills and woody vegetation. Agronomic value of the pasture of *Festuca rupicola- Bothriochloa ischaemum* is medium, being predominant by ballast species with reduced grazing capacity. Grasslands are used in a semi-extensive system, plants being trampled frequently in grazing period.

Conclusion: We recommend a management pastoral developing plan which should contain adequate maintenance and a system of sustainable use.

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HERBICIDAL STRATEGIES POST-EMERGENCE IN MAIZE (*ZEAMAYS*) CULTURE

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Keywords: *control, statistics, weed, irradiation*

Introduction: The appropriate management of the maize (*Zea mays*) culture involves the preoccupation for the suitable weed managing practices. A critical moment in development of the culture is the post-emergence phase. For this reason, the herbicidation strategies must be elaborated in such a manner that would contribute to healthy quantitative crops.

Aims: Testing post-emergence herbicidation strategies in maize (*Zea mays*) culture, in order to establish best practices, was the aim of our study.

Materials and Methods: The experimental field was located in Turda, the County of Cluj, at the RDAS Turda. Several plots were organized, in order to test the post-emergence herbicidation strategies, in parallel with a control plot where herbicidation was not practiced. The number of weeds, by each species, and by each post-emergence herbicidal treatment were recorded. Data were statistically processed with IBM SPSS for windows package.

Results: Our study emphasizes that post-emergence herbicidal treatments led to differentiated results, function of the herbicidation solution used, but in all cases the incidence of weeds are lower, compared to the control plot, where herbicidation was not applied.

Conclusion: The development of our study emphasizes the importance of practicing the herbicidal treatment in post-emergent phase of maize (*Zea mays*) development.

EPIGENOUS ENTOMOFAUNA COLLECTED BY BARBER TRAPS OF LEGUME FORAGE CROPS, IN THE AREA RACIU, MURES IN 2015

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Keywords: *pests, Barber traps, Medicago sativa, Trifolium pretense.*

Introduction: Perennial forages are widespread in temperate and boreal areas, where much of the agriculture is based on livestock production. Due to the symbiosis with N₂-fixing rhizobia, perennial forage legumes have great potential to increase sustainability in such grassland farming systems (Carlsson and Huss-Danell, 2003). The insect pests and viral diseases have significant negative impacts on the yield and persistence of forage legumes, and often it is difficult to develop resistant germplasm using traditional plant breeding approaches (Voisey *et al.*, 2001).

Materials and Methods: For monitoring we use Barber traps that were placed in alfalfa and clover crops. For barber traps we use mixture of water, antifreeze and sugar. Traps assessment was conducted at an interval of 2 weeks.

Results: During monitoring period with Barber traps were collected a total of 1205 of which 356 in May 14; 387 in June 21 and 462 in July 14. In the monitoring period, the largest number of specimens, a figure that exceeded 50% was the order Coleoptera, family Silphidae; the dominant species being represented by *Silpha carinata* Herbst representing approximately 57% of total beetles captured. Also a large number of specimens were collected of the genus Carabus (*Carabus ulrichii* Germar, *Carabus coriaceus* L. *Carabus violaceus* L.), most specimens being signaled in July. Genus Harpalus (*Harpalus distinguendus* Duft., *Harpalus calceatus* Duft., *Harpalus tardus*) was represented in a low percentage. Species with the best representation has proven to be *Odontothrips confusus* Priesn. with a total of 528 of specimens which represents 44% of the total captures. Other species that have been identified were: *Agriotes spp.* and *Gyllus campestris* L.

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THE INFLUENCE OF CLIMATIC CONDITIONS CHANGES ON GRAIN YIELD IN WINTER TRITICALE (*X TRITICOSECALE* WITTM.)

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Keywords: *climatic conditions, winter triticales, grain yield*

Introduction: Triticale (*Triticosecale* Wittmack) is known as a plant with a large adaptability to climatic conditions, capable to produce high level of yield, even in poor conditions. Growth and development of triticales plants can be substantially influenced by the parameters climatic conditions, especially drought and temperature. Those are considered as key stress factors with high potential impact on crop grain yield.

Aims: to investigate the effect of long or short periods of high variable temperature and also rainfall level in relation with final grain yield, and their combination at different growth stages of plants. Research was carried out during 2011-2015 at Agricultural Research and Development Station from Turda.

Materials and Methods: the biological material was composed from a group of Romanian winter triticales variety and perspective lines. The experimental results were processed based on regression equation between rains or temperature and grain yield, in a different growth stages of plants.

Results: Deficiency or lack of rainfall during the critical periods of growth and development stages of the plants have a major impact especially when those coincide with the occurrence of the second internode of plant, plant anthesis or grain filling period.

The effect of high temperature during early stage of growth and incipient development of spike influences negative the final grain yield level. Also high temperature from plant anthesis and post-anthesis stages had a negative influence to physiologic plant process affecting grain yield.

Conclusion: the influence of climatic conditions upon winter triticales variety revealed the effects of the thermal and precipitation in a different stages of the growing season of plants. Rainfalls from April and May had a high influence on final grain yield especially when they are associated with a normal rate of temperature for this period.

WATER PROTECTION AGAINST PHYTOSANITARY TREATMENTS MECHANIZED PRACTICES – TOPPS PROGRAMME

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Keywords: *Ardeleanca variety, germination, stem, root*

Introduction: Our days, one of the most challenging aspect of both economy and daily life practices is water quality. But if we speak in agricultural terms, an interesting aspect concerns keeping water quality, at high standards, during and after practicing mechanized phytosanitary treatments.

Aims: Proposing solutions for best practices concerning water protection against phytosanitary treatments performed with mechanized tools and means.

Materials and Methods: Our research was performed in a vegetal farm, where phytosanitary treatments are performed with mechanized tools. TOPPS programme foresees and principles are applied, in order to maintain water quality in allowed quality parameters.

Results: The results of our study demonstrate the importance of applying best practices in phytosanitary treatments performed with means and tools, which make use of mechanized infrastructure, in order to supply an appropriate frame for water quality. Water quality protection, when phytosanitary treatments are mechanized, is a limitation condition in farming good practices that must be taken into consideration.

Conclusion: The study we performed, underlines, once again, the importance of maintaining water resources in best parameters in terms of both, quality and quantity. This need is obvious because agricultural practices, including mechanized phytosanitary treatments, have to be developed in such a manner, which must keep water sustainable resource for future.

MINERAL FERTILIZATION WITH UAN ON NATURAL GRASSLAND *FESTUCA RUBRA L. WITH AGROSTIS CAPILLARIS L.*

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Keywords: *Festuca rubra* and *Agrostis capillaris*, liquid fertilizer, natural grassland, productivity

Introduction: An important part of efficient livestock production is ensuring the sufficient grass for hay and pasture. However, low soil nutrient levels often limit forage production. With good fertilizer management and soil fertility, the productivity of many hay and pasture fields can be greatly improved. Through good fertilizer management, the productivity of many hay and pasture fields can be significantly improved by Ross H. McKenzie (2005).

Aims: The aim of this paper was the effect of fertilization with liquid fertilizer (UAN) on harvest of dry and floristic composition changing on natural grassland.

Materials and Methods: The experiment whose results we present, was placed in 2014 in the place in Baisoara Mountain village, Cluj county, at the altitude of 1240 m. Experience has been placed on the *Festuca rubra* and *Agrostis capillaris* - of grassland type. The experience was placed after experimental technique method.

Results: The natural meadow of *Festuca rubra* with *Agrostis capillaris* responded very well to mineral fertilizers with liquid fertilizer UAN.

Conclusion: The floristic composition of natural grassland fertilized with liquid fertilizers based on nitrogen, it can be seen an increase the graminee families and an evidence downward trend from fabaceae families. After a relatively short period of experiment (2 years), it may be advisable to use liquid nitrogen based fertilizers because it is effective in natural grasslands in the mountain they improve yields.

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THE EFFECTS OF PHOSPHATE SOLUBILIZING RHIZOBACTERIA ON SOYBEAN (*GLYCINE MAX. L.*) PLANTS GROWN UNDER INSOLUBLE PHOSPHATE FERTILIZATION

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Key words: *Glycine max.*, growth, insoluble phosphate, PGPR

Introduction: Natural rock phosphates and other phosphorus (P) amendments have been recognized as valuable alternatives to P fertilizers, but nutrient efficiency of these sources is very poor. The assimilation of fixed soil P as well as hardly soluble phosphates through the use of microorganisms is an option to augment the availability of P in easily available form by the crops.

Aims: The aim of this study was to assess the comparative efficacy of two phosphorus solubilizing rhizobacteria namely *Burkholderia cepacia* B36 and *Enterobacter radicincitans* D5/23T combined with insoluble phosphates in soybean (*Glycine max. L.*).

Materials and Methods: Inoculated plants were grown in sand culture under controlled greenhouse conditions. All the inoculated treatments showed better plant growth and nutrient uptake when compared to uninoculated control.

Results: The inoculation with *B. cepacia* performed better than with *E. radicincitans*. Phosphorus concentrations in shoots and roots did not change significantly at the early stage of plant growth. However, the bacterial inoculation had better stimulatory effect on phosphorus uptake by soybean fertilized with insoluble phosphates, in particular in treatment with combined application of both bacteria strains.

Conclusion: Combined use of strains *B. cepacia* and *E. radicincitans* proved to be superior to their separate application on growth and phosphorus nutrition of soybean plants.

DYNAMICS OF MICROBIAL FUNCTIONAL GROUPS IN RHIZOSFERE SPRING BARLEY

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Keywords: *spring barley, community level physiological profile, functional group, fertilizer.*

Introduction: Plant rhizosphere is the portion of soil which is in direct contact with the plant roots. From the microbiological point of view, this area is characterized by strong dynamic of functional groups with high specificity towards the substrate available. Spring barley is a crop with high requirements to the composition of the microflora in the rhizosphere, disturbances produced by agronomic inputs affecting the stability of rhizospheric contact interfaces and ultimately the plant growth.

Aims: Analysis of changes within the microbial community was carried out with the purpose of defining the disruptive impact of mineral inputs and potential of zeolite to reduce these disruptions.

Materials and Methods: Microbial functional groups were analyzed on the basis of the CO₂ export under the specific conditions of soil inoculation on specific substrates over a time period of incubation. Microresp detection plates allow evaluation of a large number of samples under identical conditions of inoculation and the establishment of dynamics of the entire microbial community.

Results: The dynamics of the entire microbial communities (basal respiration) is stimulated to increase in case of unilateral application of zeolite and zeolite as a buffer for urea fertilization. General growth trend of microbial communities follows proportional the associated application of zeolite with urea, the most powerful non-symbiotic nitrogen fixation processes being stimulated by this combination of fertilizers. Simultaneously, it was observed an increase in the dynamics of denitrifiers, also the decomposition of lignin and cellulose and biological crust formation due to the proliferation of cyanobacteria.

Conclusion: Rhizosphere of barley plants is characterized by the presence of actinomycetes as dominant in functional microbial community of all experimental variants analyzed with a high capacity for biological degradation and raised mineralization of organic matter.

IMPACT OF MINIMUM TILLAGE SYSTEMS ON THE SOIL PENETRATION RESISTANCE AND PEA YIELD AT ARDS TURDA

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Keywords: *tillage systems, soil penetration resistance, yield, pea, climatic conditions*

Introduction: Soil compaction increasing soil resistance to root penetration (Moraes et al., 2013) and limiting the depth and volume of soil explored by plant roots for water and nutrients (Bergamin et al., 2010), reduces infiltration capacity and aeration.

Aims: The purpose of this paper is researching the influence of the minimum tillage systems application on soil penetration resistance and pea yield.

Materials and methods: The experimental factors: factor A - the experimental years A1=2014, A2=2015; factor B – tillage system B1= conventional tillage system, B2= minimum tillage system, B3= no tillage system. The afila pea variety cultivated is Tudor.

Results: Soil penetration resistance is very significantly influenced both tillage system and the climatic conditions of the two experimental years, in the minimum systems is recorded an increase of the soil penetration resistance. The highest values of the soil penetration resistance were recorded on the depth of 30-40 cm in the conventional system and on the depth of 25-40 cm in minimum tillage systems. Between soil penetration resistance and the yield of peas, in the three tillage systems, is a direct relationship. The yield has been very significantly influenced by the climatic conditions of the 2014 when yield were higher than in 2015, but also the method of tillage, the yield obtained in minimum tillage systems being smaller than conventional tillage system.

Conclusion: Minimum tillage systems and climatic condition at ARDS Turda influenced the soil penetration resistance and the yield of peas.

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THE REACTION OF SOME MAIZE HYBRIDS, CREATED AT ARDS TURDA, TO *FUSARIUM* SPP. INFECTION

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Keywords: *fusarium*, *maize*, *mycotoxin*, *quality*

Introduction: The most important disease of maize in Romania are stalk and ear rot, which caused yield losses in average of 20%. The resistant hibrids represent one of the most efficient solution for reducing the field loses caused by *Fusarium* spp. on the maize (Nagy Elena et al., 1997) Diseases caused by *Fusarium* spp. can affect the yield and grain quality of maize because of contamination with numerous mycotoxins produced by these fungi (Elżbieta Czembor et al., 2015).

Aims: The purpose of this paper was to know more about the reaction of different maize hybrids to *Fusarium* and the evaluating the effect of stalk and ear rot on the yield ability and mycotoxins accumulation.

Materials and Methods: The experiments carried out at ARDS Turda, during four years (2012-2014). The biological material was represented by 11 hybrids, from different maturity groups, tested in two infection conditions with *Fusarium* spp. (natural and artificial infections).

Results: The temperature and rainfalls of the four years of experiments corresponding to the vegetation of maize (april-september) are influenced favourably the pathogenesis of stalk and ear rot caused by *Fusarium* spp. and a good discrimination of the resistance reaction of genotypes. *Fusarium* ear rot has significantly affected production capacity and chemical composition of corn hybrids tested. In conditions of artificial infection with *Fusarium* spp. was a decrease in the content of starch, fat and increased protein content compared with artificially inoculated variants. The quantity of fumonizin B1+B2 has reached to 16350 µg/kg in conditions of artificial infection. There are negative correlations between production capacity and degree of attack of fusarium ear rot; depending on the reacting genotypes tested increasing disease causes production decrease.

Conclusion: The response of maize hybrids to *Fusarium* infection is influenced by infection and climatic conditions. These factors affect production both in terms of quantity and quality and accumulation of mycotoxins

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ASSESSMENT OF ALLELOPATHIC POTENTIAL OF EXTRACTS FROM *COLVOVULUS ARVENSIS* ON PLANT GERMINATION AND GROWTH IN WHEAT AND MAIZE

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Keywords: *extract allelopathic, corn, wheat, bindweed*

Introduction: In Romania, corn and wheat are the main crop, occupying the largest area of arable land. Production of wheat and maize is affected by weeds, producing significant damage by not applying maintenance, wheat may record losses of 45% and maize 90%. *Convolvulus arvensis* is one of the main weed species present in maize and wheat. It is a problem weed, ranks 12th in the world being present throughout Romania, on all soil types and in all cultures. *Convolvulus arvensis* is a competitive and invasive weed, produces direct and indirect damages to which is added production of allelopathic substances.

Aim: The objective of this study is to evaluate the allelopathic effects of the extracts of bindweed on germination and plant growth of wheat and corn.

Materials and Methods: In order to accomplish the study were placed two experiences with wheat and corn, under laboratory conditions. For the preparation of extracts was used 50 g of the ground material added to 800 ml of distilled water and placed in a horizontal shaker for 24 hours, after this time period filtration was performed. The extracts used in the study were different throughout vegetative organs (roots, stem, leaves and whole plant) of *Convolvulus arvensis* and through the two concentrations: 5%, 25%, 45%, 65%. Corn and wheat seeds were placed on a layer of filter paper in a Petri dish (30 seeds/petri dish) and covered with sterilized sand, each variant was moistened with 200 ml of the extract.

Results: From the study conducted was observed that germination, shoot length and dry mass of wheat and corn plants were significantly affected by the type and concentration of the extract.

Conclusions: Inhibitory effects highest were recorded in variants treated with extracts of the root and the whole plant in conc. 65%. Extracts of bindweed stem showed inhibitory effect only at the maximum concentration.

SOWING DENSITIES INFLUENCE ON CERTAIN CHARACTERS ON SOME EARLY MAIZE INBRED LINES

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Keywords: cobs, inbred lines, sowing densities, *Zea mays*

Introduction: Because of the great advances which improving maize achieved in, it is known that how much the density of the plant increases as more their drop resistance becomes low, increase sterility, and finally grain yield is adversely affected (Brekke et al., 2011). Cobs weight is a component of production, which is directly correlated with that, therefore knowledge of the sowing densities that influenced positively this characters, is helpful in the process of maize improvement (Cristea, 2004).

Aims: Benefiting ARDS-Turda germplasm, in the 2014-2015 years there were studied eight early maize inbred lines (*Zea mays* L.), and the research aims was to establish interactions between sowing densities and certain characters, such as kernels and cobs weight and also numbers of kernels per row.

Materials and Methods: The research study was carried out on maize breeding fields, at three culture densities: first density 40,000 plants/ha, second density 60,000 plants/ha and third density 80,000 plants/ha. Method of settlement of the experience was randomized blocks, consisting of two experimental years, eight experimental variants and two repetitions.

Results: Regarding kernels weight, TC 344 and TC 385A inbred lines have been very significantly positively influenced by the 1st and 3rd densities, with an average value over 87 grams of kernels weight. In terms of cobs weight, also TC 344 and TC 385A have been positively influenced by all three densities, together with this lines was remarked TE 382 inbred line at 1st density. Regarding PI 187 inbred line, for which the cobs weight was lowest, there was very significantly negatively influenced by all studied densities.

Of the results for the number of kernels per row, were noted significantly positively influenced by the 1st and 2nd densities only for TC 385A; also here was remarked TA 470 inbred line, with very significantly negatively influence for the number of kernels per row, for all three studied densities.

Conclusion: The research environmental conditions were different, so the 2014 year has proven to be favourable to maize crop, can say that of the eight studied inbred lines at the 3 sowing densities, only two were noted: TC 344 and TC 385A for the studied characters.

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AGROBIOLOGICAL PECULIARITIES AND ECONOMICAL VALUE OF THE CULTIVAR 'Speranta' OF *GALEGA ORIENTALIS* Lam.

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Keywords: *agrobiological peculiarities, biochemical composition, biogas yield*

Introduction: *Galega orientalis* Lam. is a perennial leguminous plant native to the sub-alpine regions of the Caucasus, with pinnate (sometimes imparipinnate) oval leaves borne on stems,

0.8-1.50 m, tap-rooted and rhizomatous with overwintered rhizomes emerging in spring to initiate new shoots which eventually take root and become independent plants. Good, long-term persistence for 15 to 20 years is characteristic of this species.

Aims: The objective of this research was to evaluate the growth and development rates, biochemical composition harvested fresh mass, fodder value and biogas yield of the cultivar 'Speranta' of *Galega orientalis*.

Materials and methods: The cultivar 'Speranta' of *Galega orientalis*, which was cultivated in the Botanical Garden (Institute) of the ASM, served as object of study. Investigations on growth and development, productivity and nutritional value of fodder plants according to known methods were performed. The biogas was calculated using the gas forming potential of nutrients according to Baserga (1998) and the digestible nutrient index – according to Medvedev and Smetannikova (1981).

Results: It has been found that the 5-year-old plants of *Galega orientalis*, due to the specific climatic conditions in the spring of 2016 (high amount of rainfall and temperatures below normal), grew and developed more rapidly, starting to bloom approximately 12-17 days earlier as compared with the previous years, a fact that influenced the rate of accumulation of nutrients. The dry matter content in the harvested fresh mass changed from 12.52 %, in April, to 18.27 % in mid-May. The biochemical composition of dry matter ranges from 22.84 % to 15.51 % raw protein, 3.51-2.90 % raw fat, 31.95-43.60 % raw cellulose, 38.06-30.68 % nitrogen free extractive substances and 8.86-7.31 % minerals.

The nutritional value of 1 kg of natural forage, harvested in April, is 0.11 nutritive units and 1.13 Mj metabolizable energy, a nutritive unit contains 155.7 g digestible protein, but the forage harvested in the middle of May – 0.15 nutritive units, 1.57 Mj metabolizable energy, 123.0 g digestible protein.

The calculated capacity to produce biogas of the cultivar 'Speranta' of *Galega orientalis* can reach values of 450 l/kg organic substance, containing 54.4 % methane.

Conclusion: The cultivar 'Speranta' of *Galega orientalis* is a promising crop with multiple utility, being used as food for livestock and as raw material in biogas production.

THE ABANDONMENT OF SEMI-NATURAL GRASSLANDS FROM APUSENI MOUNTAINS

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Keywords: *grassland, study method, vegetation carpet.*

Introduction: The European Community highlights high abandoned surfaces of grasslands (Osterburg *et al.*, 2010). The abandonment of grasslands entails important changes of the vegetation carpet. Normally after a period of time the semi-natural grassland became forested land. In our country the abandonment of semi-natural grassland still persists even when subvention programme exists.

Aims: The aim of our research was to track the effect of abandonment on the vegetation carpet.

Materials and Methods: The experience was placed in Ghetari village, Garda de Sus commune, on an altitude of 1130 m and consists in 3 experimental variants (control-mowed annually; abandoned for 5 years and abandoned for 15 years).

Results: The vegetation was studied after Braun-Blanquet method modified by Păcurar and Rotar, 2014. The scientific results were modeled with PC-ORD program using the numeric analysis for classification (Cluster Analyses). The grassland abandoned for 5 years didn't showed statistically assured changes compared to the control variants. In which concerns the grassland abandoned for 15 years the results highlighted important changes in the vegetation structure translated thru the disappearance of some species from the vegetation cover.

Conclusion: Semi-natural grassland have several economical disadvantages due to their placement and we recommend their mowing at least once at 5 years.

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EVALUATION OF RESTORATION PATTERNS (*Rf*) OF MALE STERILE CYTOPLASMS (*CMS*) OF SOME EARLY MAIZE LOCAL LANDRACES FROM TRANSYLVANIA-ROMANIA

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Keywords: *cytoplasmic male sterility, fertility restoration; local landraces*

Introduction: Several sources of cytoplasmic male sterility were discovered in various parts of the world in local open-pollinated populations; these in relation to the behaviour towards the nuclear genes “*Rf*” were classified into four distinct genetic groups. In our maize breeding programs the local maize landraces show a particular interest, especially as useful sources for adapting capacities, valuable physiological (cold resistance, precocity), agronomic and quality traits.

Aims: The aim of this study is consisted in detecting the presence of dominant alleles of *Rf* genes in more than 50 local landraces provided from the germplasm collection of the Maize Breeding Laboratory, at the Agricultural Research and Development Station Turda.

Materials and Methods: 53 local landraces were crossed with different types of cytoplasmic male sterility: *cms-C*, *cms-ES*, *cms-M* and *cms-T*. Observations regarding pollen restoration reactions were scored, in 2015.

Results: The fertility restoration data clearly showed the relationship between the two representative “C” and “ES” of the group-C. 20.8% of the landraces maintained the male sterility induced by *cms-C* and 13.2% to *cms-ES*. Many genotypes were imperfectly sterile or fertile, respectively proved to be different type of restorers 79.2% to *cms-C*, 73.6% to *cms-ES*, 66.0% to *cms-T* and 58.5% *cms-M*. A special remark should be made concerning Zagra local population, which maintains all types of cytoplasmic male sterility and Răzoare population that maintains almost entirely the pollen male sterility for all studied types of cytoplasm. Câmpeni landrace fully maintains male sterility for types *cms-C* and *cms-M* and fully restores the type *cms-T*.

Conclusion: Generally, the pollen fertility restoration reactions of the local landraces were in connection with *cms*-source, *cms*-versions, of several landrace backgrounds, nuclear x cytoplasmic interaction and environmental conditions.

THE COMPARATIVE STUDY OF THE VARIOUS DISCRIMINATION INDICES OF SOME RELATED MAIZE LINES CREATED AT ARDS TURDA

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Keywords: *composite, heterosis, relationship, pedigree*

Introduction: Differentiation of maize inbreds in order to assess their degree of relationship and their classification in germoplasm groups or in heterotic groups is performed by different methods. For the primary differentiation the method of pedigree is used, which gives us information on the origin of the initial material of selection.

Aims: Assessing the degree of relationship of a set of lines created din SRR Comp. A (Comp. B) and Tu SRR Comp. B (Comp. A) and the heterosis study of the hybrids resulted from the inbred lines obtained from Tu SRR Comp. A (Comp. B) and Tu SRR Comp. B (Comp. A).

Materials and Methods: The biological material used is represented by F1 hybrids realised in some radial crossbreeding systems of type (4) p (p-1) / 2 respectively 8 inbred lines, 28 hybrids tested in 2 years and 4 repetitions. The field experiences on the hybrids were performed at ARDS Turda in the years 2013-2014, after the model of randomized blocks, in four repetitions, on a plot size of 7.0 m², at a density of 60,000 plants / ha.

Results: The calculation of heterosis for the maize cob length showed that the lower value of 17.5% was identified in the case of the crossbreeding of the lines obtained from Tu SRR Comp. A (Comp. B) x Tu SRR Comp. A (Comp. B) which demonstrated that these lines are genetically similar. The heterosis value of 146.9% for the grain weight, that was obtained in the case of F1 hybrids formed from the crossbreeding between the lines Tu SRR Comp. A (Comp. B) x Tu SRR Comp. B (Comp. A), shows that these lines belong to alternative groups genetically speaking.

Conclusion: After the heterosis calculation of the characters studied the highest value was found in the case of the crossbreeding lines obtained from Tu SRR Comp. A (Comp. B) x Tu SRR Comp. B (Comp. A) and the lowest values of heterosis derived from crossbreeding of the lines obtained from the same composite Tu SRR Comp. A (Comp. B) or Tu SRR Comp. B (Comp. A).

RESEARCH ON THE RELATIONSHIP BETWEEN THE DEGREE OF EUROPEAN CORN BORER (*OSTRINIA NUBILALIS* HBN.) ATTACK AND MAIZE FUSARIOSIS (*FUSARIUM* SPP.) AT ARDS TURDA

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Keywords: *Fusarium* spp., maize, *Ostrinia nubilalis*, treatments

Introduction: The European corn borer (*Ostrinia nubilalis* Hübn.), which is found almost universally in Europe and America, is an extremely important pest from economic point of view (Szőke et al, 2005). European corn borer larvae cause physical injuries to stalks and ears, and promote infections with *Fusarium*, by carrying the fungus spores from the plant surface to the surfaces of damaged kernels or to the interior of stalks, where infection occurs (Czembor, 2015).

Aims: On account of the fact that between *Ostrinia nubilalis* Hbn. and *Fusarium* spp. there is a strong connection, and their presence lead to lower maize production, its purposed is reducing the corn borer attack, but also the occurrence of maize fusariosis, by applying treatments to the vegetation.

Materials and Methods: The research was carried out at ARDS Turda, in the period 2014-2015 as a bifactorial experience, in which were performed two treatments on growing period, with insecticides, using the products: Avaunt 250 ml/ha (s.a. indoxacarb), Coragen 250 ml/ha (s.a. chlorantraniliprol), Proteus 400 ml/ha (s.a. tiacloprid + deltametrin), Calypso 150 ml/ha (s.a. tiacloprid) and Confidor 400 ml/ha (s.a. imidacloprid + deltametrin), and the biological material was used Turda 165 hybrid.

Results: Amid the climatic conditions in the two experimental years (2014-2015), regarding the frequency attack of the *Ostrinia nubilalis*, 2015 proved to be a very favorable year for this pest, and by applying treatments to the vegetation, *Ostrinia nubilalis* Hbn. and *Fusarium* spp. attack has been reduced very significant.

Conclusion: In order to combat the european corn borer (*Ostrinia nubilalis* Hbn.) chemically, are recommended products based on: chlorantraniliprol and tiacloprid+deltametrin.

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CHANGES OF THE MICROBIAL COMMUNITY IN CORN SOIL DUE TO THE SYNERGISM ZEOLITE-MINERAL FERTILIZERS

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Keywords: *microbial communities, fertilizer, zeolite, corn.*

Introduction: Microbial communities in agricultural ecosystems are characterized by a strong dynamic and radical change due to technological inputs applied. Corn is a plant cultivated on large areas with high requirements for nutrients and an increased potential for activation of specific microbial groups.

Aims: The aim of this study was to assess the unilateral and synergic effect of zeolite and mineral fertilizers on the development and transformation of microbial functional groups in the rhizosphere of corn.

Materials and Methods: Physiological profile assessment of microbial communities has been carried out on the basis of substrate induced respiration, monitored over a period of 6 hours of incubation. The amount of CO₂ registered in plates Microresp represent the activity of functional groups in decomposition of each type of substrate applied.

Results: Characteristic groups of microorganisms in maize rhizosphere are capable of decomposing acids: citric, L-malic, oxalic and α -Ketoglutaric. These substrates indicate the presence of high concentrations of organic matter in soil and the existence of a biological crust on the surface (citric acid), respectively the existence of powerful processes for the decomposition of organic material by actinomycetes (α -KetoGlutaric acid). The highest increases of microbial activity were observed in groups of bacteria involved in processes of plant growth promotion and microbial groups with an important role in the processes of denitrification (oxalic acid). For the application of urea is observed a triple value of activity of this type of microflora

Conclusion: Functional groups codominant in soils cultivated with corn are specialized for the efficient degradation of organic matter and biological crust, zeolite providing the complex substrate necessary for the development of these microorganisms.

KARIOLOGIC STUDY ON THE SPECIES OF PLANTS ON THE SOUTH-WESTERN GUTAI MOUNTAINS PASTURE

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Keywords: *cariology, diploid index, polyploidy*

Introduction: The genetic structure of phytocoenosis will consider only the karyology issues. The presence of polyploids in various phytocenosis can reveal a number of phytogeographic regularities: this frequency has been found in a direct correlation with the age and conservative character of the studied vegetal associations (Boșcaiu, 1971, Cristea *et al.*, 2004).

Aims: The karyology issues (frequency of diploid and polyploid species) of phytocenosis which are characteristic to mountainous pasture in the south-western region of the Gutai Mountains as well as the diploid rate calculation will be followed in this study.

Materials and Methods: The phytosociological study was conducted through the method developed by Braun-Blanquet. Karyotypes were taken for all encountered vegetal species to achieve an accurate cytoaxonomic analysis. The diploid index, developed by Pignatelli S. (1960), was calculated.

Results: The frequency of polyploid species was found in the five vegetal associations that were identified and studied in karyology terms. The number of polyploids, comprised between 42.8 - 62.5%, is ahead of the diploids number comprised between 9.52 - 35.29%, in the vegetal associations phytocoenosis of the mountainous region. Diplo-polyploid plants and those with an unknown karyotype have lower participation. The calculated value of the diploid index decreases with the increasing of the altitude, with subunit values between 0.16 - 0.75.

Conclusion: The genetic structure of the phytocoenosis and vegetal associations studied seen from the perspective of karyotypes, indicates a drop in the dioloid index value with the increasing of the anthro- zoogen factor (excessive grazing).

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SECTION 2: ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

ROAD BORDER EFFECT ON THE UNDERSTORY OF THE LAUREL FOREST OF ANAGA RURAL PARK, TENERIFE (CANARY ISLANDS)

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Keywords: *understory composition, Edge effect, laurel forest, gradient.*

Introduction Road density has increased in the Canary Islands' forests during the last century affecting an unknown amount of forested area.

Aim. We studied road corridor effects on vegetation in a relict laurel forest of Tenerife. We assessed edge effects on plant species richness and species composition.

Materials and Methods. We selected four sites and in each site we established three transects of 15 m length and 10 m wide, perpendicular to the road and beginning from the canopy of the last tree next to the road/trail. At 5 m intervals (starting from the edge of the road) we located a 5 x 10 m plot and in each plot we recorded all species and their individual cover. We identified all herbaceous and woody species and estimated their cover by cover classes (1: traces, 2: >1 %, 3: 1-2%, 4: 2-5%, 5: 5-10%, 6: 10-25%, 7: 25-50%, 8: 50-75%, 9: >75%).

Results. With respect species richness, road edge effects on vegetation were detectable only within the first 5 m towards the interior and not for all the transects and sites. This suggests that main corridor disturbances regarding species richness are limited to the immediate road edge in the laurel forest but also that a high variability is present in these sites. With respect species composition, we did not find discrimination of plant community in the gradient border-interior.

Conclusion. A buffer of approximately 5 m would result in the reduction of the total area of the remaining undisturbed laurel forest. Building of new paved roads should be discouraged and less well justify and necessary.

STUDY UPON THE DEVELOPMENT OF COMMON BEAN UNDER ELECTROMAGNETICAL INPUTS

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Keywords: *Ardeleanca variety, germination, stem, root*

Introduction. The nonconventional agriculture, generally speaking, and vegetal production, in particular, takes more and more interest worldwide. For this reason, lots of attempts were made, in order to use different unconventional techniques for enhancing vegetal production.

Aims. Testing the germinative capacity of *Phaseolus vulgaris* var. *Nanus*, Ardeleanca strain, and growing rhythm plantules, under microwave electromagnetic radiation stress in laboratory conditions, is the aim of our study.

Materials and Methods. The research is developed within controlled conditions of the Laboratory of Environmental and Plant Protection of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. The following parameters were studied, in conditions of application of the electromagnetic field in special devices, and without application of electromagnetic field: germinative capacity, stems growing velocity, stem length development, root length development, and vigor index. Interpretation of results was done based on statistical processing of data using STATISTICA software v 7.0.

Results. The results of our study developed in laboratory conditions emphasize the positive influence of the irradiation with electromagnetic beams upon all analyzed parameters. The biggest influence of the irradiation may be reported on germinative capacity, stem length, and vigor index, while in root development the influence is smaller. These results are confirmed by the differences between aimed parameters (germinative capacity, stem length and vigor index) in and without the influence of irradiation which are statistically significant ($p < 0.5$), while the differences between root lengths developed in electromagnetic field even they are bigger than those developed in absence of irradiation, they are not statistically assured at 5% threshold.

Conclusion. Our trial emphasizes the positive influence of the electromagnetic field upon common bean germination and plantules development, and because of this reason, we recommend the use of this technology in the aim of enhancing the yields of this vegetal culture.

THE BEHAVIOR OF SOME POTATO MID-TARDY VARIETIS WHEN TREATMENTS WITH SOME UNCONVENTIONAL PRODUCTS ARE PERFORMED (2013-2014)

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Keywords: *mid-tardy potato varieties, unconventional products*

Introduction. Potato is a plant which has particular importance for human food, feeding of animals and for industrial processing. Among major goals of ensuring food of humanity is located and potato which it had and continues to have a large role in the increase in supply resources in many geographical areas of the world. Considered rightfully "a second loaf" of the world, potato is one of the most approved foods. At present, because demographic explosion, potato, along with a few other plants, represents a hope for to accommodate the needs of the mankind, being in competition with the most important foods: cereals, meat, fruit.

Aims. The work of front proposes identification and quantification of behavioral aspects of mid- tardy potato varieties in terms of production and the implementation of unconventional treatments.

Materials and Methods. For the achievement of the objectives a polyfactorial trial was organized, with type 2 x 6 x 6, in 3 repetitions, to identify mid-tardy behavior potato varieties in terms of production, the application of treatments with unconventional products, where the Factor A - the experimental years 2013, respectively 2014; the Factor B – mid-tardy potato varieties: Productiv, Rozal, Redsec, Laura, Armonia and Sante; the Factor C - the unconventional products: Bordeaux mixture, Bionat, Biostar, Glutaxim, Terra Sorb Foliar, Maxiroot.

Results. The results obtained after the interpretation of data using Duncan test, reveals that the mid-tardy varieties taken in the study have behaved differently in the two experimental years. Although some varieties have not reacted to these products, most effective product appears to be Biostar, which led to yield increases in all mid-tardy varieties studied. Some varieties respond very well to the application of these unconventional products, like Sante and Laura, others just some of the products (Redsec and Rozal).

Conclusion. These elements can be explained by the fact that certain unconventional occur at different metabolic assimilation of varieties, or presence of certain trace elements in their composition does not fully satisfy the physiological processes of assimilation. From the point of view of the group of which the varieties taken in the study are a part, the application of uncoventional treatments seem to have a positive influence on production potential of these varieties.

RESEARCH UPON PINE DRYING PHENOMENA AND CLIMATE CONDITIONS FROM MUREŞ AREA

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Keywords: *hierarchy, pests, pathogens, forest*

Introduction. The problem of the health of the pine forests is of great interest in our country and worldwide. Lots of problems must be faced by all those involved in pine tree forests management, beginning with maintenance and finishing with fight against mites and pathogens.

Aims. The aim of this paper is to study the phenomenon of pine tree drying within the complex context of climatic changes. The problem of the climatic changes is a sensible one which is supposed to affect lots of aspects regarding forest management.

Materials and Methods. Our research is developed within conditions of a pine tree forest located in the County of Mureş, within the Forestry Office Târgu Mureş. The following parameters were monitored: the climatic factors (air temperature, air humidity, precipitation regimen, wind velocity, dew point), occurrence, duration and type of the extreme phenomena, drying status of pine trees, in dynamics, pests and pathogens attack degrees. A database was compiled with data collected from the experimental field and processed using IBM SPSS for windows.

Results. Our research demonstrates the importance of the monitoring phenomenon in establishing the health status of the pine trees in the studied experimental field. According to our findings the pest and pathogens attacks are responsible for the most important share of drying phenomenon, in amount of 65%, while extreme climatic phenomena, as drought, storms, rains and snow, have only local importance, being responsible just for 35% of the drying phenomena in pine tree forest located in the experimental field.

Conclusion. The process of scientific monitoring the factors affecting the phenomenon of pine trees drying has great advantages, because it led us to correct assessment of the hierarchy of these factors, from the point of view of their importance.

RESEARCH CONCERNING THE IMPROVEMENT OF OAK FOREST PHYTOSANITARY PROTECTION

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Keywords: *Ipidae, monitoring, powdery mildew, strategy*

Introduction. During the last decades, the problem of phytosanitary protection of the forest tree species have been receiving more and more attention. The reason may be put on two important factors, which, as literature demonstrates, are tightly interconnected. These factors are the pests and pathogens attack against tree species, and climatic conditions, which are characteristic for their environment.

Aims. The aim of the present paper is to emphasize the ways and means destined to improve the phytosanitary protection of the oak trees.

Materials and Methods. The research has been developed within and oak tree forest managed by the Forestry Office Târgu Mureș. The pests and pathogens characteristic for the oak forest were monitored, under two aspects, the intensity of their attack and frequency of the attack. The collected data were processed using STATISTICA software v 7.0, for windows.

Results. Our study demonstrates that in selected location, the most important mites attack against oak trees was performed by individuals belonging to *Ipidae* family (40%), while concerning pathogens attacks, the most encountered were those performed by the agents producing powdery mildew (75%). The process of monitoring these aspects is an essential one in establishing strategies for better fight against these undesirable inputs.

Conclusion. The process of monitoring the attacks of the mites and pathogens against the oak trees, in climatic conditions specific to a certain site, allows us to establish the most important threats against targeted tree species, and in this way, to develop appropriate phytosanitary strategies meant to better protect the health status of the oak forests.

DETERMINATION OF BIOFILM PRODUCTION IN ANIMALS ORIGINATED PSEUDOMONAS AERUGINOSA STRAINS

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Keywords: animal strains, biofilm, Congo Red Agar, *Pseudomonas aeruginosa*.

Introduction: Biofilm are defined as microbial derived sessile communities characterized by the cells that are irreversibly attached to a substratum or to each other, are densely packed multicellular communities of microorganisms attached to a surface or interface.

Aims: testing of *Pseudomonas aeruginosa* MDR strains able to producing biofilm and checking the correlation between the production of biofilm and resistance profile.

Materials and Methods: Biofilm detection was tested by Congo Red Agar method (CRA). These method is rapid, sensitive and reproducible, this method is suitable for detection of biofilm formation in the present study. For the detection of biofilm formation method, total 56 clinical isolates of *Pseudomonas aeruginosa* were used. Clinical isolates were identified as per standard microbiological procedure. Antibiotic susceptibility test of biofilm producing bacteria was performed by using the Kirby-Bauer disc diffusion technique.

Results: Out of 56 isolates, CRA method detected 17 (30,35%) as high biofilm producer, and 39 (69,65 %) biofilm non-producer. Antibioresistance an ever growing panel of antibiotics is not strictly influenced by the *Pseudomonas aeruginosa* bacterium property to produce biofilm.

Conclusion: According to the antibiotic susceptibility test, higher antibiotic resistance was observed in biofilm producing bacteria than non-biofilm producers and biofilm-producing *Pseudomonas* strains have been isolated from a chronic infection, as a consequence of inadequate treatment. For our samples, statistical assays have shown that there are no significant differences between the resistance profiles of *Pseudomonas aeruginosa* strains biofilm producers and non-producing biofilm

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CONSIDERATIONS CONCERNING THE PHYTOSANITARY REGULATIONS AND THEIR IMPACT ON PINE TREES HEALTH STATUS

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Keywords: *law, management, practice, solutions*

Introduction. Ourdays, when internationalization occupies more and more place worldwide, the legislation is a very important factor affecting all domains worldwide. The alignment of forestry legislation to this line is a reality in European Union. In this context, Romania, as part of EU, must accomplish all regulations concerning forest management.

Aims. The aim of this study is to emphasize the impact of the current phytosanitary regulation on the pine tree forest health status.

Materials and Methods. The research has been developed in a pine tree forest located within the County of Mureş, under the managerial responsibility of the Forestry Office of Târgu Mureş. The occurrence of pathogen and mites threats against pine trees was recorded, and attack degrees calculated. The on line data basis and national, international, and EU regulations portfolios were studied, in order to adopt the more suitable solutions in order to supply a satisfactory health status for the pine trees.

Results. The research shows the importance of applying the phytosanitary regulations in the phytosanitary management of the pine tree forests, and involved the study of a large diversity of mites and pathogens within the complex forest ecosystem. Our study, also aimed the study of the phytosanitary management under appropriate practices corresponding to current phytosanitary appropriate practices.

Conclusion. Our scientific analysis of the impact of implementation of the national phytosanitary regulations aligned to EU regulations applying upon the phytosanitary management shows the positive effects upon pine trees health status.

STUDIES CONCERNING THE IMPACT OF PATHOGENS AGAINST VINEYARDS

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Keywords: *management, phytosanitary treatment, climatic conditions*

Introduction. One of the most valuable and profitable agricultural business is the vineyard cultivation. In this respect, is important to know that, in order to obtain best productions and profit, for both grapes and wine production, besides cultivation of the appropriate varieties and location of the cultures, the phytosanitary protection is one of the most limitative condition.

Aims. Our research aimed to identify the action of the pathogens against vineyards in specific climatic conditions, and assess their attack degrees.

Materials and Methods. The experimental field is located within a private vineyard, in Blaj, the County of Alba. The presence of the vineyard pathogens was recorded together with the attack frequency and attack intensity. Taking into account the intensity and frequency of the pathogens attack the attack degree was calculated, and data were statistically processed using the programme STATISTICA v.8.0, for windows.

Results. The results of our research demonstrates that big attack degrees were identified in the vineyard. At least three important pathogens are identified, and in this respect taking into account the available products, treatments are performed and the results are compared, in order to assess the best phytosanitary practices against the targeted organisms. The trial allows us not only to identify the impact of the pathogens against the vineyard, but also to deliver solutions to fight against them.

Conclusion. Our research is of interest mainly for the region where the studied vineyard is located, because allowed us to identify the impact of identified pathogens against a certain vineyard strain, in specific climatic and cultural conditions.

PHENOLIC COMPOUNDS AND ANTIOXIDANT CAPACITY OF APRICOT (*PRUNUS ARMENIACA* L.) POMACE FERMENTED BY FILAMENTOUS FUNGAL STRAINS IN SOLID STATE SYSTEM

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Keywords: *Apricot pomace, Filamentous fungi, Solid- state fermentation*

Introduction: The use of agricultural and food by-products is an economical solution to industrial biotechnology. The apricot pomaces are abounding by-products from juice industry which can be used as substrates in solid state fermentation process (SSF), thus allowing a liberation and increase the content of various biomolecules with high added value.

Aims: The aim of this study was to evaluate the changes in phenolic compositions and antioxidant activity through the SSF of apricot pomaces with *Aspergillus niger* and *Rhizopus oligosporus*.

Materials and Methods: The fermentation mediums were inoculated with spore suspension of *A. niger* and *R. oligosporus*. Extraction of phenolics (from 1g of samples of the fermented media) was made with an extraction mixture (HCl/CH₃OH/H₂O=1:80:19) for 30 min. The extracts were used for determination of total (Folin –Ciocalteu method) and individual phenolics (HPLC-DAD-ESIMS), total flavonoids (aluminium chloride colorimetric method) and antioxidant activities (DPPH).

Results: The results showed that the levels of total phenolics increased by over 70% for SSF with *R. oligosporus* and by more than 30% for SSF with *A. niger*. A similar trend was observed in the amounts of total flavonoids (increases of 38%- for SSF by *R. oligosporus* and 12%- for *A. niger*). Free radical scavenging capacities of methanolic extracts were also significantly enhanced. The main phenolic compounds identified through HPLC-MS in fermented apricot press residues were chlorogenic acid, neochlorogenic acid, rutin, and quercetin 3-acetyl- glucoside.

Conclusion: The present work showed that the enrichment of apricot pomaces with phenolic compounds can be achieved by SSF using food grade fungi.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS–UEFISCDI, project number PN-II-RU-TE-2014-4-1255.

PHOMA/PHOMOPSIS INFECTION LEVEL ON SUNFLOWER, IN TERMS OF DIFFERENT FERTILIZATION

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Keywords: *attack degree, Phoma, Phomopsis, sunflower*

Introduction: Plant pathogens attack, influences the production of sunflower, but in their turn they are influenced by the fertilization. Compared to other crops, sunflower is a plant that has large needs of nutrients, very pretentious to the soil reserve with potassium, pretentious in terms of nitrogen and middle pretentious for phosphorus (1).

Aims: This paper aims to test the reaction of sunflower plants, at the attack of complex pathogen consists of *Phoma macdonaldii* and *Phomopsis helianthi* fungus, hereinafter called *Phoma/Phomopsis* complex, in the climatic conditions of the northern plains of Transylvania.

Materials and Methods: To achieve this objective in 2015 was located in the village Lozna, an experimental field, where they were tested three sunflower hybrids (HYSUN 202 CL, Mas 95 IR and PR65F50) under conditions of differentiated fertilization. Data recorded were related to the attack degree of *Phoma/Phomopsis* complex. The attack degree was determined on leaves, stems and inflorescence, using the formula $AD = (I \times F)/100$, where I - is the intensity of the attack and F - the attack frequency (2).

Results: Comparing the three hybrids tested, we can say that in terms of their resistance to attack, first is the hybrid Mas 95 IR, with a total level of attack of only 8.05%. In second place is HYSUN 202 CL with a total attack of 29.44%, and last PR65F50 hybrid in which case total degree of attack exceeded 50%. It should be noted that these data have been recorded in the experimental conditions where we not applied any chemical treatment with fungicides.

Conclusion: In the present research work, we demonstrated that additional fertilization with chemical fertilizers affect pathogens manifestation in different ways: The attack on the leaves is not influenced by fertilization; Additional fertilization with nitrogen increases the attack on the stems; Additional fertilization with complex + foliar application increases the attack on inflorescence.

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IMPACT OF A METALLURGICAL SLAG ON SOME CHEMICAL CHARACTERISTICS OF AN ACID SOIL

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Keywords: acid soil, amendment, metallurgical slag

Introduction: There are different types of slag produced in the metallurgical process; one of them, ladle slag (LF), produced in the steel-making process, is used for various applications including agriculture or reclamation the acidic lands. In Europe, 2% of steel-making slag is used in agriculture.

Aims: The present research study was initiated about of steel slag capacity to be considered as a mineral amendment in agriculture and to evaluate the impact of adding on the chemical characteristics of an acid soil. The paper presents the data obtained in the field research stage regarding the use of steel slag as a liming agent for acidic soils.

Materials and Methods: Research studies have been initiated starting with the selection of the acid soil area and the source of steel slag. The experiments were carried out in an agricultural area situated in the East side of Bucharest, Romania. Treatment (0 t/ha, 1 t/ha, 2 t/ha, 3 t/ha, 5 t/ha steel slag) has been applied to testing and observing changes at soil reaction and some other chemical properties at two depths (0 -20 cm, 20 – 40 cm).

Results: The soil belongs of the silt loam medium texture class according to Soil Taxonomy Romanian System (STRS). It is in an early debasification process (nonsaturated base cations), with a Base Cation Saturation Ratio (% from Cation Exchange Capacity) under the normal range, but with high Hydrolytic Acidity value (6.67 me/100 g soil at 0-20 cm depth) and a medium acid soil reaction (pH=5.55).

Conclusion: Source of steel slag is a steel refinery from Romania. Some chemical characteristics of steel slag are also presented. Steel slag has an alkaline reaction and high content of calcium and magnesium oxides. After the treatment, pH values increased for all rates compared with control for the two depths. The cation exchange properties have been statistical favorable influenced. Calcium and magnesium exchangeable contents increased starting with 1 t/ha steel slag (V₂) for the two depths (0- 20 cm, 20-40 cm).

ROMANIAN INTERNATIONAL MEAT TRADE – POST-ACCESSION EVOLUTIONS AND TRENDS

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Keywords: *extra- and intra-EU trade, meat, Romania*

Introduction. The reforms after 1990 induced severe disruptions in the supply chains for animal products - that included mostly state-owned large enterprises for animal husbandry and processing units. The new private sector emerged and developed slowly, and the domestic production was unable to either replace efficiently the old supply chains, or to satisfy the domestic demand. Imports increased gradually, mostly for pork and chicken, the main types of meat included in the Romanian food consumption model.

Aims. The paper is analysing the evolution of the Romanian trade in meat both with the EU and non-EU countries, in the post-accession years, as compared to the pre-accession period. The analysis is performed separately for the main types of meat (beef, pork, chicken, sheep and goat meat).

Materials and methods. Data used for the calculations were extracted from Eurostat Comext database, CN8 classification, at 2 and 4 digit levels. Romanian exports, imports, dispatches and arrivals were examined in value and quantity terms, as well as geographical orientation of the trade flows.

Results. Romania's accession to the EU and the Single Market resulted in a significant increase in the agri-food trade volume. For meat, the average total trade volume (exports + imports) in the post-accession period doubled as compared to the pre-accession period. Although in the first two years of EU membership imports increased sharply, the hit of the economic crisis in 2009 slowed down and even reversed the upward trend of the imports, while the exports increased continuously in the post-accession period until 2012. In 2013-2015, meat trade deficit increased again, through the combined effect of diminishing exports and expanding imports. Between 2010 and 2015, Romanian meat imports amounted for EUR 450-570 million yearly, of which about 81% pork and chicken, with Germany and Hungary as main suppliers.

Conclusion. In the last decade, in the Romanian agri-food trade, meat was by far the main imported product. Despite significant expansion of both exports and imports, mostly after EU accession, Romania remains a net importer for meat, and particularly for pork and chicken; but is a net exporter for sheep and goat meat.

RESEARCH UPON THE INTERACTION OF PATHOGENS WITH *SALIX VIMINALIS* CULTURES

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Keywords: *phytopathology, data base, study, mitigation*

Introduction. One of the most interesting challenges of our times is the energetic issue. In this respect, the use of some energetic cultures accommodated in our country is of increasingly interest. Besides Paulownia, one of the most interesting energetic cultures for Romanian farmers is *Salix viminalis*, due to its uses.

Aims. The aim of this paper is to emphasize the interaction of pathogens with *Salix viminalis* cultures, as result of a bibliographical study.

Materials and Methods. The methodology involved in realizing the present study was to consult data basis available on web, and also bibliographical material available in libraries. Taking into account the available data, a synthesis was made, and most important solutions concerning the interaction between pathogens and *Salix viminalis* cultures are searched.

Results. The data base developed as a result of our bibliographical study concerns the most important solutions meant to mitigate the negative effects of the pathogens of this energetic culture. The details concerning the specificity of pathogens, and also the most effective tools to fight against them (phytosanitary treatments, and cultural practices), are also presented.

Conclusion. Our research resulted in a database concerning the most important pathogens, which attack *Salix viminalis* cultures, specific for Romanian environment, and solutions for efficient fighting against them.

COMMON SOLUTIONS FOR EXTERNALITY OF ENVIRONMENTAL ECONOMICS

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Keywords: *research, study, literature, details*

Introduction. Developed as a relatively new discipline, the environmental economics is a scientific branch of high complexity. This assessment is confirmed by the multitude of the issues that may be taken into consideration when one is tempted to discuss the details concerning this border science subject that combine the economics with environmental challenges.

Aims. The aim of this paper is to emphasize particularities concerning the common solutions usually used for externality of environmental economics.

Materials and Methods. Because this research is a theoretical one, the methodology of research and materials involved concerns the specific tools for this kind of approach. Thus, the bibliographical study could be performed, by consulting the bibliographic sites dedicated to the environmental economics, but also literature concerning economics and environmental science.

Results. Our study delivered important details concerning the particularities of the concerns that are of interest for the economic issues, which are linked to environmental complex problems, and also the tools usually used for the externality of the environmental economics. These aspects are analytically presented and discussed.

Conclusion. The results of our study consist in a general picture of the tools usually used for the externality of the environmental economics, with accent of their usefulness for all those interested in this issues.

BIOREMEDIATION POTENTIAL OF NATIVE HYDROCARBONS DEGRADING BACTERIA IN CRUDE OIL POLLUTED SOIL

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Keywords: *bioremediation, crude oil, native hydrocarbons degrading bacteria, polluted soil*

Introduction. Bioremediation of crude oil contaminated soil is an effective process to clean petroleum pollutants from the environment. Crude oil bioremediation of soils is limited by the bacteria activity in degrading the spills hydrocarbons.

Aims. It is known that the main microorganisms consuming petroleum hydrocarbons are bacteria, so in this paper are presented the results obtained in a bioremediation Green House experiment. **Materials and Methods.** Native crude oil degrading bacteria were isolated from different crude oil polluted soils. The isolated bacteria belong to the genera *Pseudomonas*, *Mycobacterium*, *Arthrobacter* and *Bacillus*. A natural biodegradable product and bacterial inoculum were used for total petroleum hydrocarbon (TPH) removal from an artificial polluted soil. Soil polluted with 50000 mg/kg of TPH was treated with 0.25%, respective 0.5% natural biodegradable product and/or bacterial inoculum to increase the biodegradability rate. Also, the soil polluted with 100000 mg/kg of TPH was treated with 0.5%, respective 1% natural biodegradable product and/or bacterial inoculum.

Results. For soil polluted with 5% crude oil, the bacterial top, including those placed in the soil by inoculation was 30 days after impact, respectively 7 days after inoculum application, while in soil polluted with 10% crude oil, multiplication top of bacteria was observed in the determination made at 45 days after impact and 21 days after inoculum application, showing once again how necessary is for microorganisms habituation and adaptation to environment being a function of pollutant concentration.

Conclusion. The microorganisms inoculated showed a slight adaptability in soil polluted with 5% crude oil, but complete inhibition in the first 30 days of experiment at 10% crude oil. After the acclimatization period by 30 days, the excessive concentration of pollutants has been massive multiplication of bacteria in inoculated variants, especially in the conditioned variant with Ecosol maximum dose. The application reduces the time needed to adapt to natural biodegradable product substrate for microorganisms involved in crude oil biodegradation.

THE GENETIC DIVERSITY CONSERVATION ON BEAN (*PHASEOLUS VULGARIS* L.)

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Keywords: agrobiodiversity, bean, bioconservation, landraces, "on farm".

Introduction. In the last two decades, both on International and European level a series of treaties and laws have been devised in order to save local varieties of crop plants. The most important methods of traditional seed conservation are *on farm* and *ex situ* (Maxim *et al.*, 2010; Kontoleon *et al.*, 2009).

Aims. The identification of local Romanian varieties of bean, their morphological and agronomic description, seed production and its spreading in the purpose of genetic erosion reduction. **Materials and Methods.** There have been taken into study 13 local varieties of bean. For the morphological description descriptors have been used accordingly to the IPGRI (*International Plant Genetic Resources Institute*). For the evaluation of the diseases attack, frequency (F%), intensity (I%) and degree of attack (GA%) have been calculated. The exchanges of seed between farmers were facilitated through the online catalog edited by the Eco Ruralis Association that promotes traditional seeds.

Results. Of the 13 local varieties of bean taken into study, two are with determined growth (15.3%), and 11 are with undetermined growth (84.7%). The most significant production of pods on the plant was documented on local variety MM 1039 (2.736 kg), and the most significant production of beans on plant was documented on local variety HD 904 (1.156 kg). The most resistant varieties against bacterial attack, anthracnose, aphids and rust were: SJ 890, CJ 909, CV917 și HD 1159.

Conclusion. The growing phenomenon of genetic erosion implies the identification and the conservation of crop plants. In the year 2015, 13 local varieties of bean have been taken into study that were used for conservation in seeds' genbank and for the exchange of seeds between farmers.

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THE INTERACTIONS BETWEEN CLIMATIC CONDITIONS AND LATE BLIGHT ATTACK ON POTATO CULTURES

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Keywords: *phytosanitary practices, statistics, Phytophthora infestans Mont de Bary, research*

Introduction. Even an old issue, the problem concerning the action of late blight against potato cultures continues to be a challenge for farmers worldwide. One of the reason of this situation is determined by the importance of the influences of the climatic conditions, temperature, and humidity, manly, upon the intensity and frequency of the attack of the *Phytophthora infestans* Mont de Bary, which is the pathogen agent of the disease.

Aims. The aim of this study was to emphasize solutions for the mitigation of late blight attach function of administration of treatments appropriate to the climatic conditions *in situ*, as consequence of identification of the interaction between climatic conditions and late blight attack.

Materials and Methods. The research was developed in a potato field located in the village of Poieni, County of Cluj. Climatic parameters (air temperature, rainfall regimen, air humidity, wind velocity), frequency and intensity of late blight attack, were recorded. The IBM SPSS for windows was the programme used for statistical data processing.

Results. Our study demonstrates that the adoption of appropriate solutions of treatment applied against late blight attack against potato cultures, as consequence of an accurate analysis of the interaction between the *Phytophthora infestans* Mont de Bary attack degrees and climatic conditions, had positive effects.

Conclusion. The research developed within this trial, demonstrates the importance of identification of the particularities of the interactions between climatic conditions and late blight attack, in order to adopt pest phytosanitary practices.

USING REED AS BUILDING MATERIAL

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Keywords: *building materials, ecology, reed, traditional buildings*

Introduction. The accumulation of greenhouse gases in the atmosphere – mainly due to the burning of fossil fuel – dramatically alters the Planet's weather patterns. Even if steps are taken today, years or even decades may have to pass before they are absorbed by forests and oceans. Thus, researchers' desire to reduce pollution and costs has led them to try unconventional building materials which have similar features to the traditional ones used in civil engineering. Reed makes for one of the vastest compact surfaces in the Danube Delta, covering over 1500 km² of its total surface.

Aims. This paper constitutes a synthesis of the way in which reed can be used in the field of building materials, with a focus on improving the energy performance of buildings by using natural, eco-friendly materials.

Materials and Methods. Due to its physical characteristics, reed makes for an ideal building material, as it is both light and stable. The air inside and in between reed straws ensures remarkable thermal and acoustic insulation, thus generating high comfort. It can also be easily combined with other building materials such as lime, plaster, polyvinyl alcohol and cement. Producing these materials requires reduced energy consumption and can be done without the use of chemical components, carbon dioxide emissions or residues.

Results. Examples from countries such as Austria and Germany have shown that the use of reed in construction is not obsolete, but the opposite: it represents a future-oriented technology. In the case of the Danube Delta, using this material can be an economic and ecological boost for traditional culture in the direction of sustainable development.

Conclusion. Globally speaking, the field of ecological, energy efficient building is on the rise. The governments of many countries encourage the use of natural building materials, the main beneficiaries being public institutions themselves. In Romania, eco-friendly houses with natural thermal insulation systems are becoming more and more known and ever more specialists are interested in this type of building.

STUDY UPON UNCONVENTIONAL SOIL FERTILIZING SOLUTIONS

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Keywords: *wood ash, X-ray spectrometry, apple, nursery*

Introduction. The complex problem of soil fertilization, is a challenging one, our days. The reasons are multiple, but among the most important are those connected to soil quality, culture destination and not at least, the risk of soil pollution. These being the premises, the unconventional fertilization solutions become more and more interesting. One of the alternatives that may be taken into consideration is the use of ash resulted from wood debris burning as soil fertilizer.

Aims. The aim of this paper is to emphasize the results of the use of unconventional soil fertilizing solutions represented by ash resulted from wood debris burning, in apple nurseries.

Materials and Methods. The research was developed in a private apple nursery located in the commune Vâlcele, County of Cluj. An experimental design with two factors (fertilization, phytosanitary treatment) was organized. Conventional (NPK) and unconventional (wood ash) fertilizers and phytosanitary treatments were administered. Wood ash composition was tested previously to field administration by X-ray spectroscopy in order to avoid the risk of toxic components presence. The collected data were statistically processed using IBM SPSS for windows programme.

Results. As result of our study we can mention the advantages of using the unconventional soil fertilizer, combined with unconventional phytosanitary treatment, while conventional (NPK) fertilization gave best results when combined with conventional phytosanitary treatments. We also mention the more accentuated positive effect of administration of ash as soil fertilizer for apple seedlings in nurseries, in seedlings physiological development (stem and roots growth; vigor index), compared to its influence on phytosanitary treatments.

Conclusion. Our study emphasizes the advantages of using wood ash as soil fertilizers in apple nurseries because of its positive effects on seedling development and also on phytosanitary culture protection when organic phytosanitary treatments re applied.

CONSIDERATIONS REGARDING THE MANAGEMENT OF URBAN FORESTRY CONSIDERING THEIR ENVIRONMENTAL SERVICES

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Keywords: *heavy metals, biomonitors, Tilia cordata, Aesculus hippocastanum*

Introduction. Urban forests and parks are of greatest importance ourdays, when the spectrum of pollution is all around, in city agglomerations, mainly. There is well known the effect of large capacity of trees to deliver oxygen, as result of the photosynthesis process. In polluted urban areas, due to traffic, industrial emissions, etc., this issue is of the greatest importance.

Aims. The aim of this paper is to deliver considerations regarding the management of urban forestry, considering their environmental services.

Materials and Methods. Our study has been developed in the urban area of the Cluj – Napoca town, being located in the Central Park area, and also in two areas characterized by high traffic, Mănăştur, and Mărăşti areas, respectively. Two tree species (*Tilia cordata* and *Aesculus hippocastanum*) were selected in order to emphasize the environmental services of forest containing these trees, when pollution with heavy metals is detected. X-ray spectroscopy was used in order to quantify the heavy metals occurrence in trees' foliar tissues.

Results. Six heavy metal species were detected in the foliar tissue of the selected tree species, Si, Al, Cu, Zn, Pb, and Cd, respectively. The content in Si, Pb and Cd identified in the foliar tissues of *Tilia cordata* and *Aesculus hippocastanum* tree species, are much higher in sites located in Mănăştur, and Mărăşti areas, compared to Central Park, as expected.

Conclusion. The research performed in this study demonstrates the capacity of biomonitoring of the *Tilia cordata* and *Aesculus hippocastanum* tree species, which, in this way, may be considered as important instruments for delivering environmental services, when appropriate management is practiced, in urban areas.

THE INTERACTION BETWEEN MITES AND FOREST DEVELOPMENT

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Keywords: *monitoring, healthy trees, Ixodidae, oak tree*

Introduction. The forest development is an acute problem in Romania. Due to the deforestation phenomenon which is a reality in our country, the appropriate management of the forest must be of great concern. Besides these problems, an important issue is represented by the mites attacks occurred in forests, and their interactions with forest development.

Aims. The aim of this paper is to identify the interaction between mites and forest development, in the particular case of *Ixodidae*, *Leucaspis*, *Brachideres incannus* and *Calomicrus pinicola* attacks in an oak forest.

Materials and Methods. The research was developed in an oak tree forest within the Forestry Office Cluj from the County of Cluj. The presence of the target mites was monitored, and frequency and intensity of their attack was recorded, while the forest health status and development, was also monitored. Their attack degrees were calculated and data were statistically processed using IBM SPSS for windows programme.

Results. The monitoring of the *Ixodidae*, *Leucaspis*, *Brachideres incannus* and *Calomicrus pinicola* mites attacks in the oak forest emphasized that biggest attacks were the result of *Ixodidae* in a share of 78%, 20% due to *Leucaspis*, 1.5% to *Brachideres incannus* and 0.5% to *Calomicrus pinicola*. The interactions between the *Ixodidae* and forest development expressed by the number of healthy trees, was quantified by calculation of their correlations, which are, in average strong ($R = 0.799$). Between the other mites identified in the oak tree forest, correlations were weak.

Conclusion. The interaction between mites (*Ixodidae*, *Leucaspis*, *Brachideres incannus* and *Calomicrus pinicola*) and forest development expressed by the number of healthy trees, quantified within the present study, delivers important example of how mites interact with forest development.

THE PHYTOSANITARY PROTECTION OF TREES IN TRANSYLVANIAN FORESTS

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Keywords: *oak, monitoring, mites, pathogens*

Introduction. The phytosanitary protection of the trees in the forest is a challenging issue because the particularities of the aimed ecosystem, which is much harder to manage, compared to an agricultural culture. The difficulty of the issue is also enhanced by the climatic conditions, which are specific to a certain site, being well known the fact that phytosanitary treatments are, at great extent, dependent of temperature, rainfall, wind velocity and direction, air humidity, etc.

Aims. The aim of this paper is to emphasize solutions for phytosanitary protection of trees in Transylvanian forests, taking into account the particular case of an oak forest located in the County of Mureș - Forestry Office of Târgu Mureș.

Materials and Methods. The presence of mites and pathogens was monitored. Their attack frequency and intensity were recorded, and attack degrees calculated. The interpretation of results has been done on the basis of using the statistical package STATISTICA software v 7.0.

Results. Our study emphasizes the presence of specific mites and pathogens in oak tree forest, in climatic conditions characteristic for Transylvania region, in the same time with their attack degrees, and phytosanitary solutions selected for fighting against them.

Conclusion. Our trial emphasizes the importance of accurate quantification of mites and pathogens attack degrees in specific conditions of Transylvania, together with their correct identification, in order to formulate the most effective phytosanitary solutions for fighting against them.

THE PHYTOSANITARY REGULATIONS AND THEIR IMPACT ON FOREST HEALTH STATUS

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Keywords: *questionnaire, management, law*

Introduction. The importance of phytosanitary regulation in maintaining forest health status is of great importance, even though, at first sight it seems to be less important. This importance is due to the fact that regulations may also be a guide in application of appropriate products in efficient doses, without negative effects of tree itself or environment.

Aims. The aim of this paper is to emphasize the importance of the phytosanitary regulations and their impact on the forest health status, under the prism of forestry specialists.

Materials and Methods. Our research involved the sociological tool of questionnaire. 50 specialists in the field of forest management were asked to fill a questionnaire with 15 questions concerning issues regarding the importance of the phytosanitary regulations and their impact on the forest health status. Data were statistically processed using the programme STATISTICA v 7.0.

Results. The responses of the subjects concerning the importance of the phytosanitary regulations and their impact on the forest health status emphasize a good knowledge of the phytosanitary legislation at EU and national levels, and also of the degree of transposing of EU regulations in national laws, among the respondents, which are specialists in forest management.

Conclusion. The use of questionnaire methodology is a useful tool in assessing the degree of knowledge of the phytosanitary regulations concerning forest status, among forest management specialist, which is an important premise for improvement of the forest health status.

THE CONSERVATION MEASURES OF NATURA 2000 "SOMESUL RECE" SITE MANAGEMENT PLAN

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Keywords: *conservation measures, European network, Natura 2000 site*

Introduction: Natura 2000 is an European network of protected natural areas, including a significant number of natural habitats and community interest wild species. Natura 2000 ROSCI 0233 "Somesul Rece" site is located in the south-western part of Cluj County, within the administrative territory of Măguri-Răcățau and Ierii Valley. It has 8529 ha and it is a region of Apuseni Mountains.

Materials and Methods: The conservation measures were established using field studies and bibliographic data. According to the field studies, conservation status for each type of habitat and species was set. Knowing the conservation status (favorable, unfavorable, inadequate, bad), we could elaborate proper conservation measures for all the community interest habitats and species within the site.

Results: Three types of habitats have a favorable conservation status; four types have an inadequate conservation status and one habitat has a bad conservation status. The species of *Bombina variegata* has an inadequate conservation status, but all the big mammals and fish species have a favorable conservation status.

Conclusion: The conservation measures of Natura 2000 Somesul Rece Site, elaborated in order to protect the habitats and the species, do not interdict local human activities within the site, being little restrictive in some precise and small areas.

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RESEARCH CONCERNING THE MACROPHITE CHARGE AND WATER HEALTH STATUS

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Keywords: *biomonitor, heavy metals, data base*

Introduction. The water quality is one of the most challenging issues ourdays. This aspect became more and more important in urban places, where drinking water quality is a limitative component in supplying populations' health. In this respect the use of biomonitoring organisms in order to assess heavy metal pollution of drinking water may be a subject of interest.

Aims. The aim of this paper is to emphasize, according to a bibliographical study, the aspects connected to the macrophite charge and water health status.

Materials and Methods. The methodology used in order to perform the appropriate documentation concerning the problem of macrophites, consists in consulting websites with scientific content referring to the presented scientific issue, and also literature from scientific books.

Results. Our study allow us to put together the gathered information concerning the aspects connected to the macrophite charge and water health status, and put into practice the conception of a data base that must be an useful tool in identifying the most important macrophite species, in detecting water pollution with microelements.

Conclusion. The bibliographical research we performed, resulted in a data base concerning macrophites that can play the role of biomonitors of the drinking water in order to identify its charge in heavy metals, which may be toxic for the human organism.

CONSIDERATIONS CONCERNING THE IMPACT OF POLLUTION INPUTS AGAINST FORESTRY ECOSYSTEMS

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Keywords: *theoretical study, research, input, knowledge*

Introduction. The forestry ecosystems are very sensible to pollution agents, and for this reason, may be considered as suitable indicators of environment health status. The polluted inputs that may be of different types (gaseous, metallic, genic, etc.) have specific impacts upon the forest tree species, which are more or less emphasized.

Aims. Delivering consideration concerning the impact of different pollution inputs against forestry ecosystems, was the aim of our study.

Materials and Methods. The research we performed used specific tools destined to the theoretical study. This portfolio consists in the study of literature available in books from scientific libraries, and specialized web sites.

Results. Our study allows us to elaborate considerations concerning the effect of different pollutant inputs (gaseous, metallic, genic, etc.) on forestry ecosystems, which are specific, function of a series of particularities, as tree species in the forest or type of pollutant input.

Conclusion. The theoretical study we performed, bring an important contribution to the present know-how concerning the impact of different pollution inputs against forestry ecosystems, by bringing to date the available knowledge on the treated subject, worldwide.

AGRI-ENVIRONMENTAL INDICATORS ESTIMATED BASED ON THE PRODUCTION METHODS AT FARM LEVEL. ROMANIAN CASE

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Keywords: *agri-environmental indicators, eco-conditionality, production methods.*

Introduction. CAP introduced the concept of “eco-conditionality” as a control and sanctioning mechanism which reduces direct support in case of failure to fulfill the set of agreed environmental standards. Agri-environment measures encouraging farmers to protect, maintain and enhance the environmental quality of their farmland are adapted to particular farming systems and specific environmental conditions having many implications for soil conservation. The whole process of integration the environmental concerns into the CAP requires periodic evaluations. The 28 agri-environmental indicators (AEIs), jointly agreed internationally, are a useful tool for monitoring the application of management practices in the production methods.

Aims. The objective of the study is to outline the integration of environmental concerns into production methods based on analysis of the results of the farm structure survey and the survey on agricultural production methods carried out in Romania.

Materials and methods. Each AEI provides comprehensive information for characterizing the state or trend of a particular agro-ecological variable aimed to the sustainable management of the farm. To incorporate these indicators and reflect the cause and effect relationship between agriculture, resources, and the environment it was used the model designed by the European Environment Agency's, known as Driving Force-Pressure-State-Impact-Response (DPSIR) model.

Results. Information required for calculating the entire range of AEIs, according to DPSIR model is rather partial due to the complexity of the system for collection agri-environmental data and information, while establishing the causal relationship between agricultural policy, farming practices and environment is rather limited at this phase. Nevertheless the developed indicators allow us to identify major tendencies in production methods adopted by Romanian farmers.

Conclusions. Comparing the production methods adopted among farmers gives an accurate insight in the agricultural production methods adopted at national level and indicates where might be opportunities for improving agricultural production systems, enabling us to assess the factors that affect the sustainability of individual farms.

SECTION 3: FOOD SCIENCE AND TECHNOLOGY

GLUCOSINOLATES: FROM DAILY VEGETABLES TO THIOFUNCTIONAL CHEMISTRY

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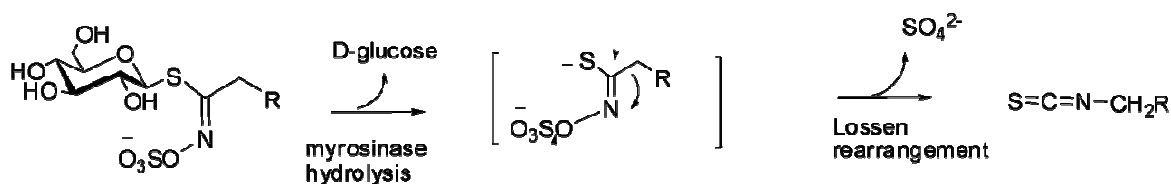
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Keywords: *Brassicales, glucosinolates, isothiocyanates, myrosinase, vegetables*

The botanical order Brassicales - which encompasses many of our daily vegetables - is strikingly chemo-characterized by the presence of thiosaccharidic secondary metabolites called glucosinolates.[1] Those atypical thioesters display a remarkable structural homogeneity over three parts: a β -D-glucopyrano unit, a *NO*-sulfated anomeric (*Z*)-thiohydroximate functional group and a rather hydrophobic side chain, the constitution of which is the sole structural variant in Nature, according to plant species.

Associated in plants with an uncommon glucohydrolase - myrosinase (E.C.3.2.1.147) - glucosinolates usually operate like precursors to biologically active isothiocyanates:



Extraction of glucosinolates from appropriate vegetable sources can prove convenient in a number of cases to obtain pure compounds [2]. Nevertheless, the chemical synthesis approach has appeared to be a more efficient way to access most of glucosinolates – either natural or artificial. Diversified synthetic approaches of glucosinolates and tailor-made analogues - mainly targeting the myrosinase inhibition process – have been developed over the last decades.[3]

In other respects, the discovery of several odd chemo-enzymatic transformations of glucosinolates have sparked off, in our laboratory, investigations on less common organic thiofunctionalities, such as cyclic thionocarbamates and thio-imidate *N*-oxides.

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THE IMPACT OF FOOD PROCESSING ON THE QUALITY OF FOOD AND HEALTH EFFECTS ON THE DIGESTIVE TRACT

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Keywords: *bioactive compounds, nutrient accessibility, thermal processing*

Introduction: Food quality, nutrient accessibility, absorption and biological activities are dependent on the formulation and processing of the raw material. We focus primarily on the impact of formulation and thermal processing and their impact for the consumer.

Material and methods: This paper is offering a brief review of different experiments both in vitro (cellular or microbiological models of the digestive track) and in vivo (rodents).

Results: Food processing, including formulation or thermal treatment is bound to have an impact on nutritional, microbiological or organoleptic properties of the final product. Some examples will be presented regarding thermal processing and its impact on nutritional and organoleptic qualities.

Food composition, whether it is the choice of chiral or geometric variants of a nutrient or its formulation into specific matrix has a great influence on bioavailability and absorption by the digestive tract. Examples are provided using astaxanthin, a carotenoid with growing interest in the field of functional foods. Similarly, mixing indifferently a number of beneficial nutrients may lead to their chelation and respective inactivation, as is the case with polyphenols and ionic nutrients such as vitamin B1.

Food processing, and the consequent modifications in the food composition or the properties of the food matrix, also has a role to play in regulation of physiological activities, mostly towards the digestive system, first organ in contact with foodstuff. The impact may be beneficial; some advanced glycation end-products (AGEs, e.g. melanoidins) have shown prebiotic activity. It may also be detrimental; early AGEs seem to have ambiguous impact on colic inflammation but different fractions of heat-treated food have shown cancer-promoting properties.

Conclusions: The different experiments have shown the importance of understanding not only the theoretical aspects of the individual bioactive compounds but also the role of the global matrix and food processing on the food composition, with the formation of new molecules and disappearance of some nutrients, and their consequences for the consumer.

BIOCONVERSION OF AGRI-FOOD RESIDUES INTO LACTIC ACID

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Keywords: *agri-food residues, fermentation, lactic acid (LA)*

Introduction: Especially for biotechnological processes, in which the carbon of various substrates should be converted into microbial products, there is an increasing interest in the use of cheap raw materials, biogenic residues and wastes.

Aims: The goal is to develop a lactic acid fermentation process based on the substitution of expensive substrates and nutrients by cheaper materials from biomass due to their main proportion of the whole costs.

Materials and Methods: Many feedstocks cannot be used normally for fermentation directly because the fermentable sugars are bound in the structure especially as cellulose and several types of hemicelluloses. A pre-treatment of agricultural residues is required when enzymes are used for hydrolysis in an enzymatic approach. The pre-treatment in form of an acidic pre-digestion or physicochemical treatment (e. g. steam explosion) ensures that the recalcitrant structure is accessible to enzymes [Ravindran/Jaiswal, 2016].

Results: The viability of the production of lactic acid from several residues has been demonstrated from laboratory up to pilot scale including the entire value chain starting from the raw material and resulting with a polymer-grade product (LA). Pre-treatment methods are energy-intensive and the selection of an efficient method is crucial for the overall economy of a biotechnological process. As a result of the achievements so far the optimization of pre-treatment, hydrolysis, fermentation, and downstream processing steps in parallel together with the screening of other LA producing bacteria have been performed [Pleissner/Venus, 2014].

Conclusion: The entire processing chain has been implemented to generate marketable lactic acid of high enantiopurity and quality. Exploitation of L(+)- and D(-) lactic acid for the production of biopolymers is one of the recent applications.

It is likely that one of the future trends in lactic acid production will end up in mixtures of different low-cost raw materials in order to avoid the use of expensive complex supplements [Koutinas et al., 2014].

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STUDIES REGARDING THE INFLUENCE OF BROWN FLAXSEED FLOUR ADDITION IN WHEAT FLOUR OF A VERY GOOD QUALITY FOR BREAD MAKING ON BREAD QUALITY

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Keywords: *bread, brown flaxseed, colour profile, crumb structure, texture*

Introduction: *Linum Usitatissimum* is an oilseed rich in fat, protein and dietary fibre. Brown flaxseed (Canadian origin) has an average fat content of 41%, protein content of 20%, total dietary fiber of 28%, moisture content of 7.7% and ash content of 3.4%. It is a good source of vitamins, lecithin, lignans, minerals and antioxidants. Due to its composition it is a functional food ingredient because it provides digestible proteins, essential amino acids, oil rich in omega-3, phenolic compounds, dietary fibers, e.g.

Aims: Taking into account the functional properties of brown flaxseed it may be used in bread in order to improve its quality. For this purpose, whole ground brown flaxseed (5%, 10%, 15% and 20% levels) were used to substitute wheat flour 650 type of a very good quality for bread making in order to evaluate bread quality.

Materials and Methods: The quality characteristics of the cool bread samples prepared were analyzed. The bread physical properties: loaf volume, porosity, elasticity were determined according to SR 91:2007. Colours of bread were analyzed by Konica Minolta CR-700 colorimeter, textural properties by using a texture analyzer, crumb cells by using a MoticSMZ-140 stereo microscope and the bread sensory characteristics with 9 point hedonic scale.

Results: Samples containing 10% of brown flaxseed were with the highest values for loaf volume, porosity and elasticity. The control sample had lower redness and greenness values. The maximum hardness was found for bread with 20% brown flaxseed addition. With the increase level of brown flaxseed addition large cells can be noticed in crumb structure of bread. Samples containing 20% of flaxseed were rated poorest in taste, texture, overall acceptability, appearance.

Conclusion: The brown flaxseed addition could be added to a typical bread formulation up to levels of 10% with a good overall acceptability offering promising healthy and nutritious alternative to consumers. Between bread flour characteristics at different brown flaxseed flour addition principal component analysis shown significant correlations ($p \leq 0.05$) between bread physical characteristics (loaf volume, porosity, elasticity) and bread overall acceptability.

Acknowledgment: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0214.

RAMAN IMAGING OF CAROTENOIDS AND ENCAPSULATED CAROTENOIDS AFTER CELLULAR UPTAKE

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Keywords: β -carotene, carotenoids, D407 cells, norbixin, Raman imaging, Raman mapping

Introduction: Raman imaging or mapping has recently become an emerging analytical technique biological and biomedical research and applications. It is a non-invasive, label free technique with high chemical specificity. Raman mapping provides chemical information coupled with spatial information. Recent advances of Raman mapping include single cell detection and imaging, medical diagnosis, including cancer detection.

Aims: The aim of the study was to use Raman mapping for imaging the intracellular distribution encapsulated and non-encapsulated carotenoids after uptake in human retinal epithelial D407 cells.

Materials and Methods: The Raman measurements were carried out using the 532 nm laser line of a Renishaw confocal Raman microscope. The polymeric microcapsules were obtained using the polyelectrolyte multilayer technique (PEM).

Results: In this study we have exposed D407 cells to the carotenoid norbixin and also to PEM capsules containing β -carotene. Basically, in Raman mapping, the sample is scanned with the desired step size, Raman spectra are recorded at every point location, and Principal Component Analysis of the recorded Raman spectra provides false color Raman maps. For control cells it is possible to distinguish cellular components such as the cell nucleus and cytoplasmic RNA, whereas for cells exposed to norbixin and PEM capsules it is possible to image the intracellular distribution of the two. We found that norbixin is concentrated in the cell cytoplasm, in a region surrounding the nucleus. The PEM capsules are distributed in the cell cytoplasm.

Conclusion: Raman mapping enables the detection of internalized carotenoids and the imaging of their intracellular distribution.

Acknowledgements: We thank the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, for funding through project number PN-II-RU-TE-2014-4-2211.

WASTEWATER TREATMENT USING MACROALGAE KELP Sp.

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Keywords: *algae, treatment, wastewater*

Introduction: Algae are used as bioindicators for water quality because they have short life cycles and they respond in a very short time to changes in the environment. Algae-whether they are micro- or macroalgae- can accumulate in their cell different amounts of substances found in water. This wastewater came from a household.

Aims: The main objective of this study was to assess the treatment capacity of macroalgae Kelp sp..

Materials and Methods: Initially, for this experiment, it was necessary to collect wastewater from a household from Budești-Finate, Bistrița-Năsăud county, Romania. The wastewater came mainly from the kitchen of a household. For every analysis in this experiment, the results were collected using Spectroquant NOVA 60 apparatus. The parameters followed were sulphates, nitrites, total hardness and ammonium ions. Methods used for this experiment are in accordance with EPA methods. In 1L of wastewater were immersed 15g, 35g and 50g of algae. For each determination were carried out 5 measurements. Kelp sp. algae that was used, was bought from a herbal pharmacy. They were sun-dried. These algae were hydrated in the collected wastewater from the household. All samples were analyzed immediately after sampling.

Results: All parameters decreased when for the treatment were used 15g of algae, but had an unexpected increase when were used 35g of algae. Therefore, it can be concluded that a larger quantity of algae is highly inefficient.

Conclusions: Macroalgae Kelp sp. used in this study has a good potential for wastewater treatment.

OVERVIEW OF ANALYTICAL TOOLS FOR WINE AUTHENTICATION: A ROMANIAN PERSPECTIVE

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Keywords: *analytical techniques, multivariate statistical methods, wine authentication*

Introduction: In an exceedingly competitive international market, the assessment of wine traceability and authenticity is a critical issue and the development of analytical methods giving reliable information about wine authenticity is highly desirable for consumers, producers and administrative authorities.

Aim: The focus of this overview is to highlight the most important developments in the field of wine authentication in terms of geographic, year and varietal origins and also identification of wine adulteration.

Materials and Methods: Wines originating from different vineyards from Romania were characterized in terms of their elemental composition, isotopic signature and organic compounds fingerprints, to highlight potential origin markers. Advanced instrumental techniques, including ICP-MS, IRMS, SNIF-NMR, NMR and HPLC methods were used for testing wine authenticity. Prediction of the wine origin was evaluated by multivariate statistical methods (ANOVA, LDA).

Results: Here we present the results obtained for the use of elemental content and stable isotope ratios ($^{13}\text{C}/^{12}\text{C}$, $^{18}\text{O}/^{16}\text{O}$ and $^2\text{H}/^1\text{H}$, $^{87}\text{Sr}/^{86}\text{Sr}$) as instruments for the discrimination of wine geographical origin and vintage year (1), while wine organic compounds fingerprints represent suitable tools to classify wines varieties and vintage year (2). Isotopic signature ($^{13}\text{C}/^{12}\text{C}$, $^{18}\text{O}/^{16}\text{O}$) coupled with chromatographic investigations (testing the addition of synthetic red dyes and sweeteners, anthocyanins profile) enable to detect the adulteration of red table wines (3).

Conclusions: Different methodologies for wine authentication based on analytical investigation and multivariate statistic interpretation of the resulted data were proposed and their application in the Romanian context are highlighted.

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DIETARY SUPPLEMENTATION WITH PLANT EXTRACTS AFFECTS PERFORMANCE OF CHICKENS INFECTED WITH *EIMERIA* spp

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Keywords: chicken, coccidiosis, plant extracts

Introduction: Chicken coccidiosis is considered as one of the most devastating diseases of poultry. Since the emergence of resistance has been rapid to all chemical anticoccidial approved drugs, it is necessary to evaluate novel substances whether they possess anticoccidial activity.

Aims: We investigated the effects of dietary supplementation with a mixture of aromatic plant extracts on performance of broiler chickens challenged with coccidian oocysts, in order to asses and compare the efficacy of the plant extract with that of lasalocid

Materials and Methods: Two hundred forty day-old Ross-308 chicks were separated into 5 groups with 3 replicates and housed in cages. Two of the groups, each challenged with *Eimeria* oocysts were given the plant product Coccihar® at two different inclusion levels of 100 and 200 mg/kg feed. One challenge group was given the anticoccidial lasalocid at 75 mg/kg feed, and the two other groups, one of which was challenged with *Eimeria*, were given a standard diet without anticoccidials. The broilers were challenged at a moderate level with $3,5 \times 10^6$ *Eimeria acervulina*, $7,0 \times 10^5$ *Eimeria maxima* and $5,0 \times 10^5$ *Eimeria tenella* oocysts at 14 days of age. Body weight, feed intake and feed conversion ratio values were weekly recorded, along with the extent of bloody diarrhoea, oocyst numbers and mortality. On 7 days post inoculation, coccidiosis lesions were scored and samples were taken for histopathology evaluation. All data were subjected to one way analysis of variance.

Results: The mixture of plant extracts improved growth performance in comparable terms to that exhibited by lasalocid against *Eimeria* spp. Oocyst shedding was reduced reduced in the groups that received the mixture of aromatic plants. The lesion score was higher in challenged control group, whereas the lasalocid and both the groups that received the plant extracts presented lower macroscopic lesions. In ileum and cecum, intestinal architecture was modestly destroyed in infected birds except for the lasalocid group.

Conclusion: This study showed that plant extracts exerted substantial improvement in growth performance and intestinal health compared to *Eimeria* infected birds.

MAJOR IONS AND TRACE ELEMENTS IN COMMONLY CONSUMED HERBAL TEAS

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Keywords: anions, cations, herbal teas, ion chromatography, metals

Introduction: Tea is the most popular beverage consumed by human society worldwide. Every year around 2.5 million tons of teas are produced and consumed around the world. The chemical composition of tea is very complex, including polyphenols, amino acids, carbohydrates, volatile organic compounds, inorganic anions and metals. Tea is also one's of the dietary sources of antioxidants such as ascorbic acid and flavonoids (Horie and Kohata 2000).

Aims: The aim of this study was evaluation of selected Polish and Romanian herbal teas for the content of inorganic anions and cations, as well as selected metals and metalloids.

Materials and Methods: Two analytical techniques: ion chromatography and microwave plasma atomic emission spectrometry were applied to determine inorganic analytes in herbal teas infusions.

Results: The content of selected alkali metals (Na, K), alkaline earth (Ca, Mg), heavy metals (Pb, Cd, Zn, Cu, Cr, Ni, Fe, Al, Co, Mn) and inorganic anions (Cl⁻, Br⁻, F⁻, NO₂⁻, NO₃⁻, SO₄²⁻, PO₄³⁻) in the several dozen infusions of herbal teas, available on Polish and Romanian market were determined. Obtained contents of sodium, potassium, magnesium and calcium have confirmed the presence in the infusions, apart from cationic forms of these metals, also other forms, which can be neutral metal complexes with inorganic and/or organic anions. The norms of daily intake specified for particular components have not been exceeded in tested infusions, nevertheless, some teas, for example, green tea with opuntia, has had alarmingly high content of aluminium.

Conclusion: Applied methods are well suited for the rapid, accurate and simultaneous analysis of inorganic ions and trace metals in tea infusions.

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THIN LAYER CHROMATOGRAPHY SEPARATION COMBINED WITH RAMAN MAPPING FOR CAROTENOID IDENTIFICATION

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Keywords: *pigments, TLC, Raman spectroscopy*

Introduction: The gold standard in food analytics is high performance liquid chromatography (HPLC) combined with a variety of detection techniques, such as UV/Vis spectroscopy or mass-spectrometry. HPLC provides high reliability, sensitivity and reproducibility, however, the method is time consuming and cost-intensive.

Aim: The aim of the study was to develop an approach using Raman mapping in order to identify the separated carotenoids, in situ, on the TLC plate.

Materials and Methods: Raman mapping is a function of Raman spectroscopy in which the laser spot travels through the investigated sample and acquires a spectrum at set intervals. The end result of Raman mapping is an image of the scanned object that has highly precise structural information. The difference between Raman spectroscopy and Raman mapping is that singular Raman spectra only provides concrete chemical information at distinct positions within the sample while Raman imaging provides chemical information coupled with spatial information.

Results: When exciting with the 532 nm laser, the resonance Raman spectrum of carotenoids is recorded, the spectra being dominated by the C-C and C=C stretching vibrations. Slight shifts, especially for the C=C stretching vibration, depending on the particular carotenoid are observed. For example, we found the beta carotene C=C stretching vibration at 1511 cm⁻¹, whereas for zeaxanthin this peak was centered at 1518 cm⁻¹. Because of the intense Raman signal, the exposure time for each measurement was below one second. Thus, Raman maps of the analyte spots were recorded in a few minutes. Upon applying a principal component analysis (PCA), we were able to discriminate between the two carotenoids, beta-carotene and zeaxanthin.

Conclusion: A facile, time- and cost-efficient approach for on-site carotenoid detection was developed by combining TLC and Raman imaging.

Acknowledgements: The financial support from UEFISCDI through grant PN-II-RU-TE-2014-4-2211, grant PN-II-RU-TE-2014-4-0944 and grant PN-II-PT-PCCA-2013-4-0743 is highly acknowledged.

POLYCYCLIC AROMATIC HYDROCARBONS IN *LACTUCA SATIVA L.*

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Keywords: chromatography, contamination, HPLC, lettuce, PAH

Introduction: *Lactuca Sativa L* (lettuce) is one of the most important leafy vegetables, being used mainly fresh but also cooked. Exposing quite a high surface area of leafs, this plant can be easily contaminated with polycyclic aromatic hydrocarbons (PAH) from environment, which can enter the food chain and can influence the consumer's health (Lee and Shim, 2007).

Aims: The major objectives of this research is to establish the degree of contamination with PAH for lettuces cultivated during 2012-2014 in three different locations (one with historical pollution, a second located in an urban area while the third one is a reference, non-polluted site).

Materials and Methods: Ultrasonic assisted extraction with hexane was used, this being followed by filtration and concentration to dryness in a rotary evaporator; the obtained residues were redissolved in acetonitrile. High performance liquid chromatography analysis was achieved using an Agilent 1100 system consisting in a solvent degasser, a quaternary pumping system, an autosampler, a column oven, a diode-array detector and a fluorescence detector, separations being accomplished with an Envirosep PP column, using a gradient with acetonitrile:water as mobile phases.

Results: The recorded concentrations for total PAH's ranged from 0.53 µg/ kg (in 2012, in Şeica Mare), to 8.00 µg/ kg (in 2012, in Cluj Napoca), the highest levels being constantly those recorded in the urban area; the maximum average individual PAH's content were those for naphthalene (3.72 µg/ kg), fluorene (1.73 µg/ kg) and indeno(1,2,3-c,d)pyrene (0.64 µg/ kg).

Conclusion: The obtained results revealed a moderate contamination of lettuce with PAH's, the main source being the pollution caused by automobiles.

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BREAD QUALITY CHARACTERISTICS AS INFLUENCED BY THE ADDITION OF TOMATO SEED FLOUR

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Keywords: bread quality, principal component analysis, texture, tomato seed flour, wheat flour

Introduction: Processing of tomatoes led to a high amount of by-products, seeds and skin that are promising sources of valuable compounds which may be used because of their nutritional and medicinal properties. Tomato seeds account approximately 60% of the total by-product and contained appreciable amounts of fiber (35.1%), protein (25%), fat (20%), mineral elements and significant proportion of the antioxidants. Quality evaluation of tomato seed protein revealed that it contains substantial amounts of digestible amino acids, especially lysine suggesting that it can be used in fortifying various low-lysine products that are deficient in this amino acid like wheat flour.

Aims: Taking into account their potential, tomato seeds by-product were studied as a potential way to incorporate them in wheat flour, in order to produce bread products with value-added of a high quality.

Materials and methods: Commercial wheat flour of a 650 type of a very good quality for bread making and tomato seed was used as materials in this study. To make bread samples, tomato seeds flour was added in wheat flour at different levels of 0, 5, 10, 15 and 20%. Bread quality was assessed on basis of results of measurement of physical parameters of bread, specific volume, porosity and elasticity according to SR 91:200; color profile analysis by Konica Minolta CR-700 colorimeter; textural parameters using a texture analyzer; crumb cells by using a MoticSMZ-140 stereo microscope and sensory characteristics with 9 point hedonic scale.

Results: The incorporation of tomato seed flour into wheat flour bread led to significant changes of physical parameters, color, texture, microstructure and of sensory characteristics of bread samples depending of level of addition.

Conclusion: The best results were obtained up to a level of 10% tomato seed flour addition in wheat flour from the point of view of all variables measured. Principal component analysis highlighted significant correlations ($p < 0.05$) between bread flour characteristics at different tomato seed flour addition, bread physical characteristics and overall acceptability.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0214.

THE CHEMICAL COMPOSITION AND BIOACTIVE COMPOUNDS OF SOME WILD EDIBLE MUSHROOMS - A REVIEW

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Keywords: *bioactive compounds, chemical composition, mushrooms*

Introduction: Over the last decades, the consumption of mushrooms has significantly increased not only due to their texture and flavour, but also due to their nutritional composition and bioactive compounds that have positive effects on human's health when ingested (Heleno, 2015).

Aims: In this paper, an overview of the chemical composition and content in bioactive compounds of various mushrooms species (*Agaricus bisporus*, *Boletus edulis*, *Cantharellus cibarius*, *Pleurotus ostreatus*, *Lactarius piperatus*) is presented.

Materials and Methods: The methods used in research studies to determine the chemical composition of the selected wild edible mushrooms include: AOAC procedures (for moisture, ash, total carbohydrates, total sugars, crude fat and crude protein, energy), spectrophotometric techniques (UV-Vis – for phenolic compounds and overall antioxidant activity), chromatographic techniques (HPLC, GC, GC-MS – for volatile compounds and fatty acids).

Results: The chemical composition of the studied wild edible mushroom species, clearly indicate that they provide key nutrients such as protein, minerals and carbohydrates. Being a good source of protein and carbohydrate, they fall between most legumes and meat and prove to be excellent foods that can be used in low caloric diets for their low contents of fat and energy. Also, they contain health-promoting constituents, namely antioxidants such as ergothioneine.

Conclusion: The results confirmed that all selected edible mushrooms can serve as a good source of bioactive compounds in human diet, having at the same time a potential use in the development of many innovative nutritional supplement formulations.

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Acknowledgements: This work was supported by CNCIS-UEFISCDI National Project PN-II-RU-TE-2014-4-0842, 52/01.10.2015

CONTRIBUTIONS TO THE KNOWLEDGE OF MICROBIOLOGICAL QUALITY OF PASTEURIZED MELANGE PRODUCED IN ROMANIA

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Keywords: *melange, microbiological indicators, quality*

Introduction: Today's consumers show an affinity for quality products produced under production conditions that strictly observes the principles of food safety. Bacterial contamination of eggs and egg products can thus be a source of disease for the human consumer with the necessary effects on the sector of activity (Board and Fuller, 1994).

The term "egg products" defines the components of the egg (separate or as a mixture-melange) released from their shell and submitted to a heat treatment, they are forming foods rich in protein, vitamins and trace elements of high quality (Chmielewski et al. 2013).

Aims: The purpose of this study was to establishing and monitoring the microbiological indicators of melange produced in our country.

Materials and Methods: The study was carried out on the pasteurized egg mix, packaged "bag-in-box" (5 units package), and stored for a period of 25 days at the temperature recommended by the manufacturer (0 ... + 4 °C). The actual analysis is to determine NTGMA, *Enterobacter spp.*, *Bacillus spp.*, *Pseudomonas spp.*, and *Salmonella spp.*

Results: Regarding developments of NTGMA in pasteurized melange stored for 25 days, our data showed an increase of 75.22% compared to the situation found on fresh product (3.656 log cfu/ml vs 6.406 log cfu/ml). The situation was similar for *Enterobacter spp.* (119.64% increase), *Bacillus spp.* (76.27% increase) and *Pseudomonas spp.* (58.72% increase). *Salmonella spp.* was not identified in the product tested by us. Existing microbial load may be caused by pasteurization plant, and exogenous factors such as packaging and storage conditions.

Conclusion: Results obtained in the study with respect to microbiological characteristics of the pasteurized melange in our country indicated differences between the values obtained from some bacterial species than others. The heat treatment of pasteurized liquid melange does not destroy completely the initial microbial load, therefore certain precautions are needed to store these foods.

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PHENOLIC PROFILE OF HONEYDEW HONEYS FROM THE NORTH-EAST PART OF ROMANIA

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Keywords: *honey, honeydew, phenolic profile*

Introduction: Phenolic compounds that can be found in bee honey are free phenols (volatile compounds), phenolic acids, polyphenols (usually in the form of flavonoids), anthocyanins, procyanidins and pigments.

Aims: The aim of this study is to determine the phenolic profile (quercetin, apigenin, myricetin, isorhamnetin, kaempferol, caffeic acid, chrysin, galangin, luteolin, *p*-coumaric acid, gallic acid and pinocembrin) of 5 samples of honeydew honeys from the North East part of Romania

Materials and Methods: The 5 honeydew honeys have been purchased from local beekeepers of Suceava county. The phenolics extraction and quantification were made up using a method described by Escriche et al. (2011) and Coneac et al. (2008).

Results: The myricetin has ranged between 0 – 0.37 mg/100 g honey, *p*-coumaric acid ranged between 0-4.35 mg/100 g honey, chrysin ranged between 0-0.16 mg/100 g honey, caffeic acid ranged between 0-1.92 mg/100 g honey, pinocembrin ranged between 0.27-4.36 mg/100 g honey, quercetin ranged between 0.10 – 2.79 mg/100 g honey, apigenin ranged between 0-1.10 mg/100 g honey, kaempferol 0 – 0.60 mg/100 g honey, isorhamnetin 0-0.12 mg/100 g honey, luteolin ranged between 0-0.11 mg/100 g honey, gallic acid ranged between 0.02-0.26 mg/100 g honey and galangin 0.02-0.49 mg/100 g honey, respectively.

Conclusion: In the present research paper it has been presented the phenolic profile of honeydew honeys from the North-East part of Romania, and we can concluded that honey is a phenolic source.

Acknowledgement

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0110

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CHEMICAL PROFILES AND ANTIOXIDANT ACTIVITY OF BLACK ELDER (*SAMBUCUS NIGRA* L.) - A REVIEW

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Keywords: *antioxidant activity, elderberry, organic acids, polyphenols, Sambucus nigra L.*

Introduction: All plant parts of elderberry (leaves, berries, inflorescences, roots, shoots, bark) have a long history of use in herbal remedy or lots of culinary uses, widespread in almost every continent of the world (Mikulic-Petkovsek et al., 2016). Pro-health properties indicated a role of elderberry products intake in the prevention of cancer and diabetes.

Aims: This paper presents an overview of the evaluation of biochemical compounds (sugars, organic acids, total phenolics, antioxidative activity, flavonoids, flavor and volatile compounds), found in flowers, berries and leaves of *Sambucus nigra* L.

Materials and Methods: Chromatographic profiling, spectrophotometric evaluation, DPPH antioxidant assay, ABTS radical scavenging activity.

Results: The variability of concentration compounds are found by uniform maturity of each phenophase of elderberry, hence the need varieties improve the quantity and quality of its yield. Elderberry has food industry properties associated with the presence of increased nutritive and decreased caloric value at fruits best correlated with the content of sugars and organic acids of flower, organic acids as a important metabolic pathway of proteins, lipids, carbohydrates. Several studies have confirmed that *Sambucus nigra* L. is a valuable raw material with many nutrients and bioactive substances, being extraordinarily rich in antioxidants, and the leaves are remarked as easily available source of antioxidant preparations in different domains (food products, pharmaceuticals, or cosmetics).

Conclusion: A bush of *Sambucus nigra* L. in the garden is our true handy pharmacy, a food market like as functional ingredient, a spot of color with unmistakable smell.

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STABILITY OF CAROTENOIDS IN DRIED APRICOTS (*PRUNUS ARMENIACA* L.) DURING STORAGE

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Keywords: *apricots, carotenoids, HPLC, stability*

Introduction: Apricots are well known for the high content of bioactive compounds such as carotenoids, polyphenols, vitamins and minerals. Several studies have pointed out the chemical composition or the biological effects of apricots, but limited information are available regarding the stability of active compounds during storage or processing (Kurtz *et al.*, 2008; Erdogan-Orhan and Karta, 2011).

Aims: Considering that apricots are widely consumed in both fresh and processed form, the aim was to determine the stability of major carotenoids in commercial dried apricots during storage.

Materials and Methods: Carotenoids were extracted monthly from dried apricots kept in a dark environment, at room temperature, for twelve months. Total carotenoids were determined using the spectrophotometric method while the most relevant carotenoids were analyzed by high-performance liquid chromatography with photodiode array detection (HPLC-PDA) on a C30 column and using a gradient elution system.

Results: Initial carotenoid content of dried fruits was 6.72 mg/100g, after six months it decreased to 2.46 mg/100g while after twelve months of storage the total carotenoids content was 0.82 mg/100g. The major carotenoids identified in apricots were: *all trans* β -carotene, its geometrical isomers (*9-cis*- β -carotene; *13-cis*- β -carotene; *9,13-di-cis* β -carotene); β -carotene-5,8-epoxide; β -cryptoxanthin and β -cryptoxanthin palmitate. Significant decreases were observed for all pigments but *all trans* β -carotene appears to be the most sensitive, with only 15.7 % residual concentration. Although the concentrations of β -cryptoxanthin palmitate is small, it has shown increased stability compared to other carotenoids.

Conclusion: Significant loss in carotenoids occurs during the storage of dried apricots, only 20.35 % of the initial concentration remaining after twelve months. The degree of degradation depends on the chemical structure, β -carotene being more sensitive than β -cryptoxanthin and β -cryptoxanthin palmitate.

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Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project PN-II-ID-PCE-2011-3-0721

SEE BUCKTHORN PREBIOTIC EFFECT IN ENCAPSULATED FORM WITH *LACTOBACILLUS CASEI* ATCC 393 IN YOGHURT UNDER MICROWAVE TREATMENT

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Keywords: microwave, probiotics, prebiotics, sea buckthorn, viability

Introduction: Probiotics are widely recognised as the “good” bacteria that bring many human health benefits by their consumption. The positive effect of prebiotics together with the consumption of probiotic cells is recognised [1]. Protection of probiotic cells from unfriendly environment conditions can be ensure by incorporate it's in different biopolymers [2].

Aims: The aim of the present work was to investigate the microwaves heating treatment effect and the survival of *L. casei*, embedded in yoghurt as free and encapsulated form (with or without prebiotics).

Materials and Methods: Probiotic cells were embedded in yoghurt as free and encapsulated in alginate microspheres, with or without see buckthorn lipophilic fraction as prebiotic (characterised using GS-MS, HPLC-MS, FTIR spectroscopy and Crio SEM). The viability of probiotic cells was determined after different microwave treatments (10, 30, 60, 90 and respectively 120 seconds at 100 W, 450 W and 850 W) for the free and encapsulated samples.

Results: For all the samples, the temperature increased direct proportional with the time of exposure to the microwave radiation and with the microwave frequency. In term of viability of the probiotic cells, a considerable positive effect could be observed in the samples where the mentioned prebiotic was utilized (viable cells could be observed even after 60 seconds of treatment at 850 W).

Conclusion: In the present research work, we demonstrated that this innovative utilisation of the see buckthorn lipid fraction can improve, considerably the viability of probiotics and ensure valuable fatty acids (benefits of the sea buckthorn extract consumption).

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BIOACTIVE COMPOUNDS FROM BREWER'S SPENT GRAIN TO BE USED AS FOOD INGREDIENTS

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Keywords: *bioactive compounds, brewer's spent grain, food ingredients, waste*

Introduction: The food industry generates large amounts of by-products, especially in the sector of raw vegetables and fruit processing. The major waste generated from brewing industry is the brewer's spent grain (BSG), this being the insoluble residue resulted after the production of wort. Even though BSG is considered a waste, it contains valuable biomolecules that can be valorised in the production of nutraceuticals, functional foods, food additives or energy production.

Aims: This study aims to summarize and give an overview of the main classes of biologically active compounds found in the BSG and their possible applications as ingredients in food industry or in other related fields.

Materials and Methods: The most common used extraction technology of biomolecules from BSG is the solvent extraction. This method has the advantages of low processing cost and ease of operation.

Results: BSG contains appreciable amounts of bioactive compounds, such as: sugars, proteins, fibres, antioxidants (polyphenols), minerals, fatty acids, vitamins (Mussatto, 2014). These compounds, when ingested, have beneficial effects on human health (lowering blood pressure, alleviating constipation and diarrhoea, reducing plasma cholesterol) and thus BSG is a suitable ingredient for food industry. The phenolic compounds extracted from BSG have antioxidant activity which makes them a plausible alternative for the synthetic antioxidants, not only in foods but also in pharmaceutical area.

Conclusion: The interest showed towards the valorization of BSG is due, beside its valuable composition, also to its low cost and the large availability throughout the year. Even though an increased number of researches are focused on the exploitation of food wastes, there is still the need for further investigations in order to achieve the "zero-waste" desiderate.

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Acknowledgements: This work was supported by CNCISIS-UEFISCDI national project, number PN-II- RU-TE- 2014-4- 0842, 52/01.10.2015.

RED WINE CULTIVARS TYPING & CHEMOMETRICS BY MALDI-TOF MASS SPECTROMETRY

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Keywords: *cultivar, MALDI-TOF, PCA, peptides, Vitis vinifera*

Introduction: Authentication of red wine is an important matter of origin and quality control in natural winemaking process. "Shotgun" type mass spectrometry techniques are widely used methods for proteome analysis and direct typing of various matrices and became the most powerful tools available currently in proteomics (1).

Aims: Peptide mass fingerprinting and principal component analysis (PCA) were performed for rapid typing of red wine samples.

Materials and Methods: Red wine samples were selected only from vineyards with protected designation of origin and protected geographical indication. The sampling included only varietal red wines (e.g.: Băbească, Cabernet Sauvignon, Fetească Neagră, Mamaia, Merlot, Negru de Drăgășani). Peptide fraction was extracted by a combination of ethanol treatment followed by extraction with formic acid and acetonitrile. The measurements were done with a Bruker microflexTM LT/SH MALDI-TOF mass spectrometer with nitrogen laser. The MALDI Biotyper 3.0 software was used for processing of acquired spectra, PCA and dendrograms.

Results: The results showed distinct spectral patterns for most of the varietal red wines analysed. In the case of Cabernet Sauvignon and Merlot, both acquired spectra and PCA appeared identical. Moreover, the dendrogram revealed a similar hierarchical clustering of the aforementioned two varieties.

Conclusion: In the present research work, we demonstrated that MALDI-TOF mass spectrometry, followed by chemometrics, can be a rapid and practical method for identification of well-preserved varietal red wines – emphasising the fact it cannot discriminate between Merlot and Cabernet Sauvignon varieties. Moreover, this technique can be severely jeopardized by both natural proteolysis and heat exposure proteolysis.

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Acknowledgements: This work was financially supported by National project PN 16 36 04 02.

ROMANIAN KNOWLEDGE AND ATTITUDES REGARDING DIETARY FIBERS

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Keywords: *consumption habits, dietary fibers, food safety, labeling*

Introduction: Presently, the scientists recognize the health benefits of food fibers in the menu and also plant food sources are at high interest both for general population and food companies. The food companies are responsible for a clear nutrition labelling that will assist consumers to make informed and healthy choices and health providers has to inform the population about the benefits of fibers.

Aim: The aim of our study was to evaluate the Romanian knowledge and attitudes regarding dietary fibers from food products.

Materials and methods: We made a qualitative survey based on a questionnaire applied in 2015, over a period of 6 months, over 670 Romanian consumers (part of CI&DETS project). It was focused on testing the attitudes and knowledge towards ingestion of foods rich in fibers. For all data analysis we used the software SPSS, from IBM Inc.

Results and Discussions: Our results showed that the knowledge about dietary fibers and also the ingestion of food products rich in fibers were low, and most of the subjects didn't have any interest to read the nutritional information from food labels related to fibers. The female participants ate more whole grains and fruits than males and pay more attention to food labeling, the Romanian people prefer to stay and eat home than at restaurants especially in rural areas, and the knowledge about fibers benefits was significantly related to education and urban location.

Conclusion: We underline the needs for more efficient community interventions and proper information about the importance of dietary fibers for our health and also to improve and disseminate our nutritional standards and diet recommendation among population.

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SECTION 4: HORTICULTURE AND FORESTRY

MECHANISMS OF DROUGHT AND SALT TOLERANCE IN PLANTS: INSIGHTS FROM COMPARATIVE ANALYSES OF STRESS RESPONSES IN GENETICALLY RELATED TAXA

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Keywords: *abiotic stress, drought, salinity, stress responses, stress tolerance*

Environmental stress conditions, especially drought and salinity, are the main causes of global losses in crop production. A promising strategy contributing to increase crop productivity can be based on the improvement, by genetic engineering, of drought and salt tolerance of our major crops. This, in turn, requires a thorough understanding of abiotic stress tolerance mechanisms, the study of which currently represent one of the most active research fields in plant biology.

When challenged by drought or salinity, plants activate a series of basic response mechanisms, which are conserved in different species regardless of their level of tolerance and include the control of ion transport, the synthesis of specific osmolytes, or the activation of antioxidant systems. Although it is generally assumed that stress resistance depends on the activation of these response pathways, there is some confusion in the literature regarding the concepts of '*stress responses*' and '*stress tolerance*', which are often considered synonymous. Yet, for a given species, the biological/ecological relevance of a particular response and the relative contribution of different responses to the mechanisms of stress tolerance, remain largely unknown.

As an approach to elucidate the mechanisms of tolerance to abiotic stress, we propose to perform comparative studies on the responses to drought and salinity in different taxa, genetically related but with different tolerance levels. The correlation of stress-induced changes in the contents of biochemical markers associated with specific responses, with the relative resistance to stress of the investigated species, should provide novel information on the general mechanisms of stress tolerance in plants, and particularly should help to distinguish those responses that are relevant for the tolerance of a given species, from those which are not.

To support the aforementioned ideas, experimental results of such comparative analyses – carried out using different *Phaseolus* cultivars and several wild species of two different genera, *Plantago* and *Juncus* – will be presented.

EGGPLANT PRE-BREEDING USING AN INTROGRESSIOMICS APPROACH

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Keywords: *introgression, marker-assisted-selection, Solanum melongena, wild relatives*

Introduction: Introgressiomics is an approach, based in the use of a large variation of wild species, interspecific hybridization and genomic tools, to create multiple materials of crops carrying introgressions from wild relatives. One of the most promising target crops for introgressiomics is eggplant (*Solanum melongena*), as it is related to a large number of very diverse wild species.

Aims: Our objective is to develop highly diverse pre-breeding materials of eggplant that contain introgressions from different wild species using an introgressiomics approach.

Materials and Methods: We used six accessions of eggplant and different accessions of 15 wild species from the primary, secondary and tertiary genepools. Hybridizations were performed and the interspecific hybrids obtained were backcrossed to the cultivated eggplant. For one of the wild species (*S. incanum*), marker assisted selection was used in a backcross programme to obtain introgression lines.

Results: Hybrids between eggplant and 14 wild species have been obtained, and up to now first backcross generations have been obtained with 10 wild species. These materials are highly variable and a selection for high diversity using morphological traits and molecular markers will be used for further backcrossing. Also, a large set (>40) introgression lines carrying specific genomic fragments of the wild *S. incanum* in the genetic background of *S. melongena* have been obtained using marker-assisted-selection.

Conclusion: The materials obtained represent eggplant pre-breeding materials of great interest to breeders. The use of the introgressiomics approach has allowed generating a large diversity of materials that may represent the foundations for a new generation of eggplant cultivars.

Acknowledgements: This work was undertaken as part of the initiative “Adapting Agriculture to Climate Change: Collecting, Protecting and Preparing Crop Wild Relatives” which is supported by the Government of Norway. The project is managed by the Global Crop Diversity Trust with the Millennium Seed Bank of the Royal Botanic Gardens, Kew and implemented in partnership with national and international gene banks and plant breeding institutes around the world. For further information see the project website: <http://www.cwrdiversity.org/>. This work has also been funded in part by European Union's Horizon 2020 research and innovation programme under grant agreement No 677379 (G2P-SOL) and from Spanish Ministerio de Economía y Competitividad and Fondo Europeo de Desarrollo Regional (FEDER) (grant AGL2015-64755-R MINECO/FEDER, UE). Pietro Gramazio is grateful to Universitat Politècnica de València for a pre-doctoral (Programa FPI de la UPV-Subprograma 1/2013 call) contract.

EFFECT OF N AND P FERTILIZATION ON WEED FLORA OF MAIZE (*Zea mays L.*) CROP.

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Keywords: *diversity indices, fertilization, maize, weed flora.*

Introduction: Globally, maize (*Zea mays L.*) emerged as a major feed crop for both domestic use and export, thus providing abundant, high-quality animal products for consumption. Besides other production constraints, weed infestation is considered of premier importance, as grain yield losses due to weeds in maize have been estimated to be 35–83% (Usman *et al.*, 2001). Uncontrolled weeds can easily cause a complete loss of yield, and even small number of weeds can reduce yields substantially. Competition for nutrient is primarily for nitrogen (N) because, in general, all nutrients in the soil except N and water are immobile and rely on root contact and diffusion over a very small distance for uptake (Sprague and Dudley, 1988).

Aims: The present study was conducted to determine the effect of nitrogen (N) and phosphate (P) fertilization on weed flora, growth and yield of maize.

Materials and Methods: Weed assessments were made at several dates and their density per unit area and dry weight were measured. The following diversity indices were used: Shannon-Weiner, Simpson and Pielou. The diversity of weed species was characterized by means of the Shannon-Weiner index (H').

Results: There were observed differences between nitrogen (N) and phosphate (P) fertilization treatments regarding weed density and dry weight. Total maize yield on nitrogen treatments were found higher.

Conclusion: In the present research work, we demonstrated that the different type of fertilization has effect on the composition of weed flora. Differences in the amount of weed growth between the two types of fertilization were related to differences in the composition of the weed flora. However, competition between crops and weeds for nutrients, and for other factors (light, space, water) at different nutrient levels, are complex interactions that depend on many factors such as crop species, weed species, moisture, nutrient release timing, nutrients' positional availability, nutrient ratios, etc.

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PLANT SELECTION METHODS FROM THE PERSPECTIVE OF BIOCLIMATIC LANDSCAPE DESIGN

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Keywords: *bioclimatic planning and design, green infrastructure, species selection*

Introduction: Bioclimatic landscape design is a recent concept, developed in the last 2-3 decades, that relies on exploiting the impact of vegetation on microclimate and human bioclimatic comfort (Attia and Duchhard, 2011).

Aims: The approach consists in developing trees selection methods for urban green infrastructure planning considering the bioclimatic impact and the eco-climatic resilience of the vegetation in the context of the temperate continental conditions of the Romanian Plain.

Materials and Methods: The research is based on previous studies concerning the role and classification of green infrastructures in terms of bioclimatic impact (Boc, 2016). Thus, the potential bioclimatic impact and eco-climatic resilience of trees species were evaluated and compared for 3 types of green areas: protection zones (shelterbelts), mobility zones (green corridors) and buffer zones (adjacent to buildings). Bioclimatic impact assessment criteria included biological and ecological characteristics of species such as habitus, leaf area index, canopy density, height, air ionization, carbon sequestration, absorption of pollutants, allergens, etc. The analysis criteria on eco-climatic resilience comprised: resistance to air pollution, drought, wind and sunlight conditions.

Results: The findings present a hierarchy of tree species recommended for each type of green spaces depending on the criteria mentioned above. Thus, the species are grouped in three categories: optimal species – a favorable bioclimatic impact, high resilience; relatively compatible species - relatively favorable impact and/or average resilience; inappropriate species – a low bioclimatic impact and/or low resilience.

Conclusion: The conclusions reveal the opportunity to integrate the results within landscape design norms and to develop and deepen the proposed methods.

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THE WATER QUALITY AND IRRIGATION METHOD INFLUENCE ABOUT THE AUTUMN WHITE CABBAGE YIELD

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Keywords: *magnetic, nutritional, quality, water, yield*

Introduction: Many authors have studies the positive effects of the irrigation with magnetic treated water (Chern, 2012). Babu (2010), mentions that the magnetic field may determine the structure of water, reduce surface tension, increase the solubility of minerals and facilitates the uptake of the necessary nutrients for plant growth.

Aims: The aim of this work was to evaluate the behaviour of cabbage crop irrigated with magnetic treated water (MTW) as compared to results obtained when untreated water was use.

Materials and Methods: The autumn white cabbage variety “De Buzau”_was used. The magnetic treatment of the water was done with a device for water magnetization model 10”, magnet code F8-2-55, based on permanent magnets, which can achieve an intensity of the magnetic field over 7000Oe. Have been performed analysis and determinations regarding: the marketable yield, quality, nutritional value, histological structure of the cabbage leaves mesophyll, physical analysis laboratory.

Results: The irrigation of the autumn white cabbage crops with MTW lead to a significant increase of the commercial yield comparatively with the cabbage crops irrigated with untreated water; in the same time, the commercial quality of the cabbage was favourable influenced by the irrigation and especially by the irrigation with MTW. The results showed that the irrigated cabbage with MTW determined a higher content of soluble dry matter, soluble carbohydrates, C vitamin, chlorophyll pigments and mineral salts. Significant differences between variants regarding the influence of the MTW about cuticle thickness, wax layer in the inferior epidermis of the cabbage leaf and the numbers of the stomata were registered. The physical phenomena determine the increasing of the Ca and Mg salts solubility, followed by positive effects in the plant’s metabolism.

Conclusion: The use of the MTW determine positive effects at the crop of the autumn white cabbage.

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QUALITATIVE ASSESSMENT OF THE RED WINE VARIETIES GROWN IN DEALU BUJORULUI VINEYARD

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Keywords: *quality, spectrophotometer method, red wine, vine, Vitis vinifera.*

Introduction: Ecoclimatic conditions have a great influence on grapevine development and growth, these can be favorable or unfavorable. Favorable conditions: temperature, solar radiation, and humidity are important and have a positive effect on growth and fruition of grapevine. Unfavorable or critical conditions have negative influences, causing a low grape production and a wine quality decrease.

Aims: The purpose of this paper is to trace the influence of the ecoclimatic conditions of the year 2015 on the quality of wine's obtained from 3 grapevine varieties: 'Merlot', 'Cabernet Sauvignon', 'Feteasca neagră'.

Materials and Methods: The physical and chemical analysis of wines (alcohol content, total acidity, volatile acidity, free SO₂, total SO₂, sugar content, non-reducing extract and pH) were performed according to the methods of analysis described in the Compendium of international methods of analysis of wines and musts to O.I.V. and in the Romanian STAS methods. In order to get a wider perspective about the wine quality another parameters were examined, using spectrophotometer method (Miura ONE) (acetic acid, potassium, calcium, free amino nitrogen, tartaric acid, copper, L-lactic acid, iron, L-malic acid, D-gluconic acid and glycerol).

Results: The ecoclimatic conditions studied in the Dealu Bujorului vineyard, Bujoru Wine Centre, highlighted the exceptional viticultural value of Romania as well as the authenticity encountered in the wide variety of wines produced in this studied areas. Based on the results, regarding the qualitative assessment of the three varieties under testing, can be observed that the varieties have a very good suitability in the studied areas and in terms of quality rating, they display particular characters of the varieties, as well as the ecoclimatic conditions and ecopedological influence on the quality of wine. Results also show that the vine varieties cultivated in the Vineyard of Dealu Bujorului have a high content of macroelements in 'Merlot', followed by 'Cabernet Sauvignon' and 'Feteasca neagră', macroelements that are very important for human's health.

Conclusion: The results of the research confirm the suitability both, of the ecoclimatic conditions for grapevine growth in Dealu Bujorului, and of the proper growth and development of the tested varieties, in order to achieve a superior wine quality.

RESEARCH ON TRENDS IN EXTREME WEATHER EVENTS AND THEIR EFFECTS ON GRAPEVINE IN ROMANIAN VITICULTURE

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Keywords: *climate change, extreme events, grapevine*

Introduction: Romania's temperate-continental climate is affected more frequently by heat waves in summer and cold waves in winter.

Aims: The aim of this work was to investigate the frequency and intensity of extreme weather events in various centres from Romania's viticultural regions: winter frost, extreme temperatures during the growing season, summer droughts and excess of precipitations. Winter frost damaging the vine is a significant risk to grape production in Romania's viticultural regions, mainly in the plains and lowlands to the foothills. The frequency of winter frost damaging the vine has increased during the last decades, in the context of climate change. Also, there has been found a significant increase in the number of hot days ($T_{max} > 30^{\circ}\text{C}$) and very hot days ($T_{max} > 35^{\circ}\text{C}$).

Materials and Methods: The evolution of these extreme events was followed in Craiova, Constanța, Bucharest, Timișoara, Cluj-Napoca, Oradea and Iași, between 1977 and 2015. The long term study (18 years) conducted in the experimental plantation of the University of Agronomic Sciences and Veterinary Medicine Bucharest revealed their influence on vine.

Results: During the last two decades, there has been registered a trend of increasing the frequency and intensity of winter frost, damaging vine ($T_{min} < -20^{\circ}\text{C}$), heat waves (number of days with $T_{max} > 30^{\circ}\text{C}$ and $> 35^{\circ}\text{C}$) and droughts that adversely affect viticulture, production and quality of grapes and wine. The highest warming trends were observed for northern viticultural regions (Transylvania and Moldavia) and for the seaside. Analyses indicated that the increased frequency and intensity of winter frost will cause substantial production decrease.

Conclusion: Although the intensification of heat waves increases sugar accumulation in the berries, they trigger a significant reduction in grape production and in titrable acidity, requiring corrections and resulting in unbalanced wines. Meanwhile, droughts trigger production decrease.

To avoid negative effects on vine, it is necessary to take measures, both on a short, medium and long term.

A GENERALIZED METHODOLOGY FOR CREATING A REGIONAL LANDRACE INVENTORY

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Keywords: *germplasm collection, quality management system*

Introduction. Biodiversity and conservation of local germplasm pool encompass all biological sciences research. Through the acquisition, maintenance and exchange of germplasm and information, genebank and farmers support the capacity of biodiversity to contribute to sustainable operating. Research units and laboratories are documentation service providers but repositories of biological materials, as well. Required for the highest quality maintenance and rapid state-of-the-art low-cost interventions on local biodiversity conservation, resources and quality methodologies information are the key issues for the efficiency as invaluable plant genetic holders.

Aims. Our local genebank is part of a biodiversity and bioconservation research centre oriented to protect threatened species and local/regional ecosystems, choosing solutions that are sustainable, on the basis of sound science.

Materials and Methods. A generalized methodology for creating a landrace inventory has been proposed by Maxted (Maxted et al. 2009).

Results. A general model for a systematic approach is needed to continue to build a landrace inventory in as efficient a way as possible and to undertake periodic reviews. The path to develop a coherent quality strategy for our genebank will be analyzed from two sides: firstly, from a value and risk management perspective- for primary conclusions. Case studies reviewed as external environment experience will allow secondary conclusions on how our genebank can utilize the information in terms of decisions about the level of implementation of a quality management system (QMS) along with suggestions for future developments and look at the possibility of using ISO quality standards more widely and broadly within community. Centered on local species protection and local farmers' plant material inventory next to other worldwide practices our genebank aspires to create an environment where business has a long-term positive impact on biodiversity conservation.

Conclusion. Promoting the value of sustainable business the implementation of QMS for local (regional) SMEs to avoid loss of the common practice and risk to vanish putative valuable plant gene resources is demonstrated.

ACERIA KUKO MITES: A COMPREHENSIVE REVIEW OF THEIR PHYTOSANITARY RISK, PATHWAYS AND CONTROL

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Keywords: *Aceria kuko*, *Lycium barbarum*, pest risk assessment, nonindigenous pest, biosafety

Introduction: Romania had become in the recent years one of the important ‘Goji’ growers from Europe and the business is expanding, as the urge to identify economically profitable alternatives is rising, but can this be done at any risk? The presence of *Aceria kuko* in Romania was mentioned for first time in 2010 (Mencinicopschi & Balan, 2013) and confirmed in 2014 by Chiriceanu & colab. but no eradication, curative or preventive measure has been mentioned, either taken by any of the Romanian authorities. As the imports via internet from China increases in the last years, especially for living plants (*Paulownia sp.*, *Lycium sp.*, *Paeonia sp.* and many others), and the mailed small parcels are usually not verified by any authority, the risk of introducing other non-native pest in Europe is very high.

Aims: We consider that monitoring the Romanian “Goji” plantations and the changes in its biology and ecology has a strategic importance and should be regarded as a biosafety measure not only for Romania, but for entire Europe, as the “Goji” fruits produced in Romania are mainly exported in the European countries, mainly Germany.

Materials and Methods: For the present paper were used all the available online and offline bibliographical references. The analysed plant material belongs to the experimental field of USAMV Bucharest, both potted and planted directly in the field goji-berries plants. Our research focused on determinations regarding the attack frequency, attack intensity, the attack degree and the losses caused by the goji gall mite on the 3 years cultivated goji plants.

Results: Our observations show that the goji gall mite, that was the subject of an extensive eradication program in European countries, adapted his biology features to the climatic condition of Romania and produced major damages to the goji plants (100% losses for the berries production). The risk of infestation of other Solanaceous plants is high.

Conclusion: In the present research work, we demonstrated that *Aceria kuko* represent a threat and should be considered as the starting point for the elaboration of preventive and eradication control measures for the living plant material imported by mail from third countries.

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INFLUENCE OF CULTIVAR AND CULTIVATION SYSTEM ON DRY MATTER CONTENT OF *DAHLIA* TUBERS

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Keywords: *cultivation system, semi-rustic geophytes, soluble dry matter, tuberous roots*

Introduction: *Dahlia variabilis* is a well known floricultural plant highly appreciated for its economic value. From the dry matter content of tuberous roots an important part is comprised by inulin, this constituting the form in which *Dahlia* is storing sugars (Zubaidah et Akhadiana, 2013). Due to the importance of polysaccharides from the dry matter of tuberous roots, the cultivars that present a higher content of dry matter could be considered more valuable like in the case of Jerusalem artichoke (Fuchs, 1993) because this implies a higher quantity of carbohydrates and consequently an increased efficiency in industrial processing.

Aims: The soluble dry matter content from the tuberous roots of several studied *Dahlia* cultivars was determined in order to find out if the two different types of roots used to start the crop in the spring (forced and not forced in greenhouse before planting) influence the soluble dry matter content from tuberous roots of *Dahlia* in autumn.

Materials and Methods. The biologic material used was represented by seven cultivars of *Dahlia variabilis* with cactus type flower heads: 'Kennemerland', 'Tsuki Yori No Sisha', 'Hayley Jane', 'Purple Gem', 'Park Princess', 'Friquolet', 'Star Favourite', from the experimental field situated in the Agrobotanical Garden of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. In the experimental field have been used two types of plant material: *Dahlia* tubers started earlier in greenhouse and tubers that were not forced prior to planting. Biometric measurements were made during vegetation period. In autumn the soluble dry matter content from tubers was measured using Zeiss Refractometer. The data was analyzed using Duncan test, and the connection between the soluble dry matter and the plant characteristics were determined using regression.

Results: For the cultivars 'Star Favourite' (25.47% s.d.m.), 'Hayley Jane' (23.97% s.d.m.), 'Friquolet' (16.87% s.d.m.) the presence of a well developed vegetative part early on had a beneficial influence on the storage of a higher dry matter content, while for the cultivars 'Tsuki Yori No Sisha' (23.97% s.d.m.), 'Kennemerland' (24.27% s.d.m.), 'Park Princess' (20.23% s.d.m.) using tubers that were not forced prior to plating was in favor of accumulation of higher dry matter content.

Conclusion: Based on the results it can be concluded that forcing of the tuberous roots affects in different ways the *Dahlia* cultivars. For the horticultural producers interested in cultivation of *Dahlia* for inulin extraction, it is recommended to start the crops with the following cultivars: 'Star Favourite'/forced tubers, 'Tsuki Yori No Sisha'/unforced tubers, 'Kennemerland'/unforced tubers, 'Hayley Jane'/forced tubers.

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PHYTOCHEMICAL ANALYSIS IN SOME ROMANIAN TOMATO CULTIVARS

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Keywords: HPLC, TLC, tomato

Introduction: Tomato (*Lycopersicon esculentum* Mill.) is a major vegetable crop, grown for fresh consumption or for processing, and is very common in the Romanian diet. In addition to their nutritive value, tomato fruits are an important source of compounds (carotenoids, phenols, vitamin C and E) with known healthy effects, mainly due to their outstanding antioxidant properties. Among the most prominent photochemical in tomatoes are carotenoids, of which lycopene is the most abundant in the ripened fruit. Besides lycopene, tomatoes also contain α -, β -, γ -, δ -carotene, zeaxanthin, lutein, neurosporene, phytoene, and phytofluene as well as minerals (K, Na, Ca and Mg) and trace elements (Fe, Cu, Mn, Cr, Zn and B) (Nour *et al.* 2013).

Aims: The aim of this study was to determine the biochemical (polyphenols, β -caroten, lycopene, flavonoids, polyphenol carboxylic acids) variability in some Romanian tomato cultivars ('Capriciu', 'Darsirius', 'Kristin', 'Pontica' and 'Siriana').

Materials and methods: Different types (methanol, ethanol and petroleum-ether) of extracts, from fully ripened fresh and dried tomato fruits, were analysed by qualitative (TLC-Thin-Layer Chromatography) and quantitative methods (spectrophotometric determination and HPLC-High-Performance Liquid Chromatography). Spectrophotometric determinations were performed with a visible spectrophotometer (Jenway 6300), while HPLC-UV analysis was performed by an HPLC system (Agilent 1200) equipped with a reverse phase column (Eclipse XDB-C18) and UV/Vis-photodiode array detector (DAD).

Results: Overall the phytochemical investigations indicated that significant changes in quality-related metabolites occur depending on tomato genotype and processing method (fresh or dry fruits). Qualitative and quantitative data revealed that cvs. 'Darsirius', 'Pontica' and 'Capriciu' contain the highest levels of β -carotene and lycopene; cvs. 'Pontica' and 'Darsirius' have high quantities of polyphenols; cvs. 'Capriciu' and 'Kristin' contain increased levels of polyphenol carboxylic acids while flavonoids reached the highest values in cv. 'Capriciu'.

Conclusion: Significant differences were found among tomato cultivars in all studied compounds depending not only on genotype but also on processing method (fresh or dry matter). However, among tested cultivars, cv. 'Capriciu' (cherry tomato) may be considered for best overall chemical quality characteristics.

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Acknowledgements: This study has been supported by a grant of the Romanian National Authority for Scientific Research, CNCS-UEFISCDI, Project nr. PN-II-ID-PCE-2011-3-280.

HARVESTING STAGE AND GROWTH REGULATORS INFLUENCE FOR THE CUT FLOWERS VASE LIFE OF SOME ORNAMENTAL ALLIUMS

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Keywords: *Allium*, cut flowers, growth regulators

Introduction: The *Alliums*, known as vegetables, are important ornamental geophytes, used in gardens or floral art (Fritsch and Friesen, 2002). Krzyminska (2009) shown that *Allium* cut flowers life vary between 15 and 35 days, depending on species. The growth regulators have large using range, like to reduce the bulb sprouting or to incese the flower number for some *Alliums* (Pogroszewska *et al.*, 2007).

Aims: This study aims to show the optimum harvesting stage for some ornamental *Alliums* and the growth regulators influence of the vase life.

Materials and Methods: The studied cultivars were *Allium* „Purple Rain” and *Allium moly*, harvested in three stages (1/4, 1/2 and 3/4 flowers opened in the inflorescence) and post harvest treatment with two growth regulators (giberelic acid - GA₃ and cycocel- CCC).

Results: The cut flowers resistance was influenced by the both experimental factors (the postharvest treatment and the cutting stage), but it was diffrent between the species. The individual analysis of the factors, shown that each one had an influence over the logevity of the *Allium* cut flowers. The optimum cutting stage was the time when 1/2 of the flowers were opened, for *Allium* „Purple Rain” and when 1/4 stage for *Allium moly*. Regarding the growth regulators, the study shows that the postharvest GA₃ treatment improved the vase life resistance, not only like longevity but like resistance of the initial color of the flowers and the stem helth.

Conclusion: In this work, it is highlight that the harvesting stage and the post harvest treatment with some growth regulators can improve the cut flowers longevity for the *Allium* cut flowers.

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OPTIMIZATION OF MICROPROPAGATION PROTOCOL FOR GOJI BERRY (*Lycium barbarum* L.)

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Keywords: *acclimatization, gelling agent, Lycium barbarum, tissue culture*

Introduction: Goji (*Lycium barbarum* L.) is a fruit bearing woody shrub important for nutraceutical and medicinal properties. Several researchers have reported plantlet regeneration by adventitious organogenesis as well as somatic embryogenesis (Hu *et al.*, 2001, 2002, 2006). Hu *et al.* (2008) also carried out indirect somatic embryogenesis using root explants. Maseda *et al.* (2004) successfully cultured 2 genotypes of *Lycium chilense* and carried out comparative plantlet morphology and anatomy to study cuticle and stomata in plants growing in normal conditions, the ones cultured in vitro and the plantlets acclimatized ex vitro.

Aims: The aim of present research was to establish an effective protocol for the efficient and rapid multiplication of *L. barbarum* by optimizing all the stages of micropropagation in order to provide an effective technology for the production of planting material.

Materials and Methods: Micropropagation of *Lycium barbarum* cv. 'Ningxia N1' was achieved. The cultures were by initiated by axenical seed germination.

Results: The highest shoot proliferation was obtained on the MS media with 1.33 or 2.22 µM benzyl adenine, gelled with wheat starch as an agar alternative. The treatments with 2.22 µM benzyl adenine ensured proliferation rates superior to the ones with 1.33 µM benzyl adenine, but the latter provided longer and more robust shoots. Use of large microcuttings as an explant onto the multiplication media ensured higher in vitro explant survival, higher number of shoots regeneration and more vigorous plantlets. The microcuttings inserted vertically into the media yielded superior growth and multiplication as compared to the microcuttings placed horizontally. The non-rooted, elongated shoots from the treatment 1.33 µM benzyl adenine were either rooted in vitro on a hormone-free MS medium with starch or used for direct ex vitro rooting and acclimatization.

Conclusion: In vitro culture initiation of *Lycium barbarum* was successfully carried out starting from seeds, on media gelled with Plant Agar. In the multiplication stage wheat starch proved to be far more effective than Plant Agar as a gelling agent. MS media supplemented with 1.33 µM BAP proved to be very effective, as they provided high multiplication rates and well-developed plantlets.

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A STUDY REGARDING THE EFFECTS OF INTERCROPPING CELERY WITH CAULIFLOWER AND CHERRY TOMATOES

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Keywords: *pests, sustainability, weeds.*

Introduction: It has been proved that intercropping is a suitable approach for vegetable growing providing a high degree of sustainability (Bavec et al, 2010). Due to its advantages this system reduces the presence of weeds, diseases and pests (Mousavi and Eskandari, 2011).

Aims: Taking into consideration the demand among consumers regarding healthy vegetables and a high interest for a sustainable environment, intercropping celery with certain vegetables could lead to an efficient use of soil resources and reduce the presence of weeds and pests, bringing stability to the yield.

Materials and Methods: The experience was conducted in the experimental field of V. Adamachi farm belonging to USAMV Iași. In the experience was used a variety of celery for leafs, cherry tomatoes and purple cauliflower, in two different intercropping systems. Biometric aspects of the edible part, such as length and width of the stalk and leaf, and number of leafs per plant were measured and analysed in the two intercropping systems. The measurements were done from August to October.

Results: The obtained results showed in the two intercropping systems that the celery variety Pascal Giant, from a morphological point of view, was well developed, with a rich rosette and intense green leafs. Intercropped with cauliflower the length and number of stalks in the plant rosette is slightly higher than the other system.

Conclusion: The present research work showed that intercropping celery with different species has significant influence regarding the presence of weeds and pest in the two systems, decreasing the number of soil intervention when it comes to weeds. The study demonstrated that celery has a better influence on cauliflower when it comes to pests, decreasing the number of attacks.

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CLIMATE RISK PHENOMENA RECORDED IN THE GURGHIU RIVER BASIN WITH HARMFUL INFLUENCE ON FOREST ECOSYSTEMS

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Keywords: *climate, ecometric climatic indices, precipitation, forest*

Introduction: The climate changes taking place in the environment and thus the impact that these changes on the state of vegetation and health of forests is a matter of topical and of great complexity. The changes in the climate regime are part of a global context, but they are characterized by certain particularities generated by the geographic region where our country is situated

Aims: One of the main factors of the natural environment, which is at the same time one of its most dynamic component, is the climate, considered today a top priority natural resource of our planet. The climate is a complex notion that includes all meteorological elements (the radiant energy, air temperature, the air humidity, precipitation, wind.), with different values, also called in the scientific literature “climatic elements” or, more often, „climatic factors”.

Materials and Methods: The present paper determined the ecometric climatic indices and analyses statistically in order to determine the climate risk phenomena observed in the Gurghiu River Basin, having a harmful influence on forest ecosystems.

Results: From analysis the dates the averages daily and monthly the value of the temperature and of the rainfall reveals a warming trend for the analyzed period, the multiannual values being exceeded, the abundant rainfalls remain the most harmful the phenomenas, causing the production processes of erosion and of even floods, especially in areas high risk the torrential.

Conclusion: To characterize the climatic regime of a basin and especially to establish the influence of phenomena that deviate from the normal arrangements is necessary for the analysis, the interpretation and the adjustment the values recorded using the ecometric climatic indices, who stand to render detailed response to that phenomenon of climatic stress.

SAVINGS THROUGH RTK BASED GUIDANCE IN FIELD VEGETABLE GROWING

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Keywords: *economically, GNSS technology, savings, vegetable*

Introduction: Vegetable production makes high demands on the precision of the work performed. GPS-assisted guidance systems can relieve the driver and increase the quality of work. So far, data were missing for estimating related profitability in small scale vegetable production. For this reason, a Bachelor thesis at the University of Geisenheim dealt with the savings in field vegetables, through the use of a Real Time Kinematic (RTK) based automatic steering. It was shown that the investment is worthwhile even for small and medium sized farms. Due to the excellent results of the Bachelor thesis, the topic was enlarged upon in the Master thesis. Thus, the GPS technology offers new ways to more environmental friendly vegetable production.

Aims: The aim was to find out what the advantages are the used with mechanical weed control. Saving potentials in field vegetable growing; Increasing efficiency in mechanical weed control.

Materials and Methods: In a first field trial in 2008 it was shown that, unlike known from the arable crop farming, in vegetable production it comes in gaps. Average 1.6% of the planting area will not be processed during manual driving, what exactly corresponds with a cultivated area of 63 ha, 1 ha will be unprocessed. Subsequent calculations showed that the savings in lettuce amount 118 €/ha, in spinach 35 €/ha and in washingcarrots 161 €/ha. The necessary growing area is in the best case is 34 ha. Thus, it could be shown that the GNSS technology is economically viable for small and medium sized growers. In a progressive field trial in 2013, the potential savings in the mechanical weed control in field vegetable production were studied. Here, an active implement steering system was used. Thus, it was possible to increase the driving speed while hoeing from usual practice at 3km/h up to 9 km/h.

Conclusion: By increasing the driving speed, the work time requirement can be reduced by more than 40%. At the same time, it is possible to process multiple beds at the same time; thereby reducing procedural costs by up to 60% is possible. It was shown that the investment is worthwhile even for small and medium sized farms. It could be shown that the work can be carried out not only faster but also more accurately. In addition to the savings in working time some diesel consumption can be saved during the flame treatment and in some crops even propane gas.

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FOREST SCHOOL. A MODERN METHOD IN EDUCATIONAL PROCESS

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Keywords: *educational process, FORESTschool, forest function*

Introduction: FORESTschool is a modern educational method which is based on learning outdoors, offering countless opportunities for learning.

Aims: The ecological crisis combined with the failure, dropout and lack of motivation for learning have led us to propose the introduction in the educational process of this modern method called FORESTschool, which has a beneficial effect in various areas: sustainable development, environmental protection, development personal and professional.

Material and Methods: To see the double impact that FORESTschool has on society and the environment, we used investigation questionnaire, which tries to capture the current state of knowledge about the forest and its role in the evolution of society and the desire of students to know the beauty of ecosystem. The study was conducted in 2016 at a primary school of Cluj Napoca, applied to a number of 106 students and 15 teachers.

Results: Both students and teachers are open to this challenge called FORESTschool; they want a diversification of the educational process, to arouse their interest in knowledge and self-awareness.

Conclusions: It is imperative for our evolution as a species, to introduce FORESTschool in the educational process, to teach us to how we can live in harmony with all living that plays a vital role in securing our conditions of existence.

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MARIGOLD AS A COMPANION PLANT IN GARDENS

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Keywords: companion planting, insects, slugs and snails, *Tagetes*

Introduction. The genus *Tagetes* (Marigolds) is originally confined to parts of Central and South America. However, several species of the genus are widely cultivated as ornamental garden plants and for perfumery industry, some of these also become naturalized in various parts of the world.

Aims. This paper aimed to understand the deterrent effects of the marigolds towards various organism groups other than flying insects, including slugs and snails.

Material and Methods. Field observations during spring and early summer of 2016 were used to analyse the effects on snail and slug pests. To test putative deterring effect, night observations were made on two strips of marigolds as a companion plant grown together with poppy (*Papaver spicatum*) in a garden in Isparta known to be inhabited by 3 slug and 3 snail species.

Results. According to the observations, of 3 slug (*Deroceras* sp., *Tandonia budapestensis* and *Limacus flavus*) and 3 snail (*Monacha* sp., *Helix lucorum* and *Cornu aspersum*) species previously sampled from the experimental garden, 3 species (*Monacha* sp., *Deroceras* sp. and *Helix lucorum*) were active during the study period. The marigold plants exude an insect repellent, that significantly reduces herbivore on the companion plants. These chemicals are also effective on the ground insects. Therefore, it is often suggested as a companion plant in gardens.

Conclusions. Insecticidal effects of the volatile and non-volatile plant secretions probably act in the deterring effects of the marigolds. However, companion planting is relatively ineffective in the control of slugs and snails. A year-round study with broader extend of geography and pest taxa included would be applied to clarify the situation.

IN VITRO EVALUATION OF ANTIMICROBIAL ACTIVITY OF ALCOHOLIC AND AQUEOUS EXTRACTS FROM THREE MEDICINAL ALGERIAN PLANTS: *SPERGULARIA RUBRA* L., *ARENARIA SERPILIPHOLIA* L. AND *PRUNUS CERASUS* L.

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Keywords: *antifungal, antibacterial, aqueous extracts, hydro-alcoholic extracts, medicinal plants*

Introduction. The evolution of bacteria to the multi resistance to antibiotics and the increase in the incidence of urinary tract infections justified new recommendations for the management of the latter, based on the use of medicinal plants as alternative medicine. Despite the heterogeneous nature of immense African continent biodiversity in general and Algeria in particular, there has been little effort devoted to the development of therapeutic agents for these plants. *Arenaria serpilifolia* L., *Spergularia rubra* L. and *Prunus cerasus* L. are three medicinal plants used in traditional pharmacopoeia of Algeria, known for their anti-lithiasic, diuretic and antiseptic urinary tract.

Aims. Evaluation of the antimicrobial activity of hydro- alcoholic and aqueous extracts prepared from the aerial part of the three plants.

Materials and Methods. Plants were dried out of the sun and moisture and ground into powder. Plant infused (aqueous extract) and plant hydroalcoholic extract were used and their antibacterial activity was evaluated on 15 strains ATCC, 4 yeast and 7 clinically isolated bacterial strains.

Results. The *in vitro* evaluation of the plant extracts antimicrobial activity on 22 bacterial and four fungal strains shows that the hydroalcoholic extracts show significant antibacterial activity of 12 bacterial strains among the 22 tested. The diameters of inhibitions areas oscillate between 11.5 and 17.5 mm. For antifungal activity *Candida albicans* reached a diameter of 30 mm. The hydro-alcoholic extract of *Arenaria serpilifolia* L. and *Spergularia rubra* L. exhibited an antimicrobial activity only on *Citrobacter freundie*, *Acinetobacter spp*, and *Bacillus sp*. The hydro-alcoholic extract of *Prunus cerasus*, showed a positive activity on *Proteus mirabilis* and *Klebsiella pneumonia*.

Conclusion. Hydro-alcoholic extracts of *Arenaria serpilifolia* L., *Spergularia rubra* L. and *Prunus cerasus* L. are more active than the aqueous extracts. This difference may be due to the different chemical composition between the two extracts, alcohol allowing better extraction of compounds such as flavonoids.

IDENTIFICATION OF FRUIT TREES STRUCTURES IN COMPOSITION OF PUBLIC PARKS. WARSAW CASE STUDY

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Keywords: *composition, fruit trees, public parks, Warsaw*

Introduction: The balanced relationship between nature and cities concerning many aspects related to ecology, sustainability, and well-being, is an omnipresent aspect of modern urban planning (Raskovic and Decker, 2015). Public greenery has an influence on all of them. Trees, as fundamental components, build their basic structure, what is historically justified (Hobhouse, 2004). Fruit trees have utility (Draper and Freedman, 2010) and ornamental functions, but they can also be used as elements of public parks composition.

Aims: The main aim was to evaluate the fruit trees structures in Warsaw public parks.

Materials and Methods: In order to identify the fruit trees structures in composition of public parks, 22 parks have been selected as base settings for the study. Their selection was made using a random sampling procedure, based on the presence of the fruit trees in their structure. During the site visit, a visual survey was conducted in order to observe the fruit trees structures in the composition of parks and their localization was mapped on the plans of all parks.

Results: Selected types of compositional structures of fruit trees have been recognised in Warsaw parks including: single trees, groups and linear structures. The results of the study show that the most predominant fruit trees structures used in those parks are groups of fruit trees representing different species.

Conclusion: Fruit trees are important elements of Warsaw public parks plants' structure at present. They have compositional values with regard to defining the spatial arrangement of selected parts of park, scope and borders of garden interiors, and creation of visually attractive natural spatial dominants.

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HALOPHYTES - PLANTS FOR PRESENT AND FUTURE IN THE CONTEXT OF CLIMATE CHANGES

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Keywords: *biochemical compounds, elemental analysis, plant, soil*

Introduction: We live in a world where population is growing up and the available agricultural land is steady decreasing as a result of soil degradation, climate changes or residential areas expansion. An appropriate way to achieve this issue is bioremediation of degraded saline soils and followed by their recovery with valuable food crops, or developing more resilient agricultural systems that can tolerate and adapt to external disturbances.

Aims: In this respect, the present study shows information about *Salicornia* spp. mainly addressing to the plant and soil characterization.

Materials and Methods: The paper contains data related to biochemical compounds from the plant but also a soil characterization from the Lacul Sarat area, obtained through spectrophotometric and ICP-OES methods. Plant biochemical compounds analyzed were: total phenolic content, flavonoid content and free radical scavenging activity. Elemental analysis was applied both to plant and soil. Also, the evaluation of antibacterial activity was tested.

Results: Using spectrophotometric method, we found out that *Salicornia* spp. juice has a high content of phenols, and also antiradical activity against DPPH free radical. The results are very useful for further application in pharmaceutical and agro-alimentary domains.

Based on ICP-OES method, the results showed that both samples contain micro and macro elements expressed as mg/kg DW (dry weight).

With regard to the antibacterial activity, the results showed that *Salicornia* spp. juice had no effect against the tested bacteria strains.

Conclusion: In the present research work, we presented the elemental and biochemical characteristics of the plant halophyte *Salicornia* spp., and the characteristics of soil, so that they can be applied in valorisation of degraded lands.

THE INFLUENCE OF ROOTSTOCK ON THE GROWTH AND FRUITING OF CHERRY CULTIVARS IN A HIGH DENSITY SYSTEM

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Keywords: *branches, growth, Prunus avium L, rootstock, sweet cherry*

Introduction. In the last years, there has been an interest of cultivating new varieties of sweet cherries, grafted on dwarf cherry rootstock (Lang, 2001). This has allowed to develop high-density orchards with smaller vigour trees that are more productive and precocious (Andersen et al., 1999).

Aims. The objective of this study was to investigate the influence of 'Mahaleb' and 'Gisela 5' rootstocks on the growth and fruiting particularities of 'Bigarreau Burlat', 'Kordia' and 'Regina' sweet cherry cultivars, in the 4th and 5th year after planting in a high density system of planting.

Materials and methods. The influence of 'Mahaleb' and 'Gisela 5' rootstocks on the growth and fruiting of 'Bigarreau Burlat', 'Kordia' and 'Regina' sweet cherry cultivar was evaluate on the environmental conditions of Cluj-Napoca city, in 2014 - 2015, in a high density plot (4 x 1,5 m) with 1666 trees/ha, trained as Zahn Spindle with drip fertirrigation provided. The measurements regarding growth and fruiting were done each year, on 10 trees of the each cultivar grafted on 'Mahaleb' and 'Gisela 5' rootstocks. There were made measurements on height of the trees, length of the shoots, number of the long and short fruiting branches and the cumulated yield. The trunk diameter growth was measured 5 cm above the graft point. It was also calculated the total length of annual increases. All data were calculated as mean value for the two years of study.

Results and Discussion: After the first five years from planting, all cultivars grafted on 'Mahaleb' rootstock proved to be more vigorously than in the case when they were grafted on 'Gisela 5', considering the height of the trees, the total length of the medium and long branches per tree. 'Bigarreau Burlat' cultivar proved to be the most vigorous between the three cultivars studied. Between 'Kordia' and 'Regina' there were no differences statistically assured regarding the studied parameters. Regardless the cultivar 'Mahaleb' rootstock gave greater vigor of growth and delayed fruit setting. Moreover, the number of fruit formations and the yield were reduced by half in the case where the trees were grafted on 'Mahaleb' rootstock. Also 'Mahaleb' rootstock delayed the precocity of all the three cultivars.

Conclusion. Compared to Mahaleb, Gisela 5 rootstock improved precocity being the most efficient rootstock for sweet cherry trees in high-density systems.

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EFFECTS OF ETHEPHON APPLICATION ON COLOR DEVELOPMENT OF “GALA MUST” APPLES

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Keywords: *apple, ethephon, color, quality, yield*

Introduction: Fruit peel color is an important quality parameter and marketing attribute that influences consumer acceptance (Larrigaudiere *et al.*, 1996). Red color development in apples is due to the formation of anthocyanin pigments in the apple skin. Anthocyanin production, and therefore apple color is influenced by a range of environmental and management factors in the orchard. Ethephon is a compound that slowly releases ethylene which in turn can stimulate anthocyanin accumulation in apples. Temperature during the preharvest period influences red color development, with the critical coloring period being two to three weeks before harvest (Curry, 1997).

Aims: To evaluate the influence of ethephon to the color development of “Gala Must” apple variety.

Materials and Methods: The study subject of the experience was Gala Must apple variety grafted on M 9. The trees were trained as slender spindles. The distance of plantation is 3.5 x 1.2 m. To study color development of the apple fruits were experimented the following variants of treatment: 1. Control – no treatment; 2. Ethephon – 300 ppm; 3. Ethephon – 400 ppm. Ethephon were sprayed 2 – 3 weeks before commercial harvest.

Results: The research was conducted during the period of 2013 year. During the research, it was studied the amount and average of fruits, tree production, quality, firmness of fruits, hydrolysis and color index. Color of fruit was estimated at harvest using a scale of grading described by Alina Basak.

Conclusion: In the present research work, we demonstrated that ethephon may be included in the system of color development on apple fruits, the dose of 400 ppm, applied 2 – 3 weeks before commercial harvest.

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IN VITRO PLANT PROPAGATION AND CROP IMPROVEMENT IN LISIANTHUS (*LISIANTHUS RUSSELIANUS* HOOK.)

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Keywords: *vegetative propagation, hybrids, cytokinin, Eustoma grandiflorum*

Introduction: Romania assists at the present time to an increase of production crops for ornamental plants and as a consequence an increased demand of planting material. *Lisianthus russelianus* Hook.) is a relatively new floral crop to the international market, known for beautiful flowers of various colors and for having a long vase life. In Romania *Lisianthus* was introduced in 1980 at Codlea Brasov in greenhouse production (Toma, 2009) but nowadays the assortment is very limited despite the fact that on the international market it is recognized as one of the top 10 cut flowers in the world (Esizad *et al.* 2012).

Aims: The present study was aimed to investigate the efficiency of different medium composition and growth regulators for *in vitro* multiplication of *Eustoma grandiflorum* and obtain results that would enable researchers to identify the best type of medium for this species.

Materials and Methods: The biologic material used in the experiments, was comprised of three F₁ hybrids of lisianthus (*Lisianthus russelianus* Hook, syn. *Eustoma grandiflorum* Grise) as follows: 'Echo Lavender', 'Flamenco White' and 'Mirage Pastel Pink'. In the course of experiments conducted, for *in vitro* multiplication there were used nodal segments with axillary buds that were inoculated on MS basal medium supplemented with TDZ, BAP and IAA.

Results: The results show that the medium with BAP was most effective for obtaining the highest shoots number compared to medium containing TDZ. The highest shoots number was achieved for 'Mirage Pastel Pink' hybrid on the medium containing 1.0 mg l⁻¹ BAP and 0.50 mg l⁻¹ IAA.

Conclusion: That several factors like the hybrid, the type and concentration of growth regulators can influence the micropropagation and the rooting of lisianthus. There was a significant differences in the average number of regenerated shoots between the cultivars.

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MORPHOLOGICAL PARTICULARITIES AT TRUNK AND CROWN LEVEL FOR ELITE TREES OF THE *ACER PSEUDOPLATANUS* SPECIES

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Key words: *Acer pseudoplatanus*, elite trees, morphometric characteristics, variability

Introduction: Morphology of the tree represents the description of specific parameters together with the analysis and interpretation of the variations, therefore the morphometric analysis refers also to the shape as well as to the dimensions (Haruta, 2011). The shape of the trees and especially the size of the crowns directly influences the productivity and biodiversity of the stands (Enescu, 2004).

Aims: The choosing of high value ecosystemic stands and with superior genetic characteristics of *Acer pseudoplatanus* species, the morphometric description of the trunk and crown of the trees, based on gathered field data and establishing the variability of the analysed parameters. Generating the variation models of the attributes in relation with the chosen stands.

Material and Method: Was represented by the choosing the elite trees, from within the seedbearer populations stands, followed by the measurement of morphological parameters of the trunk and crowns of these trees, using the methods applied and described in the Silviculture literature. Trunk parameters have been measured, through direct methods, including the total height, the pruned height, the base diameter, and also the crown parameters, including the crown spread, crown ratio, crown flattening ratio, crown light percentage and crown darkness percentage. Through indirect methods, calculations have determined the tree volume, the trunk volume, and the crown volume (Giurgiu, 2004). All data have been statistically processed and analysed aided by ANOVA test and the bilateral "t" test.

Results: Following the measurements, the correlation value between the specific shape of the crown and its projection in horizontal and vertical plan was established. The result translated into a great variability of the crown spread and of the apparent volume of the crown. The shape of the crown is directly influenced by the tree's height and its location in the stand, and also by the base diameter of the trunk.

Conclusions: The variability of the crown's shape is an attribute manifesting itself at individual level, but also at population or stand level. Even though the trees of the same species present crowns with great variability, there can be identified a general or average crown shape that can be specific.

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INFLUENCE OF THE MOTHER BULB SIZE FOR THE GROWTH AND DEVELOPMENT OF *ALLIUM* 'PURPLE RAIN'

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Keywords: *Allium*, bulb size, yield

Introduction: The *Alliums*, known as vegetables, are important ornamental geophytes, used in gardens or floral art (Fritsch and Friesen, 2002). For many geophytes, the bulb size is very important in growth and development. Mosleh (2008), shown that the mother bulb size of edible onions, can increase the bulbs and seeds yield. Laskowska et al. (2013) shown that the size of *Allium moly* bulbs increased the flowers quality and the bulbs yield.

Aims: The study aims to show the influence of mother bulb weight, in the new plant flowers quality, plant height and bulbs yield.

Materials and Methods: *Allium* 'Purple Rain' one year old bulbs, were divided in three weight groups (**W**₁-15-35g, **W**₂-5-15g and **W**₃-0-5g), planted in open field and studied trough the biometric measurements and statistical analysis.

Results: The mother bulb size, expressed in weight, had clear influences in the plant development at *Allium* 'Purple Rain' cultivar. The highest number of the flowering plants, resulted from **W**₁ group (100 %), from **W**₂, bloomed only 20% of the planted bulbs and from **W**₃ group, the bulbs did not have flowers. The flowering time, was influenced by the mother bulb weight, as the **W**₁ group of bulbs got flowers earlier with around 3 days, then the **W**₂ group. Regarding the new bulbs yield, expressed in bulb number or bulb weight per plant, were increased with the increasing of the mother bulb weight. The number of leaves per plant and the length of the leaves were also higher for the plants from the **W**₁ group of bulbs, as against the other two bulb weight groups.

Conclusion: In this work, it is highlight the importance of the mother bulb weight, for the flowering improvement and for the bulbs yield, for *Allium* 'Purple Rain'.

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THE RATE OF WATER LOSS IN RELATION TO INTERNODES POSITION AND WOOD MATURITY IN VINE CHORDS

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Keywords: rate of water loss, string quality, vine chords, wood maturity

Introduction: Aspects of water regime in vines have been studied in relation to various biological, technological and environmental factors. The specificity of vines cultivars in relation to water use (isohydric and anisohydric cultivars) determines different efficiency of water use, photosynthetic rates and variable tolerance to water stress (Rogiers *et al.*, 2011; Hugalde and Vila, 2014).

Aims: The purpose of study was to assess the rate of water loss from the strings of vines in relation to internodes position on vine chords and degree of wood maturity.

Materials and Methods: The rate of water loss and associated parameters (maximum rate of water loss - RWL_{Max} , total drying time - T , time to achieve RWL_{Max} - $t_{RWL_{Max}}$) were determined from the Burgund vine cultivar, in controlled condition. Parameters studied were associated with dry matter content, degree of maturity of the wood, and internodes positions on chord.

Results: There was registered a variable rate of water loss in relation to positioning of the internodes on chord. At the basal internodes (first 2-4 internodes) was registered more time to achieve RWL_{Max} (80-90 seconds), followed by internodes with middle position, numbers 5-16 (60-70 seconds) and the apical internodes (17-19), to which was registered less time (50 seconds). The results of RWL_{med} , and RWL_{Max} parameters were correlated with the content of dry substance (sugar) and degree of wood maturation on the length of the vine chords.

Conclusion: Variable rate of water loss and afferent time, have expressed differential maturity of the wood on the chord length of vine, and quality of chords for different uses (vegetative multiplying of grapevine, fruitfulness cutting).

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INFLUENCE OF DIFFERENT SOIL MANAGEMENT EFFECTS ON SOIL ENZYME ACTIVITIES AND CHEMICAL PARAMETERS IN A LONG-TIME TERM VITICULTURAL TRIAL

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Keywords: *nutrients, organic matter, regression analysis, soil enzyme, tillage systems*

Introduction: Soil tillage moves more and more in the focus of agriculturists as well as environmentalists. Background is that tillage in viticulture heavily affects soil quality (Dick, 1992). Loss of soil organic matter resulting from extensive and/or wrong tillage systems as well as erosion reduces the fitness of soils and their productivity. There arises a need to assess soil quality in the course of development of sustainable viticultural systems. Despite the possible inputs of mineral fertilizers and pesticides, the basic and unique of interest in sustainable soil systems is its capability to cycle nutrients and C (Warkentin 1995).

Aims: The objective of this study was to determine whether tillage practices (no-till, permanent grass sod, natural vegetation, extensive tilling) affected soil nutrient levels and five different soil enzyme activities. A special focus is laid on the effects in the lane and the row in the vineyard.

Materials and Methods: A long-time tillage trial (7 years establishment without any treatment; then during 20 years 5 different tillage systems [normal tillage: plough and rotary tiller; permanent grass sod and mulching, natural vegetation; extensive and intensive tilling]. At the end of test period all plots were analyzed for C, N, P, K, Mg, Fe, Zn, Mn, and Cu and five enzymes: Neutral and alkaline phosphatase, α -glucosidase and β -glucosidase and urease.

Results: Treatments favouring growth of grasses or natural vegetation show in the soil profile a distinct zoning for all chemical soil parameters; it is very pronounced for pH, C and N. Soil enzymatic activity is highest in grass sod followed by natural vegetation. Activity of phosphatases is also higher in deeper soil layers. Lowest activities for all enzymes were found in the control and "intensive shallow tillage" plots. Significant differences exist between lane and row for all tested enzymes. Nutrients exert a distinct stratification according to soil depths. Soil enzyme activities are strongly determined by C and N content of soils. Microelements, esp. Cu inhibit soil enzyme activity.

Conclusion: The present work demonstrates very well that tillage systems exert a concise influence on nutrient mobility and soils' enzyme activity. Microelements (Cu) are strong inhibitors of enzyme and may have on the long run a negative impact on soil quality and fertility.

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WILD TYPES OF VITIS BERLANDIERI FOR ROOTSTOCK BREEDING

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Keywords: *genetic resources, rootstock breeding, Vitis berlandieri*

Introduction: Since the introduction of phylloxera European viticulture is not possible without the use of rootstocks. Only the introduction of *Vitis berlandieri* as a breeding partner led to lime tolerant rootstocks. Yet, not very much is known about this species. Very few accessions have been used for breeding up today. The whole genetic range of *V. berlandieri* yet has to be looked after. For this purpose seeds were collected from numerous natural stands in Texas and shipped to Geisenheim for germination. The resulting seedlings have been planted in germplasm collections at Geisenheim.

Aims: The aim of the project is to study the phenotypic and genetic variation in the different seedling populations of *V. berlandieri*.

Materials and Methods: Out of the main population of more than 3500 seedlings, 2000 individuals of 21 different mother plants are monitored phenotypically by ampelographic characterization of leaves and shoot tips. A subset of 23 individuals for each family is being investigated genotypic by microsatellite markers. Physiological characteristics like rooting ability are being monitored as well.

Results: Results indicate that the descendants of different mother plants show distinctive features. E.g. the rating of leaf shaping shows great variability. Discriminant analysis of ampelographic characteristics makes evident that the 21 families cluster in 4 major groups which correspond to the geographic positions of the mother plants at their original habitats.

A known problem is the poor rooting ability of *V. berlandieri*. Among the families the rooting behaviour is quite different. The families also show diverse microsatellite profiles. The three families analysed so far differ in the most frequent alleles which are the alleles inherited from the mother plant. The number of all alleles found differed as well between families which indicate that more father plants are involved.

Conclusion: The variability of distinctive characteristics featured by the investigated *V. berlandieri* plants is larger than initially assumed. This fact opens a much broader spectrum for future rootstock breeding programs, especially when focusing on improved rootstock to soil adaptation. Higher genetic diversity provides a sound base for viticulture in the future.

THE IMPORTANCE OF PERMANENT EXPERIMENTAL PLOTS IN SILVICULTURE. CASE STUDY – LECHINȚA EXPERIMENTAL FOREST DISTRICT

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Keywords: *experimental plot, forest, research, tree stand*

Introduction: Unlike other biocenosis, forest biocenosis are characterized mainly by the longevity of the trees, large developments in size, great variations in size, ecological plasticity, presence of relationships such as competition, favoring, hampering, cooperation, adaptation etc. (Giurgiu V., 1972). This imposes a certain specificity for experimenting and research in forestry. Obtaining the necessary information for the scientific process in the field of silviculture requires the existence of experimental plots, which are designed, placed, and installed according to research methods.

Aims: Updating the inventory of experimental permanent plots (blocks) and research applications in production at Lechința Experimental Forest and identification of periodic technical operations needed to be made in experimental plots.

Materials and Methods: The success of each experiment depends on the correctness of choosing the experimental device and elements of experiment, on consciously executing experimental works. On many times, the researcher cannot limit to a simple description or knowledge of a population in its current condition. Installation of research experiments is done by research teams involved in research projects and themes, and the experimental device is materialized as beacons, stakes, painted signs and G.P.S. coordinates, together with a presentation panel on which location, name of the experiment and other elements of interest are noted.

Results: After analyzing the situation from 2008, the date of the last update for experimental plots, it was noted that there were 120 experimental plots, totaling 1222.6 ha. After the assessment done in 2016, there were 40 experimental plots, totaling 275.6 ha.

Conclusion: Following changes of laws and the application of land fund laws, the reorganization of ICAS, the area managed by the forest district was greatly diminished. As a consequence of these events, the number of permanent plots managed was reduced. The 40 permanent experimental plots are currently used for 8 research themes.

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GENETIC VARIATION OF EUROPEAN BEECH (*FAGUS SYLVATICA* L.) IN ROMANIA

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Keywords: *Fagus sylvatica* L., genetic variation, nuclear microsatellite

Introduction: European beech covers about 6,900,000 ha spread along the Carpathian Mountains (Biriş, 2014) and about third part of these forests are situated in the Romanian Carpathians.

Aims: The aim of the present study was to assess the genetic diversity within and between European beech seed stands in Carpathian Mountains.

Materials and Methods: Altogether 437 trees were sampled in ten populations distributed along the whole Romanian Carpathians. DNA was extracted from cambium using the ATMA method (Dumolin *et al.*, 1995). Genotyping was done with 10 highly polymorphic nuclear microsatellites combined into two PCR systems: multiplex A: loci mfc11, FS3-04, FS1-15, csolfagus19, csolfagus31; multiplex B: loci mfs11, mfc5, mfc7, sfc0036, DE576_A_0. For PCR amplification the Qiagen-multiplex-Kit was used. An automated sequencer (CEQ8000 Beckman-Coulter) was used for fragment length assessment followed by allele assignment using the fragment analysis tool of CEQ8000 (Beckman-Coulter).

Results: All ten tested nuclear microsatellites were polymorphic. High genetic variation within and low genetic differentiation between the analysed populations was observed. Positive correlation was found between geographic and genetic distance.

Conclusion: High genetic variation is a positive prerequisite for adaptation. Intensive gene flow by pollen and seed in the continuous distribution range of European beech in the Carpathians could be an explication for these genetic patterns. The findings are similar with other genetic studies for European beech (e.g. Konnert 1995).

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DECLINE OF OAK STANDS IN REGHIN FOREST DISTRICT, MUREȘ COUNTY FOREST ADMINISTRATION

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Keywords: *biotic and abiotic factors, decline, oak*

Introduction: The presence of multiple injuries of forests, caused by various unknown causes have been signaled since the half of the past century. The rapid development of symptoms, their spatial distribution, and their action on forest species lead to the description of the so-called “unknown decline” of forests (Badea, 2008).

Aims: Tree stand decline can be assimilated to structural or functional disorders, in which several categories of disruptive factors concur and interact in different ways and directions, but whose result is the weakening of trees vigor, culminating with their death. The agents can be abiotic or biotic, the latter including bacteria, fungi and insects which are not capable to invade under normal conditions, to cause significant damage to healthy trees, but can be highly destructive when attacking devitalized trees.

Materials and Methods: For achieving the proposed aims, experimental areas were installed in stands affected in different ways and different degrees of attack by various disrupting factors. The stands had different ages.

Results: From observations made in the field, it was found that 15-20% of the trees had a very feeble state of vegetation, characterized by their drying from top to bottom, the phenomenon taking place in clusters with reduced consistency and the stands having better lighting. On tree trunk, there were identified symptoms characteristic to the insect *Agrilus sp.* Moreover, the presence of a bacterial slime on tree trunks was noted, in the vicinity of insect-made galleries.

Conclusion: studies and analyses performed show that the phenomenon occurs since 2013, initially being found in forest compartment 64D, then in the whole forest. Affected trees were capitalized as accidental products, hygiene cuttings, reducing the consistency, which leads to a structural degradation of stands.

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A FRUIT TREE AS AN IDENTIFICATION ELEMENT OF ORNAMENTAL GARDENS SHAPING IN CROATIA - ISTRIA ORNAMENTAL GARDENS CASE

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Keywords: *fruit trees, history, architecture, garden*

Introduction: Fruit trees and ornamental plant species planting on the same place being a part of the decorations around the house is a tradition that can be observed in all parts of Croatia, both in the past and today.

Aims: Presentation of fruit trees incidence continuity in ornamental gardens (private plots) in Istria (Croatia)

Materials and methods: All available scientific and expert literature has been studied whereas a part of the research was conducted in the field where the shape and structure of the private plots and gardens were determined. The frequency of certain plant species incidences was elaborated in percentage and shown in the graph. During the field reviewing, the Olympus photos have been taken and display of the selected photos was inserted in the tabled part of the paper.

Results: Thus, in Istria there are several different garden designs by the landscape characteristics of the area where a garden is located: 1 garden on lofty hills surrounded by fields or forests (A); 2 garden within the lowland part of the Istria interior (B); 3 garden along the coastal part (C). By the organization and stratification, the ornamental gardens in Istria can be divided into seven organizational types of gardens: I - utilitarian garden on the elevated parts (tops of hills); II - historically traditional style along the stone houses 100 and more years aged; III-historically and traditionally organized yard with old stone houses (100 and more); IV-recent architecture of the house along with the traditional organization of the yard; V-Recent house building (60's to 90's) along the coast with traditional elements; VI- the identic style as the V, only row houses organization and identical settlements throughout the coastal Istria area; VII - restored traditional farms with old stone houses and olive trees, mulberry, cherry or fig tree as the central part of the garden, with modern elements inserted for sport and recreation (swimming pool, tennis courts and the like); VIII - a modern construction style and the garden look with neither traditional elements nor fruit species.

Conclusion: The incidence of fruit trees in the gardens of Croatia can be traced through the centuries. Today is the traditional sequence of fruit trees planting in the ornamental garden often represented, resulting in the preservation of traditional garden shapeness including traditional and old Croatian varieties of fruit.

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NOXIOUS SNAIL SPECIES FOUND IN GARDENS OF SOUTHERN TURKEY

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Keywords: *Helicidae, Hygromiidae, Mediterranean climate, pest*

Introduction. There is over five hundred shelled gastropod species in the terrestrial environment in Turkey (Schütt, 2005). Among these, despite relatively small in proportion, a high number is represented in urban habitats. Several of the these synanthropes especially from Helicidae and Hygromiidae, most of which are originated from Mediterranean Basin, show crop pest potentials in their introduced ranges (Barker, 2002). As shown by a previous study (Kebapci, 2008), recent changes in the urban fabric and manipulation of urban habitats affect species, other able to survive conditions in traditional gardens.

Aims. Aim of the study is to give a list of snail species encountered in the city gardens in southwestern Turkey, including noxious and occasional species.

Material and Methods. Field observations carried out between 2008 and 2016 were used to obtain presence-absence data from gardens in provinces of Burdur, Isparta and Antalya. Swarming data, abundance and effects of herbivory on the crop species were recorded on site. Identifications were made using available literature (Schütt, 2005).

Results. Among members of the family Hygromiidae, which is the most species rich family with 11 species, *Cernuella virgata* (vineyard snail) is the dominant species across the area. Helicid snail *Helix lucorum* in the interior part of the area is completely replaced by *Eobania vermiculata* and *Cornu aspersum* locations and virtually non-existent in the cities of Burdur and Isparta except few locations. Antalya, generally characterized by the Medierranean climate, has the has the highest number of species not observed elsewhere.

Conclusion. Future studies are needed to uncover relations among co-occurring garden snails in the region and also the effects of the urbanization process. Apart from the community structure, our preliminary data shows that invasiveness of snails is further influenced by climatic constraints and horticultural practices.

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SECTION 5: ECONOMICS AND RURAL DEVELOPMENT

RURAL SUSTAINABLE DEVELOPMENT BY HORIZONTAL AND VERTICAL COOPERATION ON LOCAL SHORT VALUE CHAIN

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Keywords: *certified products, local producers, short value chain*

Introduction: Given that, into the North-West Development Region of Romania, according to Census of Population and Housing – 2011, live over 13% of the Romanian population, most of them working in agriculture, followed by manufacturing and industry trade, integration of producers in the short value chain is a goal that interest not only cluster, but also other development actors, whose activity is directly or indirectly influenced by agri-food sector, either economic, social, cultural political or administrative.

Aims: The study offers solutions to AgroTransilvania Cluster to accomplish its strategic objectives to increase the research and development capacity in field of bio-economy as innovative smart specialization cluster by certifying local and geographical indication products, doubled by the encouragement of the set-up and/or the development of associative forms and also the integration of producers and/or associative forms into the value chain.

Materials and Methods: AgroTransilvania Cluster is a professional association having as mission to become an integrative pole of sustainable development of agri-industrial sector in Transylvania, by supporting the sustainable competitiveness of the agri-industrial sector. The study was conducted in frame of Sub-measure 16.4 and 16.4 - Support for horizontal and vertical cooperation between actors in the supply chain in agriculture and fruit growing of National Programme for Rural Development in Romania 2014-2020, aiming to observe the sustainability of investments in cooperation between actors in the agri-food industry to market their products in short supply chains and facilitate the use of innovative methods of marketing products and attract new categories of consumers.

Results: The main results of the study reveal the feasibility of design short value chains for local certified products both for fresh and processed fruits and vegetables and for dairy and meat processed products in the North-West Development Region of Romania. It has to be mentioned, in the same time, the genuine interests to support this initiative for all actors involved into the value chain.

Conclusion: It can be concluded that a short value chain of certified product not only entail cooperation between farmers, processors, traders, food retailers, restaurants, hotels and other accommodation in rural areas, but support a sustainable development by promoting cooperation between local actors in order to sell agri-food products via short supply chains.

Acknowledgement. The study was initiated and logistically and financially supported by AgroTransilvania Cluster.

EFFICIENCY IN MANAGEMENT OF OTHER TYPES OF ACCOMODATION SERVICES OF ROMANIA

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Keywords: *hospitality, pension, financial and economic profitability*

Introduction: The increase of investments in pensions, in Romania, during the last years, relies on tourist attraction, namely the increase of economic efficiency. The development of other types of accommodation services creates the opportunity for tourism in rural areas and for cultural tourism. „Beside certain accommodation elementary services, there has to be a sustained relationship between nature, local community and tourists” (Henche, 2004).

Aims: Geographical location and analysis of profitability based on the activity efficiency indicators used in Romania.

Materials and Methods: Dissemination of information taken from the annual financial statements for the sample researched for the period 2010-2014. It was used the method of analysis that consists in: the determination of the efficiency indicators carried out through: profitability: commercial, economic, financial resources used as well as the relation between economic profitability- financial profitability.

Results: Earnings generated by the invested capital- in other accommodation units, resulting from the determined profitability ratios can be positively influenced by the complete use of accommodation capacities as well as the permanent assessment of fee- cost-profit ratio. The plus of the financial source brought by each monetary unit risked by the boarding houses owners, as other accommodation services- expressed by profitability ratios, offer policies for its use: dividends or reinvesting.

Conclusion: For the business facilities active in the researched sample by means of efficiency indicators, the following strengths are identified: access to investment funds, the existence of a specific market strategy for these accommodation services, investment and restoration works for locations, prices relatively low accessible to any type of customers. Weaknesses: environmental pollution, noise pollution, lack of well - prepared staff, inaccurate infrastructure.

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STUDY OF THE ECONOMIC IMPACT OF MOUNTAIN PRODUCTS ON THE INCOME OF CARPATHES PRODUCERS

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Keywords: *RoMontana, mountain product certification process, sheep milk products, wild fruits products*

Introduction: Romania has one of the biggest farming population in Europe with a total of 4.48 million. However, in 2007 the average utilizable agricultural area for a Romanian farmer was 3.5 hectares compared to 52.1 hectares in France. As a result of this, agricultural production is generally low. The mountains which cover a third of the area of Romania are conducive to forestry (pine, beech and oak forests) and livestock. Mountain agriculture is a traditional and marginalized agriculture using rudimentary technologies, with a low vegetal and animal performance. This is a vulnerable area of a point of view economic and ecological. Several research both at the national and the European level has been done in this sector of agriculture and it all seeks to arrive at the best strategies to valorise products from the mountains. Many institutional, scientific and economic actors think about the best strategies to promote mountains products and particularly in the context of the new European regulation.

Aims: This work therefore studied the sheep cheese and forest fruits from Vatra Dornei in order to propose a specifications report for the recognition as mountain products and a marketing and commercial strategy for the promotion of these products, and particularly about sheep products and wild fruits.

Materials and Methods: The study involved investigation/survey with farmers from the region of Vatra Dornei (producers of sheep milk and/or wild fruits and vegetables) in order to understand their working conditions and their organizational system and check the possibility to apply for a recognition of their production as “mountain products”, in two directions: sheep producers and wild fruits. A frame of information to obtain from producers has been previously prepared with the following items: the different products sold, ways of valorisation, selling places (near cities or touristic places), the link between the product with the region, its culture and its ecosystem, way of producing, value chain and packaging.

Results: The study reveals the mountain product certification process in the region of Vatra Dornei by understanding working conditions and farmers’ system of organization in the region, by learning about European and Romanian regulations about recognition of mountain products and by evaluating the process of value added for the production of Carpathians farmers.

Conclusion: The authors achieved a first specifications report for the recognition as mountain products and a list of key points for a future marketing and commercial strategy of promotion of these mountains products.

Acknowledgement. The study was initiated and logistically and financially supported by Master Food Identity – ERAMSUS MUNDUS.

STUDY REGARDING THE MARKET OF LOCAL PRODUCTS IN CLUJ COUNTY

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Keywords: *certified products, local producers, short value chain*

Introduction: Small producers in Cluj Area face difficulties to create competitive associations to sell their products and at the same time, promote rural development in their communities and to have access to better deals, new markets and storage facilities, among others. However, a major puzzle still needs to be solved and is to find the best-selling strategy for their products in the market. This requires to understand the newest but not yet very documented trend to buy local products but who is not able still to afford higher prices to sustain the chain. Our ultimate goal will then be to find the best solution to allow the associated producers to sell their products in the best competitive way in the current market.

Aims: The research aims to study the possibilities of improving identified strategies for selling local food products of the AgroTransilvania Cluster in Cluj area. The objectives of the study are to recognize the possible value chains and the new possibilities for selling the products of the AgroTransilvania Cluster and to compare the possible value chain using the Porter's Five Forces Model and Diamond Model and develop the best strategy.

Materials and Methods: The study is mainly qualitative with secondary type of data mostly. A practical approach to get primary data and do some statistical analysis is done by doing surveys to approach consumers and study their purchase behaviour, but is mainly descriptive and observational. Some of the tools to be used to develop the study are Michael Porters's 5 forces, Michael Porters's Diamond model, SWOT analysis and marketing mix

Results: The result of the study offers the possibilities to recognize the possible value chains and the new possibilities for selling the products of the AgroTransilvania Cluster and, by comparing the possible value chain using the Porter's Five Forces Model and Diamond Model was developed the best strategy.

Conclusion: The study requires to understand the newest but not yet very documented trend to buy local products but who is not able still to afford higher prices to sustain the chain. As final result, it was proposed an improved solution to allow the cluster to sell their products in the best competitive way in the current market.

Acknowledgement. The study was initiated and logistically and financially supported by Master Food Identity – ERAMSUS MUNDUS.

DIMENSIONS OF POPULATION AGEING IN ROMANIA

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Keywords: *demographic transition, life expectancy, population ageing*

Introduction: Population ageing is a social international phenomenon that appears when the median age of a country or community rises due to rising life expectancy, external migration and declining fertility rate.

Aims: There has been observed, initially in the more economically developed countries but also recently in less economically developed countries, an increase in life expectancy which causes the ageing of populations. The aim of this article was to analyse the dimensions of population ageing in Romania, concentrating on rural realities of ageing.

Materials and Methods: The document analyses were done, comparing official data from the Statistical Yearbooks of Romania and results of the latest Census. Documents reviewed in the process of collecting information were obtained in May-June, 2016, for the period 1990-2015.

Results: The phenomenon of ageing is affecting the Romanian society too, especially in the last decades. The structure of population age has the characteristic of a process of demographic aging, mainly due to declining birth rates which has reduced the rate of young population (0-14 years old). In the same time, the increasing life expectancy determined the increase the proportion of older adults (65 and more) in the Romanian population. As well, the rural population is more affected by aging than the urban society.

Conclusion: The kickback of birth rate and deterioration of overall mortality, plus a negative external migration left their mark on the situation of elderly population in total population of Romania. The effects that aging has on carrying out economic and social life, and the prospects of demographic evolution of Romanian society must be addressed in terms of making decisions that will prevent the negative consequences of this phenomenon.

ROLE OF FINANCIAL SUBSIDIES ALLOCATED BY THE CAP IN REDUCING OUT EMIGRATION IN ITALIAN COUNTRYSIDE

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Keywords: *choice model, FADN, rural development*

Introduction: In all European countries there has been an intense emigration from the countryside towards the urban space making worse living conditions of population in rural areas (Kasimis, 2000). Theoretically, it is harsh to define the role of CAP in contrasting the dichotomy between rural versus urban spaces (Gray, 2000) and a quantitative approach is the first and foremost tool to estimate nexus between rural emigration and CAP subsidies (Tocco *et al.*, 2014).

Aims: The purpose was to assess main correlations between the variable emigration from Italian countryside and financial subsidies allocated by the Common Agricultural Policy.

Materials and Methods: Using a quantitative approach and different source of data from 2004 to 2013 such as FADN dataset and annual results of demographic statistics, the paper has estimated by a Probit model and by a structural equation modelling the main relationships among financial supports allocated by the CAP, crop specialization and rural emigration.

Results: Findings have pointed out as there is an indirect correlation between financial subsidies paid by the second pillar of the CAP and emigration from rural areas. Structural equation modelling has also highlighted a positive impact of crops specialization on the level of investments and on the rural emigration. Italian regions located in the south, where are scattered lots of rural villages and farm with poor agrarian areas, have pointed out the highest level of rural out emigration.

Conclusion: The European Union throughout specific financial aids has tried to curb the rural emigration even if this phenomenon is strongly influenced by an exogenous variable such as the economic crises even if farm diversification and a new generation of farmers are pivotal in contrasting out emigration.

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LECTURER'S KNOWLEDGE REGARDING AN AGRIBUSINESS

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Keywords: *Agribusiness, lecturers, agriculture and knowledge*

Introduction: Nowadays, the terminology of agribusiness has moved from referring to a large-scale farming enterprise through mass production of agricultural goods and services through techniques. It includes production, processing and distribution, which all agricultural activities are related to goods and services. Although, agribusiness involves the agricultural input sector, the production sector and the processing-manufacturing sector (Bryceson, 2006) and (Jobst *et al.* 2007). Beside the defiance of supplying inputs, the requirement of agribusiness is to present food to the consumer (Chandrasekaran and Raghuram, 2014)

Aims: The study aims to identify the knowledge's degree of the lecturers that are working in the agriculture domain regarding the agribusiness, as a concept. It was considerate also important to analyse their knowledge about the importance of agribusiness in the Kurdistan Regional Government of Iraq.

Materials and Methods: The data were collected from the lecturers of the Faculty of Agricultural Sciences, of Technical Institute for Agriculture and of the Preparatory of Agriculture from Sulaimani city. The research method was the survey, and the instrument used was the questionnaire. The questionnaire was applied in January 2016. The total number of the interviewed lecturers was 200. The descriptive statistics and Pearson correlation test was used to analyse the data.

Results: The results of the study showed that the majority of the lecturers (53%) do not have knowledge about agribusiness, even 51.5% of them do not know the importance of agribusiness in future. Also, 67% of respondents showed that; it is important to have the department in university named agribusiness, but 27% of them do not have knowledge about having this scientific department or not.

Conclusion: In this research work interpreted the rarity of knowledge from the agronomist lecturers unremarkable through the importance of agribusiness. More than half of the lecturers believe; agribusiness it helps the development of rural area.

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HIGH NATURE VALUE FARMING AND THE COMMON AGRICULTURE POLICY. THE ROMANIAN CASE

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Keywords: *direct payments, rural development, low-intensive farming*

Introduction: High Nature Value (HNV) farming refers to low-intensive systems that sustain biodiversity conservation across Europe (Keenleyside *et al.*, 2014). Despite their growing environmental importance they are deeply vulnerable to global economic and social changes (Plieninger and Bieling, 2013). In Romania, HNV farming represents around 25% of the entire agricultural land.

Aims: The paper presents the main governmental programs designed for sustaining HNV farming in Romania. It also debates their capacity to access different types of subsidies.

Materials and Methods: Statistical data about different type of payments were obtained from official governmental and European sources. The quantitative research methods like correlation and regression were used to show the link between the type of farming (HNV or not) and the possibility to access different payments. Also, the bibliographical study was employed to present the current status and to discuss results.

Results: For the first CAP financial allocation (2007-2014) the Romanian HNV farms had only a limitative access to direct payments system. The correlation coefficient between the number of farms coming from a HNV area and the volume of payments received in the first CAP pillar is negative and close to one. In the same time, in the second CAP pillar, based on the special programs created for HNV farms (like agri-environment measures; semi-subsistence farms; etc) the access to funding was easier. These results showed that the Fishler's CAP framework had only limitative positive effects on HNV Romanian farms despite the official objectives. On the other hand, the Ciolos reforms (2014-2020) seemed to be better tailored for these farming systems especially in the first pillar due to several new payments schemes.

Conclusion: Even if the money dedicated to create programs for HNV farming sustainable development is important, the results are still less effective.

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IDENTIFICATION OF FOOD SECURITY CHALLENGES IN ROMANIA USING DELPHI TECHNIQUE

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Keywords: *export support, GMO crop, livestock production, nutrition supplementing*

Introduction: Four themes were submitted to experts' attention referring to a structural correction of the agricultural sector (livestock production revival), to the technological transfer (agricultural productivity increase, introduction of GMOs in crop production), to finding markets for the Romanian agricultural products (identification of foreign markets) and to the nutrition supplementing programs (for the vulnerable groups from Romania). The consultation of agricultural and food experts based on the Delphi method applied to policies was held in the period April – June 2015.

Aims: The survey objective was to identify the food security challenges in Romania, in order to define a national vision on this theme.

Materials and Methods: The sample selected for consultation consisted of 35 experts and it was designed in such a way so as to reach an equilibrium between three large categories of stakeholders: high level decision-makers; representatives of research and higher education institutions; representatives of agricultural production, agro-processing industry and agricultural services. Two questionnaires were applied.

Results: The first questionnaire contained, for each of the four themes, a forecast question (the probability of a certain evolution was estimated) and an option question (for which the desirability as well as the feasibility of the respective agricultural policy measure were estimated). The response rate to the first questionnaire was 71% (25 questionnaires received out of 35 questionnaires sent). The second questionnaire contained two option-related questions (the desirability for each of these was estimated), only for each of two themes (GMO crops and the nutrition supplementing measures), for which no consensus had been reached with regard to the measures of action after the first questionnaire. As regards the second questionnaire, sent only to those who completed the first questionnaire, the response rate was 80% (20 completed questionnaires out of 25).

Conclusion: Starting from the consensus per total sample on the desirability of certain agricultural and food policy options, it would be useful for the option on Romania's food security and safety towards 2035 to include the following: need to design a program for livestock production revival in agriculture; recommendation for the organization of a public debate that should debunk both the benefits and risks of GMO crop cultivation; defining a plan to support the export of Romanian agricultural products, mainly to the countries with food consumption increase potential; proposing an ad-hoc coordination between the public and private organizations involved in providing support for nutrition supplementing.

IRRIGATION INVESTMENTS IN ROMANIA. SIZE, RESULTS, EFFICIENCY

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Keywords: *economic efficiency, intensification, investment per ha drought, irrigation systems*

Abstract

In Romania was equipped for irrigation over than 3 million hectare, one of the greatest surfaces in Europe. The aim - drought control and intensification of agriculture by increasing the yield per hectare. The financial effort was very important - over 10 million USD borrowed from the International Bank for Reconstruction and Development and World Bank. To accelerate the construction of the irrigation systems and to save financial resources the constructors renounced to ones of the main parts of the system: drainage systems, measuring equipment, waterproofing transport canals and for application were provided cheap and hand shifted equipment.

Operation of the irrigation systems was defective to: there was not sufficient electric power for pumping water, fertilizers and pesticides and other production factors so that the yields per hectare were 50-70% under projected level. Economically all national irrigation system produced loses instead profits. At present about 1.5 million hectare are within rehabilitation course especially in the Danube Plane, which can be operated in profitability terms.

THE PROCESS OF LINGUISTIC EUROPEANIZATION REFLECTED IN THE LANGUAGE OF THE COMMON AGRICULTURAL POLICY IN ENGLISH AND ROMANIAN

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Keywords: *linguistic Europeanization, specialized language, standardization*

Introduction: Europeanization is the engine of change in Romanian society, public policy, economy, as well as agriculture and its corresponding scientific and technical fields. These paramount changes are reflected in Romanian specialized language, in the new essential terms employed in European communication, particularly in the field of the Common Agricultural Policy (CAP). Language represents a means to reach Europeanization goals, as language reflects and plays an active part in the dynamics of the Europeanization of agriculture, economy, society, language and mindset, thus facilitating access to the EU.

Aims: This selective analysis aims at revealing and illustrating the birth of new specialized language in CAP-related fields, following EU accession.

Materials and Methods: The CAP community *acquis*, mass-media and specialized literature sources were selectively analyzed, according to generalizing or relevance criteria, alongside *Interactive Terminology for Europe* (IATE) as referential database. The terminological analysis involved terminological inventory and classification of terms and translation analysis.

Results: The present analysis revealed the emergence of new specialized terms in CAP-related fields (*eco-condiționalitate*, *plafonarea plăților*, etc.) and the shaping of a new European vocabulary in these fields, towards an adaptation of the Romanian language to the new EU realities.

Conclusion: The new CAP specialized language in Romanian is abundant, but seldom inconsistent and therefore standardizing initiatives are recommended and must be officially undertaken. However, it is this abundance of new European terms in the Romanian specialized language that allows for the exploration of *linguistic Europeanization* in Romania, a novel dimension to be outlined in specialized literature, provided that official standardization and classification requirements are met.

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SECURITY AND SAFETY IN ROMANIAN TOURISM

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Keywords: *legislation, security, safety, tourism*

Introduction: In the present-day context, threats and dangers are increasingly more present, more popularized and tourists need to become more interested and informed about these aspects, before choosing tourist destinations. The image of a tourist destination depends not solely on the tourist attractions and quality of services provided, but also on elements related to the social and political climate, public order maintenance, security measures and emergency response capabilities.

Aims: High security provisions may be considered essential for the survival and development of a tourist destination (Shin, 2005). The paper aims at analyzing a popular topic, particularly that of security and safety in tourism, in terms of the definition of concepts, their place and purpose in the development of Romanian tourism.

Materials and Methods: The research of safety and security concepts involved the document analysis method, encompassing policy analysis, as well as the assessment of initiatives and measures at EU and Romanian level in relation to tourism and security. The paper provides and analysis of different risk assessment models for tourist destinations perceived by potential tourists (Fuchs *et al.*, 2006).

Results: The concept of security in tourism is employed, emphasizing the dimensions of security issues, both in terms of content, as well as negative impact on tourist destinations. The connection between security and safety in tourism underwent analysis through a series of perspectives: the analysis of security aspects that can affect tourism, the highlight of the impact exerted by these security issues on the tourism industry, the reaction of the actors on the Romanian tourism market to security and safety issues.

Conclusion: Romania, as tourist destination, must develop and support a coherent policy in terms of security and safety provisions in tourism.

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IMPACT OF THE IMPLEMENTATION OF THE MEASURE 141 “SUPPORTING SEMI-SUBSISTENCE FARMS” IN ALBA COUNTY

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Keywords: *farmers, semi-subsistence farms, European Funds*

Introduction: During the period 2007-2013 were financed 51,189 projects, from a total number of 88,846 submitted projects proposals for the measure 141 of the National Rural Development Plan County (MADR, 2016). From the total number of financed projects more than 10% were in Alba.

Aims: The study analyses the impact of the implantation of the measure 141 in Alba County. The objectives of the research were: to identify if the farms diversified the agricultural production and if this had influence on the life standard of the farms.

Materials and Methods: The research was conducted in Alba County, in April 2016. The research method was the survey, and the instrument was the questionnaire. A number of 162 farmers that accessed the Measure 141 were interviewed. The data were mainly collected from the animal husbandry farms (59%) that are specific for the research area. The descriptive statistics and chi-square test was used to analyse the data.

Results: The main results of the study that the projects had a positive impact on farmers, although 15% of them use some of the money for the personal scope, 85% of them increased production, and 61% of farmers selling the entire production, and 20% some production. The farmers considerate the accession of the European Funds being a difficult process because of the bureaucracy and lack of information. Even this for more than 50% of the farmers are satisfied with the results of accessing the Measure 141.

Conclusion: Conclusions reached on the course of the study are likely to find ways conducive to improving the management of EU funds and the management of small-scale farming. The main use of the funds was to assure the current activity of the farm and not for the development of the farm. It can be underlined the fact that the farms from the study area cannot survive from the current activity, because they do not produce enough to compete with bigger producers.

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STUDENTS UNDERSTANDING OF THE IMPORTANCE OF LEARNING ABOUT THE CONCEPT OF SUSTAINABILITY IN AGRICULTURE AND FOOD PRODUCTION

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Keywords: *food, graduate program, sustainability*

Introduction: Universities play a crucial role in developing efficient and long-run learning programs that respond to current needs and trends of the labor market. Offering sustainable development courses students can acquire competences needed to ensure the quality of life for future generations.

Aims: The main objectives of the research were to assess students' level of knowledge about the concept of 'sustainable food' and to understand the level of interest towards a master program in this field.

Materials and Methods: 392 students from four faculties of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania, were interviewed in September 2015. Descriptive statistics were used to analyze the data.

Results: The level of understanding of the concept 'sustainability' and of the phrase 'sustainable food consumption' varies significantly among students from several study programs. Rural development (22%), support (8%), environmental protection (7%) are the first words associated to 'sustainability', whereas in the case of 'sustainable food consumption' were 'balanced diet, without waste' (17%), 'healthy food, beneficial' (11%), 'food consumption secured in time' (9%). High correlation was found between the level of understanding of the two concepts ($r=0.798$, $p<0.001$). Only 33% of students stated that the courses taken helped them to understand well the concept of sustainability. When offering the opportunity to study a graduate program in the field of 'food sustainability', students expressed a medium level of interest.

Conclusion: Analyses indicate that the level of knowledge about 'sustainability' is relatively low and students are not fully aware of the importance of studying this concept. It remains a challenge for the university to find efficient ways to emphasize the need of learning these concepts and to promote them as current principles in agriculture and food production.

Acknowledgments: The study was conducted under a project entitled: European Master "Green Food Industries", Project Number: 526585-LLP-1-2012-1-FR-ERASMUS-EMCR, Grant Agreement: 2012-2982/001-001, Sub-programme or KA: Erasmus Multilateral Projects: Support to the modernization agenda of higher education: curricular reform.

INITIATIVES FOR PROMOTING INNOVATION AMONG LOCAL ACTION GROUPS IN ROMANIA

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Keywords: *rural development, LEADER, innovation, LAGs*

Introduction: At the end of 1980s the necessity of making rural development more sustainable was recognized. Therefore, the European Commission expanded the LEADER programme, which introduced a completely new approach to rural development philosophy, methodology and practice in the EU Member States. One of the most important features of this approach is facilitating innovation, which can provide new responses to the persistent problems in rural areas.

Aims: The paper focuses on the assessment of innovation knowledge and initiatives among Local Action Groups in Romania (LAGs).

Materials and Methods: A number of 67 LAGs were interviewed in June 2016. The research area covered 7 development regions of Romania.

Results: For 82.1% of respondents, LAGs innovation implies solving community problems, using new solutions, different from what has been applied so far. Only 17.9% of the investigated LAGs understand the innovation process as an adaptation to local needs of policies as seen in other communities. LAG members are those who can provide innovative solutions to the needs of the organization, followed by private specialists and residents of the communes belonging to the LAG. More than a half of respondents (56.7%) considered that the LAG they belong to didn't succeed in the implementation of innovative concepts until this moment. For the majority of LAGs questioned, a project is considered innovative if it has never been implemented in their area. The innovation is also seen as a process that could be implemented at the management level of the LAG. The initiative of branding the LAG is considered a more innovative measure than the association of farmers.

Conclusion: There is a need for more innovative projects developed by LAG in the actual programming period 2014-2020, which differs from those funded by the National Rural Development Programme for the period 2007-2013. The communities' problems need to be solved by implementing innovative measures using local resources.

Acknowledgments: The study was conducted under the project: "Master en agriculture, changements climatiques et sécurité alimentaire" financed by AUF BECO, code 290, 2014-2016.

PRIVATE LABELLING FOOD PRODUCTS IN SUPERMARKETS IN THE CITY OF CLUJ-NAPOCA

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Keywords: *consumer opinion, legislation, smoking, impact*

Introduction: Private-label food products or services, are typically those manufactured or provided by one company for offer under another company's brand, typically a store brand. As a general rule they are positioned as lower-cost alternatives of national or international brands, but some of them have become “premium brands”. There are many empirical research on private label products and considerable work has been done on well-defined areas of private-label research such as buyer behavior, market structure and performance, brand strategy, market performance of this type of products, competition with other brands, and so on.

Aims: The aim of this work is to assess the store policies regarding this type of products, to identify the country of origin and to analyse comparatively the prices towards the premium brands. Also to analyse the packaging and the shelf level they are exposed.

Materials and Methods: This information is based on data from 15 food categories at supermarket chains, which operate in the city of Cluj-Napoca. The research involves the direct observation of products in the store, the results being noted in an observational sheet the results being translated on a SPSS database, and then the hypothesis were verified using statistical tests.

Results: The presence of private labelling food is abundantly on the supermarket chains. Mostly of this products are cheaper than the “premium brands” and the provenience of a great part of products is inside Romania.

Conclusion: Store image, store loyalty and store satisfaction have a positive impact on the acceptance of store brand extensions and from this point of view the private label products are not discriminated on a shelf position despite that store brands have previously been known as low-price and low quality brands. In the supermarkets of Cluj-Napoca they are currently positioned as value brands with the aim to have the quality equivalent to manufacturer brands, with lower prices

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STUDY REGARDING THE ORCHARDS SURFACE AND FRUIT PRODUCTION OF APPLE, PEAR AND PLUM IN NORTH-WEST AND CENTRAL REGIONS OF ROMANIA

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Keywords: *fruit production, orchards surface, Romania*

Introduction: Most orchards are older than 25 years with potential reduced production, declining or abandoned (MADR, 2015). According to the culture system, more than half are extensively exploited. Production technologies are noncompeting, outdated, resulting in low yields of fruits and lower quality.

Aims: To analyse the orchards surface and fruit production in two regions of Romania: North-West and Central and to identify actions that can lead to the development of this sector.

Materials and Methods: Three species were analyzed: apple, pear and plum. In the regions, the climate is suitable for these species and all cultivation conditions are assured by the soil properties. Data were collected for the period 2006-2015 from the Romanian National Institute of Statistics and analyzed using time series indicators.

Results: In the case of apple, the cultivated surface increased slightly in both regions since 2013, the production registering also a decrease. In both regions, pears production and the cultivated surface decreased since 2013. Some of the causes are the old age of trees, the high costs of establishing new orchards and the low quality of seed material. Fruit production also decreased because farmers do not own storage facilities, being difficult to assure a long time supply. Plum production increased slightly from 2010 to 2013 after a long period of decline, the cultivated surface decreased over the entire analyzed period.

Conclusion: To increase the surface of fruits it is necessary to use certified seed material. EU funds offered within the National Rural Development Program 2014-2020 encourages farmers to establish new plantations using only certified seed material. Such actions can lead not only to higher quality of fruit production but also to the development of nurseries.

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REGIONAL ANALYSIS OF IMPLEMENTATION OF THE NATIONAL RURAL DEVELOPMENT PROGRAMME 2007-2013

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Keywords: *axes, counties, development regions, European funds, measures.*

Introduction: Rural areas, representative for Romania, have substantial resources for development. On the area of the rural space by 207 520 km² the rural population is not evenly distributed. Thus, the rural population has a high proportion in certain regions (South Muntenia - 58.6%, North East - 56.8% and South-West Oltenia - 51.9%). The highest density, excepting Bucharest-Ilfov region, was recorded in the Northeast (63.24 inhabitants / km²), while in the West region rural areas are less populated (26.51 inhabitants / km²). These disparities are reflected in the socio-economic development of these areas and the quality of life of rural population.

Aims: This study examines regional disparities in the implementation of the NPRD 2007-2013 based on information and data coming from the public dissemination of the monitoring reports, and from previous studies disseminated by other research groups (Goşa *et al.*, 2014, Goşa *et al.*, 2015)

Materials and methods: The methods used were analysis, synthesis, comparison method, deduction and induction. The data used were taken from the national statistics, as well from national publications, on which we made calculations and own interpretations. The study examined the disparities related to the degree of accomplishment of the objectives set-up and the share of the effective funding by the end of 2014, grouped after axes, measures, development regions and counties.

Results: The analysis revealed the heterogeneity between the attained public expenditures and the planned ones, both at the axes level and at the level the measures, revealing as well seen significant differences in regional and county level.

Conclusion: Some causes of the lower absorption of certain measures were at the overall national level, project beneficiaries encountering difficulties due to lack of own resources for co-financing, while others were due to the long periods of implementation, specific to the investments domain. For other measures, the multiannual or specific nature of certain geographical and environmental areas, or specific grants, favored overruns of the allotted budget expenditures, or determined a high degree of absorption.

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SECTION 6-7: ANIMAL SCIENCE AND BIOTECHNOLOGIES

EMERGING TRENDS AND CHALLENGES IN SILKWORM RESEARCH

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Keywords: *Biodiversity, Bombyx mori, Genomics, Traits, Technology*

Introduction: Currently the basic biology underlying the variability of most traits of interest in silkworm is understood but its practical implications are to be carried forward. Many gene products influence several metabolic pathways and most metabolic pathways are influenced by several gene products. In addition, whole sets of genes can be switched on or off *via* so-called ‘epigenetic’ mechanisms (DNA methylation, histone acetylation, RNA interference) participating in complex regulatory networks. Such mechanisms are found to play significant roles in phenotype development and transmission. Control of a single gene may thus cause unwanted side effects when the physiological network around is not sufficiently understood. Therefore, research must focus on dissecting the genetic basis of traits of relevance to sustainability and their interrelationships.

Overview: During the past decade, quantitative genetics has experienced a triggered progress in molecular biology. In particular the development of high density genetic linkage maps based on DNA markers (RFLPs, SSRs, AFLPs, and SNPs) has opened new ways for quantitative genetics. Genetic technologies based on transposon mediated transgenesis along with several recently developed genome editing technologies have become the preferred method of choice for genetically manipulating many organisms. In recent years, silkworm has become a model organism for understanding the biology to manipulate and reconstruct the genes to produce high quality silk. Some of the significant findings include sex linked markers, characterization of DNA markers, construction of early linkage maps, establishment of stable germ line transformation, production of pharmaceutically important proteins, immune response proteins, and annotation of thousands of expressed sequence tags (ESTs), identification and characterization of Z chromosome linked genes, demonstration of lack of dosage compensation, accomplishment of whole genome sequencing, identification of W chromosome specific BACs, Lepidoptera specific genes, horizontal gene transfer, and characterization of essential baculoviral genes. The development and improvement of protocol of silkworm transgenesis has opened new areas of application. At sequence level, genomic research is yielding genetic markers for selection, pedigree control and traceability. Beyond this level, opens the whole new realm of “omics” research: transcriptomic, proteomics and metabolomics. This research is bridging part of the gap between ‘structural’ genomic knowledge and everything we hope to learn by exploiting it. Activities in the new focus are divided into two steps. The first one detection of markers associated with quantitative trait loci (QTL). The second the use of markers in marker assisted selection (MAS). However, QTL mapping is regarded as a very promising avenue to dissect quantitative traits into their underlying Mendelian factors.

Conclusion: Systematic analysis and detailed description of relevant traits using molecular genetics information is required to combine quantitative genetics with modern tools for genomic selection. Most of the important potential technical advances offered by genetic engineering technology in silkworm breeding are still ahead. The review summarizes the technologies currently available for use in *B.mori* their application to the study of gene function and their use in genetically modifying *B.mori* for bio technological applications. The challenges and future prospects associated with the development and application of genetic technologies in *B.mori* are discussed.

HOW CAN ANALYTICAL CHEMISTRY SERVE BIOECONOMY? ISOTOPIC TOOLS IN SUPPORT OF EU POLICIES

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Keywords: *ecosystem, isotopic fingerprint, provenance*

Introduction: Europe is setting course for a resource-efficient and sustainable economy. The major goals are an innovative and low-emission economy combining demands for sustainable agriculture and fisheries, food security and renewable resources, while ensuring biodiversity and environmental protection. Bioeconomy comprises those parts of the economy that use renewable biological resources from land and sea – such as crops, forests, fish, animals and micro-organisms – to produce food, materials and energy.

Aim: The aim is to develop and apply analytical tools to cope with major concerns such as fraudulent practices where goods are declared with wrong provenance or adulterated with products of minor quality or non-sustainable production as well as negative effects on ecosystems.

Materials and Methods: In the prior context, the chemical fingerprint, especially the isotopic composition of different elements has proven their potential as unique fingerprint.

Results: The fingerprint of these products can be used to assess their provenance or authenticity. In the context of sustainable energy production, effects on ecosystems, ecosystem connectivities as well as animal migration are considered as crucial parameter. Isotopic tools serve as powerful means to monitor element fluxes, contamination provenance, animal movement and migration as well as ecosystem connectivities. Moreover, the isotopic information stored in incrementally grown materials (such as e.g. tree rings, fish hard parts, sediments or ice cores) can be used to monitor past environmental conditions and to develop models on ecosystem processes and adaption.

Conclusion: The lecture will provide a comprehensive overview on isotopic tools by presenting different isotopic systems and will give selected examples of applications.

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LA-ICP-MS OF FISH OTOLITHS AS TOOL TO PROVE THE INDICATION OF THE CATCH AND PRODUCTION AREA ACCORDING TO THE EU REGULATION NO 1379/2013

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Keywords: *Aquacultured fish, country of origin, food fraud, otoliths, LA-ICP-MS*

Introduction. Wrong labelling of the origin of food is one type of food fraud, being conducted to take advantage of known regional quality to make money with food from cheaper production areas often with less quality. In fish, the *European regulation (EC) No 1379/2013 on the common organisation of the markets in fishery and aquaculture products* in Article 38 “*Indication of the catch or production area*” regulates the required labelling in regard to the country of origin of fish. In c) it is defined that “*In the case of aquaculture products, a reference to the Member State or third country in which the product reached more than half of its final weight or stayed for more than half of the rearing period is needed.*” Conventional methods are not able to determine the time a fish has spent in a certain environment, and are thus unable to control the validity of the label.

Aims. As fish record environmental conditions such as the chemical composition of water experienced over the complete lifespan in otoliths (Campana 1999), we aimed at extracting temporally resolved information from fish otoliths to determine the residence time in a certain environment and validate the possibility to prove the country of origin provided on the label.

Materials and Methods. Spatially resolved direct solid sample analysis of otoliths from *Salvelinus alpinus* (Arctic char) of known life history (imported as eggs from Iceland and Sweden and reared in Austria) was performed by using a laser ablation system coupled to ICP-MS. Elemental compositions of otoliths were analysed by inductively coupled plasma quadrupole mass spectrometry (ICP-QMS), the $^{87}\text{Sr}/^{86}\text{Sr}$ isotope ratio was determined by multicollector inductively coupled plasma sector field mass spectrometry (MC ICP-SFMS).

Results. The Sr/Ca and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in arctic char otoliths studied reflected well the composition of the ambient water and allowed for a determination of the time spent in a certain environment with a temporal resolution as defined by the laser spot size and the monthly otolith accretion rate of the otolith of about 2-4 months. Even the origin of the eggs could be determined by the information stored in the center of the otolith.

Conclusion. Temporally resolved elemental and isotopic information in fish otoliths are suited to support the control of the indicated country/fish farm of origin. Spot size and otolith accretion rates of otoliths mainly determine the spatial resolution that can be achieved.

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CATTLE GENETICS REVEALS THE VIKING COLONISATION OF THE ENGLISH CHANNEL ISLANDS

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Keywords: *approximate Bayesian computation, cattle, genomics*

Introduction: Jersey cattle are a unique breed of taurine cattle (*Bostaurus*), renowned for their affable predisposition, small body size and hardiness while still producing milk with an exceptionally high butterfat content (~5-6%). The origin of the Jersey and Guernsey cattle populations on the British territories of Jersey and Guernsey in the English Channel is not clear. It has been suggested that these populations are derived from Norman cattle, or that they derive from African cattle breeds imported to those islands.

Aims: Identifying the putative origin of Jersey and Guernsey cattle and their relationship to African and European taurine cattle using a genome wide dataset of single nuclear polymorphisms (SNPs).

Materials and Methods: We used a dataset of ~30,000 autosomal SNPs genotyped in 101 animals representing Norman, Jersey and Guernsey cattle, as well as a representative set of taurine cattle breeds of African and Europe. We used approximate Bayesian computation (ABC) to model their divergence history of this breeds.

Results/Conclusions: Our results suggest that Channel Island cattle breeds separated from Normandy cattle approximately 1,100 years before present, coinciding with the Viking settlement of those islands. Additional analyses were carried out to identify signatures of selection at a breed level and those in common in both Island populations to characterise local adaptation and selective pressures (both artificial and natural).

NIGELLA SATIVA AND ORIENTAL SPICES AS PROTECTIVE PRODUCTS IN IRON INTOXICATION: IN VIVO EXPERIMENTS ON RABBITS

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Keywords: *iron intoxication, Nigella sativa, oriental spices, rabbits*

Introduction: *Nigella sativa* is a medicinal plant with quinoid compounds with high medical and pharmaceutical importance, used in traditional medicine for different medical problems, even in cancer. Also, there are more plants with health protective role especially when are used fresh and organic. Iron is an essential element for human and animal organism, but in high concentrations become toxic for cells.

Aims: This experiment wanted to prove the protective role of diet (containing oat, dry alfalfa, carrots, black cumin, clover, garden parsley, leek, chives, coriander, and fenugreek), in intoxication with iron overdoses in two different concentrations to rabbits.

Materials and Methods: We administrated i.p. FeII (gluconate) in two different doses to German Lop Eared Rabbits breed. The experimental animals had a special protective organic diet based on oat (*Avena sativa*), dry alfalfa (*Medicago sativa*), carrots (*Daucus carota subsp sativus*), black cumin (*Nigella sativa*), clover (*Trifolium*), garden parsley (*Petroselinum crispum*), leek (*Allium ampeloprasum*), chives (*Allium tuberosum*), coriander (*Coriandrum sativum*), and fenugreek (*Trigonella foenum-graecum*). The experiment was performed in the summer time, and last 43 days. At the end of the experiments, we collect blood for hematological analysis.

Results: The haematological blood tests did not presented significant differences between control group and experimental group, which demonstrated that even in iron intoxication for a short time, the diet can protect the organism.

Conclusion: In the present experimental research we demonstrated that fresh, organic plants can be effective for health protection and enhancement of rabbit's organism even in high doses of iron administrated for a short period of time.

GROWTH PERFORMANCE OF RED RUBIN BASIL (*OCIMUM BASILICUM* VAR. *PURPURASCENS*) IN A NFT INTEGRATED AQUAPONIC SYSTEM

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Keywords: growth performance, integrated aquaponics, Red Rubin basil, Russian Sturgeon.

Introduction: To keep up with an increasing global population and food demand, new and sustainable techniques of food production must be researched and applied.

Aims: To determine the performance parameters, in terms of both quantity and quality, of Red Rubin basil (*Ocimum basilicum* var. *Purpurascens*) grown in a nutrient film technique (NFT) integrated aquaponic system along with Russian sturgeon (*Acipenser gueldenstaedtii*).

Materials and Methods: The experiment was conducted for a period of 42 days, in triplicate, using three NFT aquaponic modules and three fish rearing units (0.55 m³ each). A crop density of 31 plants/m² was applied. Fish were fed with a 45% brute protein feed, at a feeding ratio of 1% of total biomass. The only nutrient source for the plants was the technological water resulted from the fish rearing activity. Initial, intermediary and final biometric measurements were recorded.

Results: The water quality was monitored using the photometric method and a series of growth parameters were determined, such as: leaf area index (LAI), relative growth rate (RGR), average net assimilation rate (NAR), mean leaf area ratio (LAR) and crop growth rate (CGR). The concentration of chlorophyll a, b and carotenoids the ash and the dry matter from Red Rubin basil leaf from each of the three triplicate experimental variants was determined.

Conclusion: No statistical significant differences ($p > 0.05$) were recorded between the triplicate experimental variants in terms of biomass quality and growth performance in a Red Rubin basil – Russian sturgeon integrated aquaporin system.

THE EFFECTS OF SOME PREBIOTIC PRODUCTS (ACTIGEN, BIOTRONIC TOP3) ON THE PRODUCTION AND CONSUMPTION INDICES IN BROILER CHICKENS

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Keywords: *Actigen, Biotronic Top3, broiler chicken, production performance*

Introduction: The prebiotics are natural or synthetic organic substances that favour the growth of beneficial microorganisms in the gastro-intestinal tract, thus maintaining the animals healthy and productive and subsequently increasing the production performances.

Aims: The aim of this study was to evaluate the effects of prebiotic products (Actigen and Biotronic top3) on the main production and consumption indices of broilers.

Materials and Methods: The study was conducted on a 75 broiler chicken Ross-308 hybrids divided in three groups, over a period of 42 days. Group 1(E) received combined feeds with the Actigen prebiotic for 42 days as follows: 0.08% in the starter phase (1-14 days), 0.04% in the grower phase (14-35 days) and 0.02% in the finisher phase (35-42 days). The broilers in group 2(E) were administered feeds containing prebiotic Biotronic Top3 (0.1%) for the whole duration of the study. The broilers in the control group were fed the base feed only. The broilers from all groups were weighed at the beginning and every following week; their average body weight, daily weight gain, feed consumption and feed conversion ratio (FCR) were determined.

Results: The use of the Actigen in experimental group 1(E) led to a body mass increase of 11.26%, to an 11.54% higher daily weight gain and to the reduction of the FCR by 2.31% compared to the control group. In Group 2(E) receiving Biotronic Top 3, an increase was recorded for the body mass (9.25%) and daily weight gain (9.49%), the FCR being the same as the one recorded in the control group.

Conclusion: These results confirm the favourable influence of prebiotics on the production performances of broiler chickens.

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THE INFLUENCE OF EXTRUDED FEED WITH A HIGH PROTEIN LEVEL UPON THE BIOPRODUCTIVE PERFORMANCES OBTAINED ON THE RAINBOW TROUT FEMALES, *ONCORHYNCHUS MYKISS*

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Keywords: *extruded feed, protein levels, rainbow trout.*

Introduction: The effects of feeding level, of the water temperature, of the composition and the preparation mode of the feed on the growth performances and on the use and nutrient assimilation and energy by the salmonids, have been the subject of many studies and speciality research and the results obtained are different (Bozkurt 2006; Gavriilidou 2003; Memis 2004). Under this aspect, an important part is played by nutrients which are contained in the feed and the quantity and quality of the sexual products can be improved through the insurance of the nutritive quantity and quality of the breeders feed (Boaru 2010).

Aims: The main objective of the study was to highlight the way that the differential feeding of rainbow trout females (*Oncorhynchus mykiss*) has influenced their growth and development. Also, have been followed the effects of the extruded granulated feed with a high protein level on egg weight and the gonosomatic index.

Materials and Methods: The research has been performed on the trout farm of Remetî (Bihor county, Romania), on the female rainbow trout biological material (*Oncorhynchus mykiss*). Two experimental lots have been designed (C-control, E-high protein), each one formed of 100 females, which have been distributed in the breeders basins at a density of 3 exemplars/m². For the feeding of the fish, two types of granulated feed have been used, differentiated both in terms of chemical composition and method of production. Data were statistically analyzed using the Graph Pad Inst 3 programme to highlight the statistical differences between the averages of the two groups (test „t” p<0.05).

Results: The results obtained were structured according to the administrated feed and the age of the females, in identical growing conditions. The growth dynamic of the female rainbow trout from 2 to 3 years shows significant differences (p<0.001) in favor of the second lot (E), for every feature followed. Referring to the evolution of the females from 3 to 4 years old, the results obtained also highlighted the differences we followed and we observed, namely that the biological material continued its growth and development after the first artificial reproduction. For egg weight, we also recorded a difference between the two reproductive cycles and between the two lots.

Conclusion: The body development and performance of breeding obtained in rainbow trout females (*Oncorhynchus mykiss*) were significantly influenced by the quality of the administered feed and the best results were obtained when the peeled feed with the high protein level of 53% was used.

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BEEBREAD FROM *APIS MELLIFERA* AND *APIS DORSATA*. COMPARATIVE CHEMICAL COMPOSITION AND BIOACTIVITY

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Keywords: *Apis mellifera*, *Apis dorsata*, beebread, chemical composition

Introduction: Beebread is a valuable bee product, both for bee nutrition and for humans. The high nutritional and bioactive properties of beebread were evaluated by chemical composition analysis of beebread from *Apis mellifera* and *Apis dorsata*.

Aim: Bee bread harvested from Romania and India, coming from *Apis mellifera* and *Apis dorsata* bees, were evaluated for their chemical composition. Analyses were made in APHIS Laboratory from USAMV Cluj, using validated methods for bee products.

Materials and Methods: Lipids were determined by the Soxhlet extraction method, total protein content was determined by Kjeldahl method, sugar spectrum was determined by high performance liquid chromatography with refractive index detection (HPLC-IR) and free amino acids using liquid chromatography coupled with mass spectrometry detection (LC-MS).

Results: Water content of beebread samples were situated between 11.45 and 16.46%, total protein content between 16.84 and 19.19% and total lipids between 6.36 and 13.47%. An attempt of determining the free amino acid content was made and high amounts of free amino acids were obtained. Beebread has high bioactive properties which can be expressed as antioxidant and antibacterial activity.

Conclusion: Chemical composition and bioactive properties of beebread is influenced by floral origin of the pollen which the bees collect and place in combs for fermentation. Also the climatic conditions have an important role in developing different fermentation compounds, that may act as antioxidants or antibacterial agents.

TRANSFER OF TRANSGENIC SEQUENCES FROM GENETICALLY MODIFIED FORAGE TO ANIMAL TISSUES

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Keywords: *GM soybean, labelling, poultry, transgene transfer*

Introduction: Considering the necessity of labelling for the products containing more de 0.9% GM it is of great importance to determine if the transgenic sequences identified in complex food derived from meat or from the added soybean. The GM detection systems are based on a very short DNA sequence (118 bp), therefore it is consider that its transfer in animal tissues by feeding is possible.

Aims: Experiments focused on identification of specific DNA fragments transferred from feed to consumers were performed, in order to emphasise the possibility of manufacturer unintentional mislabelling.

Materials and Methods: The biological materials were collected from chickens (5 individuals) grown in a local farm, fed with forage containing GM soybean, being represented by muscle, liver and stomach. The DNA was extracted both from fresh and cooked materials, using CTAB method (ISO 21571, 2005). PCR amplifications were performed using the specific primers for poultry (12S rRNA gene), soybean (lectin gene) and also for the GM-soybean (t-nos gene). The amplification products were separated by 2% agarose electrophoresis.

Results: For all the samples, even for the processed ones the specie specific gene was amplified, pointing out the DNA quality. Further on, lectin - the soybean specific gene was identified in all of the analysed samples, confirming that small fragment of the feed DNA could be found in animal tissues. When GM-soybean specific gene was tested, the presence of a 118bp fragment indicated the presence of transgenic sequence in some of the animal tissues. The intensities of bands were lower compared to lectin, demonstrating that the copy number was not similar for both genes. It demonstrated that either the soybean was not 100% transgenic or the transfer of small DNA sequence to animal tissue is randomly.

Conclusion: Small amounts of transgenic sequences were identified in fresh and processed samples, using standardized and validated methods. It is necessary to extend the researches by increasing the number of tested animals in order to confirm the obtained results. But it was definitely demonstrated that small DNA sequences are transferred along the food chain.

A NEW SPECIES OF THE GOBIIDAE FAMILY IN TRANSYLVANIA WATERS: RACER GOBY (*BABKA GYMNOTRACHELUS*, KESSLER, 1857)

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Keywords: *Babka gymnotrachelus*, new species, Transylvanian waters

Introduction: The Racer Goby (*Babka gymnotrachelus*) is one of the species of gobies well represented in most of the lakes and channels of the Danube Delta Biosphere Reserve, including the Razim-Sinoe lagoon complex (Oțel, 2007). Bănărescu (1964) mentions the presence of this species even in the ponds and lakes around Bucharest. In Transylvania, its presence has not been reported until now. The Racer Goby may have migrated into the Somes River from the Hungarian sector of the Danube, through tributaries (Tisa), Weiperth et al. (2013). The presence of this species in Western European countries has been studied previously by several authors and is due to river transport on the Danube (accidental migrations), following social and economic openings in the last three decades.

Aims: Our goal is to report a new fish species of the Gobiidae family in Transylvania waters and evaluating its impact on local ichthyofauna and fish farms in the area.

Materials and Methods: Racer goby specimens were caught accidentally as a result of field studies for capturing other species of fish. A specimen was captured in a pool adjacent to Taga Mare Lake N46°93'81 " - E24°06'86 " (Cluj County) and the second specimen was captured downstream of the Mica dam N47°15'13 " - E23°91'93 " on the Somes River (Cluj County).

Results: The presence of this species, in the waters of Transylvania is atypical. Captured specimens come from the Danube (through its tributaries), being excluded the migration from the waters of origin (S-E Romania). Identification was made on the basis of dichotomous keys: DS (dorsal spines) 7-8; DSR (soft dorsal rays) 14-18; AS (anal spines) 1; ASR (soft anal rays) 12-16; SLL (on lateral line scales) 54-62. Other characters that led to the identification of species: specific color with crossbars and dorsal-ventral flattened head, different from other species of gobies.

Conclusions: The presence of gobies (including racer goby) in Transylvania waters can cause imbalances in local ecosystems, given the adaptability and resistance of this species.

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BIOCHEMICAL AND HAEMATOLOGICAL PROFILE OF COW BLOOD IN DIFFERENT STAGES OF LACTATION

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Keywords: cow, milk, albumin, cholesterol, Hb, RBC, lymphocytes

Introduction: The health status of cows is evaluated and depending on haematological and biochemical profile of blood. Blood biochemical parameters influences lipid and protein metabolism in cows (Hagawane *et al.*, 2009). Nutrition is a factor that can produce profound changes in the metabolic profile in animals (Filipejová and Kováčik, 2009). Blood parameters analyse can lead to identify if there are errors in nutrition of lactating cows (Payne *et al.*, 1970).

Aims: Evaluation of metabolic and biochemical changes that occur during colostrum period and lactation, but also in terms of number of lactations in cows.

Materials and Methods: The biological material has been represented by a total of 60 heads of dairy cows from a family farm in Sălaj County, named BioEcofarm. Blood samples were collected in test tubes with EDTA as anticoagulant from jugular vein and further analysed. Haematological and biochemical blood parameters were analysed with Abacus Junior Vet and VetScan VS-2 Abacsis equipments.

Results and discussion: Haematological and biochemical parameters showed variations depending on factors analysed here. In lactation 1 Hb was 7.55 ± 3.05 (g/dl), while in lactation 6 the value was 12.5 ± 2.10 (g/dl). RBC ranged as follows: in lactation 1 - 28.50 ± 2.05 and in lactation 6 - 30.02 ± 2.05 . Lymphocytes varied within very wide limits under the influence of lactation: in lactation 1 - 2.8 ± 1.56 and in lactation 6 - 7.55 ± 1.80 .

Conclusions: The number of lactations and lactation time have significantly influenced biochemical and haematological blood parameters in dairy cows.

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LIGHT EMITTING DIODES AND SHUNGITE AS *IN VITRO* INNOVATIVE TREATMENTS AT *GLYCINE MAX* L. MERR., *BRASSICA NAPUS* L. AND *SINAPIS ALBA* L.

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Keywords: LED, mustard, rapeseed, shungite, soybean

Introduction: Light emitting diodes (LEDs) have advantages (lower energy consumption and heat emission, longer lifetime, possibility to control the intensity and spectrum), that make LEDs be a source of light for *in vitro* culture technology. Shungite is a rock from Precambrian era, with high content of carbon and some properties (absorption, bactericidal and catalytic properties, reduce the oxidation effect) witch make it useful in industry and medicine (Mosin and Ignatov, 2013).

Aims: The *in vitro* experimental research for innovative treatments based on the influence of shungite and LEDs on plantlets of *Glycine max* (L.) Merr., *Brassica napus* L. and *Sinapis alba* L.

Materials and Methods: The biological material was soybean Vigo, rapeseed Perla, white mustard Alex. We used RGB LED strips and shungite. The seeds were germinated on MS (1962) medium, PPFD - approximate $150\mu\text{mol m}^{-2}\text{s}^{-1}$. The first innovative treatments consist in the addition of red, blue or green light emitted by LEDs, as follows: 25% white+75% color, 50% white+50% colour, 75% white+25% colour. Simultaneously, we applied a second innovative treatment with shungite in the culture medium. After three weeks, we studied the length of plantlets, the percentage of germination, the growth stage according to the BBCH scale.

Results: Red light at 50% was beneficial for the plant length and growth stage of soybean. Blue light at 25% was beneficial for the plant length of rapeseed, but for the growth stage the best was green light at 50%. Germination percentage at soybean increased semnificatively on shungite, but decreased at rapeseed. The plants of soybean were generally much more vigorous on shungite then in agar. Mustard is not suitable for *in vitro* multiplication.

Conclusions: The study demonstrates the efficacy of the LEDs and the possibility of the insertion of shungite in the culture medium with beneficial results.

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TESTING THE TREATMENTS WITH SHUNGIT AND LIGHT EMITTED BY LED-S FOR SEEDS GERMINATION AND PLANTLETS OBTAINING OF *GLYCINE MAX* (L.) Merr.

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Keywords: LED-s, plantlets, seeds, shungite, soybean

Introduction: Shungite is a rock from *Precambrian* era, with high content of carbon and some properties (absorption, bactericidal, catalytic properties, reduce the oxidation effect) which make it useful in industry and medicine (Mosin and Ignatov, 2013). Light emitting diodes (LED-s) have advantages (lower energy consumption and heat emission, longer lifetime, possibility to control the intensity and spectrum), that make LED-s be a source of light for *in vitro* culture technology. *Glycine max* (L.) Merr. (Soybean) is one of the useful plants for different industries (food, pharmaceutical, etc.). The variety Vigo, is important by oil and proteins content, and is useful for studies regarding *in vitro* breeding.

Aims: Preliminary experimental researches for testing the simultaneous treatments with shungit and light emitted by LED for the seeds germination and the plantlets obtaining of *Glycine max* (L.) Merr.

Materials and Methods: The biological material was seed of *Glycine max* (L.) Merr. variety Vigo. We used shungite and RGB LED strips. The seeds were germinated on MS medium, PPFD - approximate $150\mu\text{mol m}^{-2}\text{s}^{-1}$. The first treatment, was consisted in the addition of shungite in the artificial nutritive medium. Simultaneously, the second treatment applied was consisted in the irradiation of white and one colour (red, blue or green) light emitted by LED-s, as follows: 75% white and 25% colour, 50% white and 50% colour or 25% white and 75% colour. After three weeks, we studied the percentage of seeds germination and the length of plantlets.

Results: Red light emitted by LED-s at 50% was beneficial for the seed germination and the length of plantlets of soybean. Germination percentage increased from 14.6% in agar medium to 57.5% on shungite. The plantlets were generally much more vigorous on shungite than in agar.

Conclusion: The preliminary experimental results showed that the best simultaneous treatment was with shungit in nutritive medium and with 50% white light and 50% red light emitted by LED-s at *Glycine max* (L.) Merr. variety Vigo.

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ASSESSING THE QUALITY OF WATER FROM DECENTRALIZED SYSTEM WITH WATER (WELL) IN DAIRY COWS FROM FARMS LOCATED IN NORTHWEST OF ROMANIA. PART I

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Keywords: *Chemical states, cow, drinking water*

Introduction. Romania has potential dispensable of 380 m³/s of phreatic water which can be used without previous processing or with minimal actions such as disinfection (<http://ecotrust.ro>, 2016). In terms of quality, phreatic water is considered clean and enroll in the potability standards or industrial uses less pretentious (Muntean C., et all. 2009). Chemical status of the water may be dependent on telluric nature of the soil or the result of impurification (El Mahdy C., 2013). All animals must have access to a suitable water source or to be able to satisfy liquidity needs by other means (Ordin nr.75/2005).

Aims: assessment of the chemical status of water in terms of the parameters indicators who come from the decentralized system of water supply (wells) given as drinking water at cows.

Materials and Methods: Identification of the chemical state of water from wells use like drinking water in cattle farms was performed from 63 wells by 5 counties located in S-E, N-W and central of Romanian the request of farmers. It has been studied the parameters that indicate the status of water acidification: pH (SRISO 10523/97); indicator parameters having as landmark the minimum list of parameters monitored by the laboratories of profile from county public health department: hardness (STAS 3326/76), iron (STAS 3086/68), CCOMn (STAS:3002/85), ammonia (spectrometry), parameters indicative of saline inclusions: chlorides (STAS 3049/88), sulphates (SRISO 10523/97). Characterization of the chemical state of water: good or poor was done after the values that define the worst condition. The limit values for each parameter are compared to those required by the L.107/1996, L.458/2002, 311/2004, O.621/2012.

Results: Were recorded values which attesting good quality status for 28 wells: [1 Alba (AB), 1 Buzău (BZ), 16 Cluj (CJ), 4 Mureș (MS), 5 Sălaj (SJ)] and 37 wells whose water quality status it is poor (6 AB, 5 BZ, 17 CJ, 7 MS). Exceeding the limits values were found at the parameters: CCOMn (CJ: 05.29±3.87 mgO₂/dm³, 10.59±2.04 mgO₂/dm³ AB); ammonia: (AB: 0.56±0.08 mg/dm³, MS: 0.51±0.1 mg/dm³), iron (BZ: 0.85±1.05 mg/dm³, CJ: 0.37±0.47 mg/dm³, MS: 0.62±0.57 mg/dm³), chlorides (AB: 330.42±208.8 mg/dm³, MS: 243.18±164.8 mg/dm³). Contamination risk score of wells in the studied areas is medium (3 point).

Conclusion. Regarding the requirements of water quality and chemical parameters analyzed, waters enroll in potability norms subject performing bacteriological examination, the water being suspicious in terms of CCOMn, but the decision remain at the discretion of farmers.

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WATER QUALITY, ESSENTIAL CONDITION SUSTAINING THE HEALTH, PRODUCTION, REPRODUCTION IN CATTLE- REVIEW

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Keywords: *cattle, health status, parameters, water*

Introduction: The water, like as protein, the carbohydrates, lipids (fat), vitamins and minerals constitute a nutrient (Harper F., 2012), but on other hand excessive minerals present in water can constitute a risk factor on status of health and major impediment to obtain the desired production when water parameters: organoleptically, physical - chemical, bacteriological exceed certain limits (Drăghici C., 2001). The water represents an important component in animal diet (Beede David K., 1994, 2005), but the presence of minerals from water contribute at daily intake of mineral concomitant with their decreasing from feed administered to cattle (Elrod Charlie, 2013), because can interfere with bioavailability of other micro or macro minerals by their synergistic or antagonism action if the quantity found in water overlaps over those in feed (Man C., 2002, 2007).

Water quality administered to livestock must meet the requirements of potability to maintaining the health, production and sustaining breeding (El Mahdy C., 2013), quantity of water administered being dependent on the several factors (Dave German, 2008) some of them dependence by animals: pregnancy, lactation, activity, others of environmental: type of diet, feed intake and environmental temperature. (Lardy G. et al., 2008). Excessive minerals in water can affect the availability of other dietary nutrients and can contribute to digestive, health, and performance problems (Linn J, 2008). Some parameters affect milk production by production decrease (Swistock B., 2012), others factors affect the quantity of water ingested which influences the feed conversion rate and average daily gain, affects health status through local adverse actions by reducing the local resistance and installation of laryngitis, pharyngitis and decrease overall body resistance (Man C., 2007), metabolic disorders (Adams R.S, et al., 1995), digestive disorders (Harty A., 2012), skeletal disorders (Olkowski A.A., 2009) and impaired reproduction sphere translated through: decreasing fertility, abortions (Stephen F. Higgins, Carmen T.). Other unfavorable actions: elements interfering with the absorption of other essential element sand which produce chronic or acute poisoning (Jim Krantz, 2011).

Conclusions. Alongside with minerals in the feed, the contribution of minerals in the water is essential. Ensuring water quality has as result maintain welfare, health, production and reproduction in dairy cows. Is required the regular testing the water quality administered to livestock, certain compounds that are found in excess having a negative impact, anti-nutritive and challenging of changes in the health status of the animals.

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METABOLIC, BIOPRODUCTIVE AND REPRODUCTIVE EFFECTS OF AQUATIC EXPOSURE TO CADMIUM IN FISH- A REVIEW

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Keywords: *cadmium (Cd), fish, food, production.*

Introduction: Aquatic organisms exposure to heavy metals has been extensively studied starting with the second half of the twentieth century. Effects of exposure, the capacity of bio concentration and bio-propagation of Cd within the aquatic trophic chains is of wide interest, as all these combined involve important food security risks to humans. It is well-known that aquatic organisms, particularly various fish species, consistently react to water pollution; therefore, they represent reliable bio indicators of water quality.

Sources of Cadmium Pollution in Aquatic Systems. Cadmium is a common element, ubiquity distributed in the environment in concentrations varying between 0.1-25 ppm. Cadmium concentrations depend on the nature of the rock structure of origin (Cook and Marrow 1995). Freshwater pollution is commonly the consequence of elutriation of agricultural soils, mine extracts deposits and industrial waste by rainfall water. The Cd load in these waters depends on the location and sources of pollution found in each area, explaining why reported concentrations may vary largely between 10-4000 ng/mL (OECD 1996; WHO 1992). In sea and ocean waters, mean Cd concentration is 5-20 ng/mL, but the level is significantly higher unindustrialized coastal areas where it may reach 100 ng/L (Cook and Morrow 1995; OECD 1994).

Cadmium Bioaccumulation in Fish. Normal ranges of Cd concentration in fish meat should not surpass 5-40 ppb (ATSDR, 1997). Cadmium enters the animal body by intestinal absorption in most cases or, alternatively, by branchial respiration or transdermal passage.

Metabolic, Bio productive and Reproductive Effects of Cd Exposure. Studies on various fish species, experimentally exposed to sub lethal Cd concentrations, indicate a reduction of food intake and significant decrease in metabolic processes rates. The data indicate significant physiological changes in the muscle metabolism, possibly linked to alterations in gas exchanges at the branchial arches level (Zhang et al., 2013). Exposure to Cd induces several effects on the endocrine status and on carbohydrates metabolism in fish. Acute effects of 0.4, 0.8 and 2.4 mg/L Cd exposure for 2, 4, 24 and 96 hours on young rainbow trout populations (*Oncorhynchus mykiss*) consisted of increased T₄ levels and an elevation of plasma cortisol, whereas T₃ concentration remained unchanged. Subacute exposure (0.4 and 0.8 mg/L Cd) for 1 week resulted in a decrease of liver glycogen combined to an increase in glucose and serum cortisol levels, while T₄ decreased and T₃ remained stable (Hontella et al., 1996).

Conclusions. Exposure to Cd results in morphological, biochemical and physiological changes in fish, irrespective of the fish species. All together will interfere with the metabolic rate, eventually leading to a reduced growth rate by lowering the energy efficiency at increased energy costs. Both endocrine-disrupting effects of Cd and Cd-induced alterations in the immune response exert deleterious effects on the reproductive function.

CONCEPTUAL INCONGRUENCE BETWEEN PRION DISEASE AND GENETIC DIVERSITY IN OVINE SPECIES WITHIN EUROPEAN UNION DEFINED BY INFORMATIONAL STATISTICS TERMS

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Keywords: *biodiversity, genetic diversity, scrapie, sheep.*

Introduction: Biodiversity is perhaps the most modern concept of life sciences. Also, the studies of spongiform encephalopathy's in the farm animals, including the scrapie in sheep too, represent one of the most amazing fields of genetic, biomedical and cellular biology research. All countries of the European Community have developed special programs for the study of this terrible disease and been making considerable efforts to eradicate it. But reducing the morbid phenomenon caused by prion protein runs counter factually with biological diversity preservation and even with its enhancing.

Aims: In this context, the paper examines the genetic diversity of sheep in the European space and the evolution of this phenomenon in parallel with genetic prophylaxis measures applied in animal populations to limit or even eliminate the pathogen agent of scrapie (protein prion). This paper proposes a precise quantification of genetic biodiversity in all sheep populations in Europe by a modern concept derived from informational statistics - *informational energy*.

Materials and Methods: The molecular genetics works has been carried out on animal samples extracted from sheep populations belonging to all breeds reared in the European Community. The biological fluid analysed was the venous blood. Sheep genotyping at the PrP locus was performed by PCR RFLP method. The *informational energy* parameter (e) was used to quantify the genetic diversity of sheep populations from Europe, both at certain times, but as well in its evolution

Results: The technological and prophylactic measures applied to reduce or to eradicate the scrapie in Europe by promoting for reproduction only individuals with prion genotypes that confer resistance to scrapie and eliminating all reproducers with prion genotypes susceptible to scrapie, lead to the narrowing of genetic diversity in sheep populations at the PrP locus that can be in linkage with other loci responsible for exteriorization of some features of animal productivity. Then, eliminating PrP alleles associated with morbid phenomenon, also some genes associated with valuable production traits can be eliminated from populations.

Conclusion: To avoid the drastic decreasing of biodiversity it is required a special accuracy of the selection process and a perfect perspicacity of sheep breeder when performing the mating schemes between individuals having regard to the prion genotypes.

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RESEARCH ON THE INFLUENCE OF THE LIGHT AND SEXING ON GROWTH PERFORMANCE AND SLAUGHTER RESULTS AT YOUNG QUAILS FROM MIXED BALOTESTI POPULATION OF EGGS-MEAT

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Keywords: *Carcase, females, light, males, quail, light*

Introduction: The programs of light asymmetric fractionated presents a potential interesting for poultry whereas help to the application of the restrictions feed supply and enables savings of electricity (Elena Popescu-Micloșanu, 2007). Furthermore, it was found that the fractionated illumination programs have a positive influence for growth and feeding conversion (Mahmud et al., 2011).

Aims: The purposes of determining the influence of the light and sexing on growth performance and slaughter results at young quails from Balotești population, was organized an experiment on 150 quails between age 28 and 70 days. The chicks were divided into two groups (control and experimental), and growth and slaughter performance were determined separately by sex.

Materials and Methods: Have studied 2 lighting programs, a program of continuous lighting with photoperiod duration of 16 hours (16L+8N, control group) and a program of lighting with asymmetric hour intervals with photoperiod duration of 16 hours (10L+2N+6L+6N, experimentally group).

Results: Males and females from the experimental group were recorded average performances of growth higher during the period 28-70 days. Live weight at the age of 70 days was higher with 7.54%, average weight gain was higher with 14.86% and feed conversion rate was lower with 13.51% at males from experimental group compared to males from the control group. Also, the live weight at the age of 70 days was higher with 18.09%; average weight gain was higher with 35.12%, while feed conversion rate was reduced 30.08% on females from the experimental group compared to females from the control group. The results of the slaughter at the age of 70 days were superior in the case of females from both groups versus males. The average weight of the carcass was higher with 17.53% in case of females than that of males from the experimental group, and the carcass yield was 65.37% at females and 65.56% for males. Also, the average weight of the carcass was higher with 5.08% in case of females compared to that of males from the control group, and the carcass yield was 64.20% to females and 66.70% on males.

Conclusion: Superior results recorded in the case of females and males from the experimental group recommended the program of lighting with asymmetric hour intervals in the growth of youth quail. Also the higher slaughter results recorded in the case of females of the two groups recommended them in the meat production through a broiler of quail that combine advantages in the production of both males and females.

INVESTIGATION ON THE INCIDENCE, DIAGNOSTIC POSSIBILITIES AND DESIGN OF PROFILACTIC TREATMENT IN AN OUTBREAK OF BACTERIAL HEMORRHAGIC SEPTICEMIA OF CARP

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Keywords: *crap, investigations, diagnostic, prophylactic-treatment*

Aims: Investigations regarding the incidence, possibilities of diagnostic and design of profilactico-treatment in the case of an outbreak of bacterial hemorrhagic septicemia in carp breeders, raised in a traditional system.

Materials and Methods: Investigations were conducted in Cluj county, in a fish farm from Suatu, specialized in raising carp in an extensive system, on a group of 53 breeders (31 females and 22 males).

Among the breeders diagnosed with anatomic and clinical lesions with external bleeding, a number of 3 were badly affected. On these samples bacterioscopic and bacteriological exams were conducted, in order to clearly establish etiological diagnostic, within the laboratories belonging to the Ihtiopathology Department, Faculty of Animal Science in Cluj Napoca.

Conclusions: Incidence of bacteriosis presents varried values depending on breeder's gender group, 54.8% in females and 36.3% in males.

The necropsy performed on 3 specimens with supposed bacteriosis revealed that the presence of hemoragic lesions on skin (diffuse or dotted) and necrosis of skin and muscles.

The bacterioscopic examination of smears from the pathologic material (skin surface end internal samples) and colored with the Gram method, reveled bacterial microflora, represented by coccobacillus and straight bacilli or slightly curved, both Gram negative.

Results: The bacteriologic examination performed on normal and selective media revealed as well the isolation of the Aeromonas germs.

Testing the sensitivities to antibiotics and chemotherapy of the diagnosed strains reflects values of sensitivity for isolated bacteria in descending order: amoxicillin, oxytetracycline, florfenicol and enrofloxacin, reduced sensitivity to tetracycline and resistant to ampicillin and erythromycin.

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SERUM LIPIDOMIC BIOMARKERS FROM PATIENTS WITH PROSTATE PATHOLOGY IDENTIFIED BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY COUPLED WITH MASS SPECTROMETRY

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Keywords: *lipidomics, prostate hyperplasia, cancer, mass spectrometry, biomarker*

Introduction: Lipidomics can offer an instant snapshot of the lipophilic metabolites from tissues and bio fluids and can indicate the presence of different pathologies, such as hyperplasia or different types of cancers. Related to prostate pathologies, Prostate Serum Antigen (PSA), used for prostate cancer diagnosis proved to have a low grade prediction (1). Meanwhile, untargeted or targeted metabolomics became a useful technology to discover new biomarkers for a better diagnostic.

Aims: The aim of this study is to realize an adequate procedure based on liquid chromatography coupled with mass spectrometry (HPLC-MS) to fingerprint and to determine a quantitative profiling of lipids from serum, followed by adequate biostatistics (2, 3).

Materials and Methods: Blood samples, obtained from healthy men (C) and patients with prostate benign hyperplasia (H), presumed cancer (CB) and confirmed cancer (CO) were processed for extraction of lipids with Bligh & Dyer method, and subjected to HPLC-ESI(+)QTOF-MS measurements. TofControl 3.2 and Data Analysis 4.2 software (BrukerDaltonics) were used for the control of the instrument and data processing. To process the raw matrix data, Profile Analysis 2.0 software was applied for alignment and advanced bucketing and then, the multivariate analysis (PCA and Cluster Analysis) with Unscrambler 10.1 software.

Results: By untargeted metabolomics, molecules with m/z values of 316.3227 (eicosanoid acid or decanoylcarnitine), 369.3528 (tetracosanoic acid or 6 keto prostaglandin E1 or 5,12 diHPETE isomers), 415.2118 (ascorbyl palmitate), 432.240 (N-stearoyl phenylalanine) as well diacylglycerols, phosphatidylcholines, phosphatidylserines and ceramides can represent good diagnosis biomarkers, which can evidenciate significant qualitative and quantitative differences between the controls and pathologic groups.

Conclusion: Therefore, lipid biomarkers can be useful for an accurate diagnosis, prognosis and clinical decisions for the treatment of prostate pathologic status.

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THE ROLE OF NITROBENZOIC ACID DERIVATIVES ON CALLUS INDUCTION AND PLANT REGENERATION IN PAULOWNIA SHAN TONG

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Keywords: *Paulownia; in vitro culture; callus; alkanolamine salts of 4-nitrobenzoic acid*

Introduction: The present study was undertaken to investigate the effects of different alkanolamine salts of 4-nitrobenzoic acid on in vitro callus induction and plant regenerating in Paulownia shan tong, a multipurpose tree. The alkanolamine salts: methylethanolamine 4-nitrobenzoate (4-NO₂BA MMEA), diethanolamine 4-nitrobenzoate (4-NO₂BA DEA) and triethanolamine 4-nitrobenzoate (4-NO₂BA TEA) are new synthesized compounds with biological activity and low toxicity. The influence of title compounds on sprout length, number of internodes, leaves and ramifications has been studied at two different concentrations: 1 mg/L respectively 0.5 mg/L.

Materials and Methods: The new compounds, 4-NO₂BA MMEA, 4-NO₂BA DEA and 4-NO₂BA TEA, were obtained by the Institute of Chemistry Timisoara of Romanian Academy, via proton exchange reaction, from 1:1 molar amounts of 4-nitrobenzoic acid and different alkanolamine, in acetone solvent. The internodes excised from healthy plant of P. shan tong, sterilized and cultivate on MS culture medium were used as explants. For callus induction was used 2,4-D phytohormone in two concentrations: 1 mg/L respectively 0.5 mg/L.

Results and discussions: The morphogenic response of the explants to alkanolamine salts of 4-nitrobenzoic acid is determined in this study. Similar values for sprout length, better than control were observed in all cultivation variants with exogenous supply of salts, at 0.5 mg/L concentration. Therefore, among the tested compounds, NO₂BA MMEA (1 mg/L) showed the best results for all analysed parties: A – 2.31±0.433cm, B – 5.25±0.777cm, C – 9.85±2.192cm, D – 2±0cm.

Conclusions: The present study concluded that culture medium MS supplemented with different alkanolamine salts (H1 – H3) exhibited better morphogenesis at all tried concentrations, in comparison with synthetic auxin 2,4-D and with the control sample.

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THE EFFECT OF HIPPO THERAPY IN CHILDREN WITH DISABILITIES

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Keywords: *Disability, hippo therapy, horses, interaction*

Introduction: Hippo therapy is globally recognized as a method of treatment for people with socially adapting problems, with physical problems, such as neuromotor and psychomotor, or even people with Down syndrome (Rusu A, 2012).

Aims: The purpose of this work was to highlight the effects of hippo therapy on children with special needs.

Materials and Methods: The research was conducted on a group of 20 children with disabilities, which was enrolled in this type of therapy for 8 months (January-August), at the Centre for Recreation and Recovery by Riding Leorint. In the first phase there was conducted an initial assessment of the kids, representing the starting point for finding out on what level of disability are they, where are the gaps and what could be recovered, respectively what skills or qualities may be based in therapy. After 3 months, in April, there was made an intermediate assessment of the children to see if their condition improved and if the suggested results were achieved also to see what modifications are need. The last assessment was done in August, after 4 months from the intermediate assessment. All these assessments were conducted with the assistance of a psychologist and there were analyzed the skills and cognitive functions, motor skills, spatial-temporal orientation skills, sensory-perceptual organization, language and personality of children.

Results: Applying hippo therapy in the case of children with disabilities it was found that these children are moving better, speak more easily, communicate and are becoming more aware of their surroundings. Aside from the effects and measurable results of hippo therapy there were also the subjective ones such as the satisfaction of going to the therapy sessions and of being together with a horse.

Conclusion: The results of this type of therapy proved that this method can be extremely efficient in treating children with diverse disabilities, mental or physical.

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COMPARATIVE STUDY ON QUALITY PARAMETERS OF APILARNIL, ROYAL JELLY AND QUEEN BEE LARVAE

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Keywords: *apilarnil, comparative analysis, LC-MS, queen bee larvae, royal jelly.*

Introduction Royal jelly is a secretion of hypopharyngeal glands of nurse bees. Its role in the bee family is very well known in caste differentiation, queens' development and reproduction. Apilarnil is a product of complete content harvesting of cells with drone larvae of 7 days which is triturated, homogenized, filtered and lyophilized for a better preservation. Queen bee larva is a similar product with Apilarnil, but having queen bee larvae and royal jelly in composition, harvested also in day 7 of development.

Aims: The aim of this study is to present a comparative study regarding royal jelly, apilarnil and queen bee larva.

Materials and Methods: Lipids were determined by the Soxhlet method, protein following the Kjeldahl method, sugar content was determined by HPLC-IR, 10-HDA with HPLC-PDA and free amino acids were performed using liquid chromatography coupled with mass spectrometry detection (LC-MS).

Results: The sample of queen bee larva occupied first place in terms of fat content 10.3% and proteins content 12.03%. The amino acids content was higher in Apilarnil with 1830.7 mg/100g followed by the queen bee larvae, 1780.67 mg/100g. The total content of essential amino acids was 77.98 mg/100g in queen bee larvae, compared with Apilarnil, with an amount of 68.99 mg/100g.

Conclusion: Queen bee larvae may be considered a dietary supplement with high nutritional value.

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IN VITRO TESTING OF THE INSECTICIDE RELDAN ON SWINE OOCYTE MATURATION

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Keywords: *chlorpyrifos, maturation, oocyte, pig, toxicity*

Introduction: Chlorpyrifos is a broad spectrum organophosphate insecticide that is widely used in products like Reldan to control insect pests in agricultural fields (Li *et al.*, 2015). Noteworthy concentrations have been found in human biological fluids (Casey, 2005). Chlorpyrifos is classified as moderately toxic compound by the United States Environmental Protection Agency and is associated with reproductive cycle disturbances, reduced fertility, prolonged time-to-pregnancy, spontaneous abortion, stillbirths, structural abnormalities, altered growth, and functional deficiencies in mammals (Bretveld *et al.*, 2006).

Aims: Our aim was to test the toxicity of several Chlorpyrifos concentrations and investigate its effects on maturation of swine oocytes.

Materials and Methods: Swine oocytes from ovaries harvested in a commercial slaughterhouse were cultured for 44-45h in M199 supplemented with the following Reldan concentrations: 0.1, 0.5, 1 or 2 µg/ml. *Cumulus oophorus* expansion was assessed and oocytes were denuded and stained with 1 µg/ml fluorescein diacetate to estimate viability. Afterwards, oocytes were fixed in a 60% methanol/DPBS solution and stained with 50 µg/ml propidium iodide to observe the DNA stage. Differences were analysed by the analysis of variance and interpreted using the Tuckey test.

Results: Surprisingly *cumulus* expansion was favourably influenced by the addition of Reldan with more *cumulus*-oocyte complexes reaching higher expansion stages. On the other hand viability was diminished when insecticide concentration increased, the most significant being 2 µg/ml. The same Reldan concentration significantly augmented ($P < 0.05$) percentages of oocytes with degraded DNA and at the same time reduced the number of cells that reached metaphase 2.

Conclusion: Our research shows that Reldan with Chlorpyrifos as an active ingredient is toxic for the development of swine oocytes because it acts on cell viability and ability to achieve nuclear maturation.

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AGE STRUCTURE AND GROWTH DINAMIC OF THE EUROPEAN CHUB *SQUALIUS CEPHALUS* (LINNAEUS 1758) IN TWO CATCHMENTS FROM TRANSYLVANIA-ROMANIA

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Keywords: *Squalius cephalus*, age category, different catchments, growth dynamics

Introduction: The chub (*Squalius cephalus*) has a great capacity to adapt both in terms of diet and in terms of the structure of aquatic ecosystems in which they live. The homogeneity of the chub populations and its distribution of age groups can give important information related to water quality (Kurtovic et al, 2009). In this regard, Havelkova et al (2008) noted that aquatic organisms, including chub, are bio-indicators regarding the presence and levels of chemical pollution.

Aims: The aim of this study was to analyze through the age structure and growth dynamics of the European Chub, the water quality and natural bio-productivity of these two catchments in Transylvania: the Someșul Mic catchment (Cluj County) and Târnava catchment (Alba County).

Materials and Methods: From the Someșul Mic catchment were sampled 26 specimens of European Chub aged from 2 to 11 years. From the Târnava catchment were sampled 38 specimens of European Chub aged from 2 to 11 years. The age of the specimens was determined by sclerochronology techniques, being evaluated the annual growth rings from the scales. For each age category it was calculated the Fulton Condition Factor (K).

Results: For the Someșul Mic catchment, the categories 7+, 8+, 9+ and 10+ are missing (not found during sampling). A similar situation can be observed in the case of Târnava catchment, the age groups 6+, 7+, 9+ and 10+ are missing (not found during sampling). Natural distribution of specimens in terms of age groups for Târnava is normal. The number of specimens from each category is decreasing with age. Someșul Mic catchment shows an atypical difference for the groups 2+ and 3+ (number of specimens of 3+ group being higher than the number of specimens from the group 2+).

Conclusion: The absence of age categories in the European Chub population from the Someșul Mic catchment is due to the hydrotechnical facilities that controls water flows and due to water chemical parameters that highlight the various sources of pollution. The European Chub population from the Târnava catchment is more homogenous and better represented numerically.

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PRECOCIOUS UTILISATION AT REPRODUCTION OF FEMALE YOUTH SHEEP FROM ȚIGAIE BREED

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Introduction: Ovine rearing represents a domain being in a full development process in Romania. At the base of this tendency are the solicitation of local and external markets for basic production, respectively meat and milk. To record favourable economical results farmers want to apply the most optimal technologies so, economical efficiency to reach a maximum level for each female which is part of the livestock (Pascal, 2015, Daraban et al., 2009).

Aims: One of those technologies refers also at precocious utilisation at reproduction of a female youth. So, the aim of effectuated research was represented by studying of possibilities for utilization at reproduction of female youth at an age still from the first year of life.

Materials and Methods: Biologic material was represented by domestic ovine, from Țigaie breed, reared in different farms situated in the North-East part of Romania. Experimental batches were formed by females with different ages, but all of them being utilized for the first time at mating. Respecting those demands were formed three batches differentially by age between them, which had, at the moment of utilization for reproduction, 9 months (L1), 18 months (L2) and 22 months (L3). Control batch was formed by adult females belonging to the same breed (LM).

Results: In the current research were tracked more aspects, the most important being the ones in which were analysed the influence of sheep' age on specific indexes of reproduction function, on the total duration of gestation and on further corporal development of youth females.

The obtained data were statistically processed using ANOVA software, and for determination of differences and their signification were utilized Fisher and Tukey tests. The obtained results allow us to enlightened the fact that even, in case of batches formed by female youth, the mean values for studied parameters were very close to the ones specific to adult sheep, differences are significant in majority of situations for $p > 0,01$.

Conclusion: In conclusion, even if Țigaie breed is a semi-early one, application of some optimal rearing technologies at female youth creates the possibility of precocious usage at reproduction of ovine youth.

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MINERAL PROFILE EVOLUTION OF SOME MEDICINAL PLANTS WITH ANTIBACTERIAL EFFECTS

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Keywords: feed additives, medicinal plants, strains, alcoholic extracts

Introduction: The health status of animals with a high growth performance is a predominant argument in the choice of feed additives (Parab and Vaidya, 2016).

Therefore, the feed industry is highly interested in valuable alternatives which could be accepted by the consumers. Minerals nutrients are usually present in plants in different concentrations and they can be seen as alternatives of additives in the feed intake (Caspar, 2003)

Aims: The aim of the study was to investigate the mineral contents of some medicinal plants, high antibacterial potential.

Materials and Methods: Ten minerals have been investigated (Ni, Na, Cd, Cr, Fe, Mg, Ca, Mn, Pb, K) in the following medicinal plants: pot marigold - *Calendula officinalis*, burdock - *Arctium lappa*, celandine - *Chelidonium majus*, basil - *Ocimum basilicum*, thyme - *Thymus vulgaris*, using Atomic Absorption Spectroscopy (AAS) technique. The antibacterial effect of the alcoholic extracts from the above mentioned plants has been studied on 12 bacterial stems belonging to *Staphylococcus*, *Serratia*, *Vibrio*, *Bacillus* genera, using antibiogram method.

Results: The results indicate a high content in: Ca (5605,83 µg/kg), Ni (1012,50 µg/kg), Fe (1037,78 µg/kg) and respectively, a significant sensitivity for *Chelidonium majus*, Ca (8487,04 µg/kg), Fe (1474,47 µg/kg), Cd (1614,60 µg/kg), for *Thymus vulgaris*, Ca (3955,91 µg/kg), Ni (1296,73 µg/kg), K (636,11 µg/kg) for *Calendula officinalis*, Ca (10280,92 µg/kg), Mg (553,97 µg/kg), Ni (1577,04 µg/kg), for *Ocimum basilicum* and Ca (2756,82 µg/kg), Ni (2261,19 µg/kg), K (636,3 µg/kg) for *Arctium lappa*. Low Pb, Mn and Na values have been recorded with all of the five medicinal plants, while lack of Fe is ascertained in *Arctium lappa* and *Calendula officinalis* and lack of Na is observed in *Thymus vulgaris* and *Calendula officinalis*.

Conclusion: The data obtained in the present work showed that these medicinal plants can be used for the control and cure of some mineral deficiencies or for preventing of various diseases of the animals.

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EFFECTS OF GERMINATION AND FERMENTATION ON THE FUNCTIONALITY OF WHOLE SOY FLOUR

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Keywords: *germination, soy, sourdough, rheological behaviour*

Introduction: Controlled fermentation and germination are excellent tools for improving the nutritional quality of grains. In addition germination and fermentation were found to reduce the antinutritive factors found in legumes and pulses.

Aims: The objective of the study was to investigate the effect of germination and fermentation on rheological and thermo-mechanical properties of soy in admixture with wheat flour.

Materials and Methods: The native and germinated soybeans were milled and subjected to fermentation with lactic acid bacteria. The resulting sourdoughs were characterized in terms of rheological properties using a controlled-stress rheometer. The thermo-mechanical properties of the wheat flour supplemented with native/germinated/fermented soy were investigated using the Mixolab device.

Results: Rheological measurements showed that soy germination and fermentation determined significant narrowing of the linear viscoelastic region. Soy germination determined significantly reduction of G' , G'' and stress values required for flowing. The rheological behavior of all sourdoughs during frequency sweep test resembled the perfect cross-linked gel-like structures. Germination and fermentation had no influence on the gelatinization temperature.

The influence of soy flour addition (15%) to the wheat white flour (85%) on the mixing and starch pasting properties of the dough was also studied. Soy germination resulted in the decrease of protein weakening (C2) and dough stability from 0.43 to 0.33 Nm and from 9.03 to 4.80 min, respectively. Starch gelatinization (C3-C2) and cooking stability (C3-C4) increase from 1.09 to 1.23 Nm and from 0.30 to 1.41 Nm, respectively, and starch retro gradation (C5) decrease from 1.81 to 1.71 Nm, when germinated soy was incorporated in wheat flour, compared to the samples with native soy.

Conclusion: A more pronounced swelling phenomenon was observed in case of the germinated samples during the temperature ramp test. Germination process improved the Mixolab parameters related to starch behavior.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0618.

THE INFLUENCE OF ASCORBIC ACID ON *IN VITRO* MATURATION OF CANINE OOCYTES

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Keywords: *ascorbic acid, canine, in vitro maturation, oocytes*

Introduction: The canine species has been used as an experimental model for preservation of endangered species. The efficiency of *in vitro* maturation (IVM) of canine oocytes is still very low compared to that from other mammalian species, the highest rate reported for *in vitro* maturation in canids is only 39%, which is still lower than those in other species.

Aims: It is known that ascorbic acid (vitamin C) can modulate many biochemical processes intracellularly or extracellularly as antioxidants. The aim of the present study was to examine the effects of media supplementation with various concentrations (0, 50, 150, 250, 500, 750 μM) of ascorbic acid on canine oocyte meiotic maturation, viability and the cumulus cell expansion.

Materials and Methods: Reproductive tracts from normal bitches greater than 6 months of age of different breeds were collected after routine ovariohysterectomy at private clinics, placed immediately into physiological saline solution at 37°C. Cumulus–oocyte complexes (COC) were released by slicing the ovarian cortex with a scalpel blade, oocytes were washed in the bench medium to wash off blood and other debris prior to transfer to maturation medium. To investigate the effect of ascorbic acid on nuclear maturation of canine oocytes, COCs were cultured in the tissue culture medium TCM-199, with the addition of 0, 50, 150, 250, 500, 750 μM of ascorbic acid. After 72h of *in vitro* culture, oocytes were then evaluated under UV light to determine the viability and the stage of meiosis.

Results: Our results suggest that there was no significant difference between treatment groups, however, on the group treated with 250 μM ascorbic acid was a significant difference compared to the control group on nuclear maturation in stages metaphase I (MI) and metaphase II (MII) (22% vs. 28.57%). As well a significant decrease in degenerate oocytes in all the treated groups, with the best result in the group treated with 250 μM ascorbic acid (16.07% vs. 24%). All the groups treated with ascorbic acid showed an increase of the viability compared to the control group.

Conclusion: The treatment with ascorbic acid showed some antioxidant effects on the oocytes. All treated groups had an increase on nuclear maturation in stages germinal vesicle break down (GVBD), metaphase I (MI) and metaphase II (MII) with best result on the group treated with 250 μM ascorbic acid. All the groups treated with ascorbic acid showed a decrease in degenerated oocytes.

FIRST SURVEY OF ESSENTIAL OIL QUANTITATIVE AND QUALITATIVE BLEND IN LAYING HENS NUTRITION AGAINST RED MITE (*DERMANYSSUSGALLINAE* DE GEER, 1778) IN SERBIA REGION

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Keywords: essential oils, infestation, nutrition, poultry, red mite

Introduction: Red mite (*Dermanyssus gallinae* De Geer, 1778), also known as the poultry mite, red poultry mite or chicken mite is the hematophagous arthropod which attacks resting birds at night. The mites normally feed around the breast and legs of hens, causing pain, irritation, and a decrease in egg production. The mite developmental cycle consists of 5 life stages: egg, larva, protonymph, deutonymph and adult. Under favourable conditions this life cycle could be completed within seven days, so populations can grow rapidly - causing anaemia in badly affected flocks of poultry.

Aims: Aim of this research was to investigate the effects of natural dietary red mite repellent RIDofMITE[®] in laying hens nutrition on red mite populations, egg production, egg mass and hens mortality rate.

Materials and Methods: Investigation was conducted under production conditions on a farm with 2000 laying hens of line Isa Brown. The traps for sampling of *D. gallinae* was made of rectangular pieces of corrugated cardboard (100×70×3 mm) placed along the cages line. The total of 180 traps were arranged. These traps allowed mites to hide during the day. The traps were placed three days before the natural dietary red mite repellent RIDofMITE[®] was applied. All developmental stages of the mites were recorded.

Results: During the experimental period, statistically significant ($p<0.05$) reduction in red mite blood feeding of 63% was recorded, so as the reduction in larvae number of 11.72%. Total hens egg production within 14 days of experimental period was increased for 4.5%, eggs mass was increased for 15.5%, while mortality was reduced for 7.2% with statistically significant ($p<0.05$) differences.

Conclusion: Based on the obtained results it can be concluded that the essential oils blend (RIDofMITE[®]) in laying hens nutrition is highly effective against red mite, but having in mind severity of red mite infestation on poultry farms, further investigations are still necessary.

MATHEMATICAL MODELING OF FEED RATIONS BY SOLVER SOFTWARE

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Keywords: *Mathematical models, feed rations, optimization, Solver*

Introduction: Animal nutrition is a very large area where mathematical modeling applies successfully. In addition to modeling the main physiological processes underlying the production in farm animals, optimization of objective function (i.e. total expenditure on fodder) is an issue to be raised too, both in terms of protein and vitamin intake of nutrients, and in terms of the cost of the latter.

Aims: Optimization of feed rations through mathematical modelling seeks to establish farming areas to be cultivated and the amounts of fodder to be purchased so that the objective function (named also goal function or efficiency function) be minimal.

Materials and Methods: In order to solve the mathematical model, one requires varieties of forage that are part of fodder, the fodder to be purchased (in tonnes) and the farming areas (in hectares) to be cultivated, and we made use of Microsoft Office Excel Solver package as solving method.

Results: In order to optimize the objective function one should observe the following restrictions concerning: provisioning of total feed needed expressed in nutrients, providing the necessary amount by groups of fodder, observance the ratios in the groups of fodder' structure, and compliance with forage culture technologies as well as compliance with the farming surface available for fodder crops. The mathematical model is threefold: the system of restrictions, non-negativity conditions and the goal/target/objective function.

Conclusion: This paper shows the effectiveness of the Solver software package in dealing with many linear programming problems, namely the setting of fodder ratios since the provisioning of a good and well balanced diet in terms of nutrition ensures both a good maintenance of the animals and an increased livestock production.

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THE EFFECTS OF SOME PREBIOTIC PRODUCTS (ACTIGEN, BIOTRONIC TOP3) ADMINISTERED IN THE FOOD OF BROILER CHICKENS ON THE MEAT QUALITY

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Keywords: *Actigen, Biotronic Top3, broilers, meat composition, meat quality.*

Introduction: Following the 2006 EU ban of antibiotic-based growth promoters, the use of alternative products, such as prebiotics, became a necessity.

Aims: The goal of this study was to determine the effects of prebiotic products (Actigen și Biotronic Top3) on meat quality in broiler chickens.

Materials and Methods: The research has been conducted on a number of 75 Ross-308 hybrid broilers, assigned in three groups (25 individuals/group), over a period of 42 days. Group 1(E) was fed with the base diet supplemented with the Actigen prebiotic in a proportion of 0.08% in the 1st growth phase (days 1-14), 0.04% in the 2nd phase (days 14-35) and 0.02% in the 3rd phase (days 35-42). Group 2(E) received the base feed supplemented with the Biotronic Top3 prebiotic (0.1%) throughout the whole growth period. At the end of the study period, five broilers from every group have been sacrificed to determine meat quality and meat chemical composition.

Results: The usage of prebiotics led to an increase of the carcass weight gain of 16.29% in group 1(E) receiving Actigen and 13.49% in group 2(E), fed with Biotronic Top3, compared to the control group. The percentage of superior quality meat (quality I and II) in the carcass was higher by 4.4% in group 2(E) Biotronic Top3 and by 1.67% in group 1(E) Actigen compared to the control group. Following the administration of Actigen and Biotronic Top3 prebiotics, in groups 1(E) and 2(E) the meat quality was improved in groups 1(E) and 2(E), due to an increase in the protein content and a reduction of the fat content.

Conclusion: These results confirm that prebiotics administered in the feeds for broiler chickens have favourable effects on the meat production and meat quality.

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INFLUENCE OF YEA-SACC 1026 PROBIOTIC ON SOME PRODUCTION AND CONSUMPTION INDICES IN CHICKEN BROILERS

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Keywords: *meat chicken broilers, YEA-SACC 1026, production performances.*

Introduction: Along the time, it was observed that some probiotics could influence the breeding performances in chicken broilers.

Aims: The researches had in view the effects of YEA-SACC 1026 probiotic product on production and consumption indices in chicken broilers.

Materials and Methods: The researches were conducted on 75 chickens of Ross-308 hybrid, grouped in three lots of 25 capita/lot, during 42 days. In the Lot 1 (E), for 42 days, in the mixed fodder was added YEA-SACC 1026 probiotic in proportion of 0.1% in all three breeding phases (phase I =1-14 days, phase II =14-35 days and phase III =35-42 days). In the Lot 2 (E), for 42 days, in the mixed fodder was added YEA-SACC 1026 probiotic in proportion of 0.25% in all breeding phases (phase I =1-14 days, phase II =14-35 days and phase III =35-42 days). The daily rations complied with the requirements of breeding phases for chicken broilers. The chickens of both lots were weighed at the beginning of experiment and after that weekly, being calculated the average body weight, the average daily gain, fodder consumption and forage conversion index.

Results: The use of YEA-SACC 1026 probiotic in Lot 1 (E) determined an increase of body weight with 16.26%, of average daily gain with 15.55% and the forage conversion index was reduced with 2.92% given to Control Lot. On the second place was situated the Lot 2 (E), in witch was administered 0.25% of YEA-SACC 1026 probiotic, with an increase of body weight of 8.32%, of average daily gain with 7.54% and the forager conversion index had the same value as Control Lot.

Conclusion: These superior results registered in meat chicken broilers from Lot 1 (E) (with 0.1% YEA-SACC 1026 probiotic) and those ones from Lot 2 (E) (with 0.25% YEA-SACC 1026 probiotic) confirm the favourable influence of these probiotics on performances of chicken broilers.

CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF BEEBREAD – REVIEW

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Keywords: *bee bred, biologic compounds, chemical composition*

Introduction Beebread is a product of the hive obtained from pollen collected by bees, to which they added honey, digestive enzymes and subsequently stored in the combs, starting a lactic fermentation which gives it greater power conservation.

Aims: The aim of this study is to present a brief review of research studies on beebread biochemical activities.

Materials and Methods: Lipids were determined by the Soxhlet method and protein following the Kjeldahl method. Total polyphenols was quantified according to the Folin-Ciocalteu method. The flavonoid was made using two complementary colorimetric methods. The antioxidant capacity was determined by DPPH, FRAP and ABTS assays.

Results: Beebread chemical composition - depends on plants that worker bees have collected pollen. The average content in moisture is 7.8 - 19.1 %, ash 2.19 - 2.60 % , protein 19.1 - 27.3 %, lipids 1.65 - 5.50 %, carbohydrate 23.80 – 33.85%, vitamin 3%, lactic acid 3.06 – 3.20 %.

Antioxidant activity: The total content of flavonoids is between 1.9 - 4.5 (mg QE/g beebread), total phenolics: 2.5 - 13.7 (mg GAE /g beebread), FRAP: 35.0 - 70.1 (μmol TROLOX /g beebread) and TEAC 46.1 - 76.3 (μmol TROLOX /g beebread). Different solvents like methanol, ethanol, water were used to evaluate their influences on the concentration of the bioactive compounds and their bioactive properties. Total phenolics are found to be highest in methanol extracts, 22.77 mg GAE/g and lower in water extracts, 8.32 mg GAE/g. Regarding the flavonol and flavone content the highest result was also obtained in methanolic extracts, 18.69 mg QE/g, and water with 0.158 mg QE/g.

Conclusion: Chemical and functional characteristics of beebread could play an important role for quality control of this product. Beebread can be used as treatment, food supplement and food. Beebread can supply various lack of nutrients as: proteins, mineral, vitamins (B12), lactobacillus and has a better bioavailability because pollen coating was partially destroyed during the fermentation.

MORPHOLOGICAL TRAITS OF TURCANA SHEEP REARED IN COLD CLIMATE OF ROMANIA

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Keywords: *climate changes, biodiversity, biometry, analysis.*

Introduction: The genotype x environment interaction is a well-known issue. It has been analysed from a series of perspectives, with particular accent on livestock and their productions (Beerda *et al.*, 2007). In last decades, when the influence of the climate changes became more and more present, the subject gains new valences, one of the most interesting being the interrelationships between climate and biodiversity (Javeline *et al.*, 2013).

Aims: To identify possible correlations between biometric traits of Turcana sheep, and cold climate, in the North of the country.

Materials and Methods: 21 Turcana individuals, ewes (17) and rams (4), were selected from 5 farms located in Counties of Suceava, and Neamț. The selected biometry parameters are: body weight, body full length, height at wither, chest girth, horn length, ear length and tail length. Historic climate data are delivered by national reports.

Results: The basic statistics emphasizes the means and dispersion parameters of all aimed biometry and climatic traits. The Pearson's correlations emphasize the simple interrelationships between climatic factors and body traits. The multiple regression approach, emphasizes the complex interrelationships between body traits (dependent variables), and climatic parameters (independent traits).

Conclusion: The results of our study confirm the presence of simple and multiple correlations, of different intensities, between the studied traits and parameters. This may be considered as premise for further research in emphasizing the influence of climate upon biometry traits in Turcana sheep.

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SECTION 8: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

EFFECTS ON REPRODUCTIVE CHARACTERISTICS OF 1;29 ROBERTSONIAN TRANSLOCATION IN SPANISH RETINTA BREED CATTLE: PRELIMINARY RESULTS

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Keywords: 1;29 translocation, cattle, reproduction

Introduction: The Robertsonian translocation 1;29, discovered in 1964 by Gustavsson and Rockborn, is the only translocation in domestic animals with a direct effect on the reproduction of animals carrier of the translocation in heterozygous stage because this chromosomal alteration produces selection zygotic causing embryonic loss. This feature was detected for the first time by Gustavsson in the Swedish Red and White breed. The effect on reproduction period represented an increase of calving period and a decrease of reproductive rate. This effect resulting into an economic loss that even Gustavsson quantified. In the Spanish breeds cattle it has not calculated the economic impact that this anomaly may represent but first we need to know what are the reproductive characteristics of these animals.

Aims: The Spanish Retinta breed cattle is one of the most important beef breeds that exist in Spain distributed mainly between Extremadura and Andalucía Regions. The study of the economic impact of this chromosomal alteration is very important because of the effectives of the breed (more than 20.000 animals) and the influence of the 1;29 translocation in reproductive characteristics. The main objective of this work is to begin the systematic study of the production of normal cows and heterozygous and homozygous carrier ones and analyze their differences to further quantify their economic impact.

Materials and Methods: Cytogenetic analysis was performed on microscope preparation of metaphase chromosomes obtained after a routine culture of peripheral blood lymphocytes according De Grouchy *et al.* (1964) method slightly modified. Chromosome spreads were obtained by dropping 100 µl of the cell suspension onto wet slides. Giemsa-stained karyotypes were performed in a Cytovision platform (Leica, Madrid, Spain) chromosome using the *Bos taurus* standardization (ISCNDA, 1991).

Results: A total of 2.219 animals of the Retinta breed cattle, 595 females of them were females, were analyzed. In the group of females, 129 heterozygous carriers were found to be carrier of 1;29 Robertsonian translocation representing 5.8% of the population tested. In 50 of them, with certain reproductive requirements such as at least three offspring and age (less than 48 months), it was studied as a first analysis the age at the first offspring. It was found that this age was increased significantly in more than 26 days in relationship with the age of the rest of normal cows.

Conclusion: In this initial research work, we present as a first preliminary result in the study of the influence of the 1; 29 translocation in Spanish Retinta cattle, the significantly increase of the time at the first offspring. This fact confirmed the result obtained by Kovacs and col. (1985) in Frisian cows and Moreno Millán *et al.* (2004). This is one of the factors on the

economic impact of 1;29 translocation. We continued studying the calving interval and reproductive rate of both normal and heterozygous carrier cows.

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EX OVO OMNIA: THE IMPACT OF MODERN EMBRYOLOGY ON VETERINARY BIOTECHNOLOGY

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Keywords: *veterinary embryology, biotechnology*

Embryology has always been a prerequisite for a deeper understanding of gross anatomy, histology and teratology. Today, however, also in many fields of contemporary biomedical research, modern embryology plays a central role for scientific progress.

Veterinary embryology, the study of the development of domestic animals from fertilization to birth has been performed since the times of Aristotle (384-322 BC). During more than 2000 years, descriptive anatomical studies gave an increasing detailed picture of the prenatal development of animals. Recently, modern embryology more and more adapted new sophisticated morphological techniques, like electron microscopy, histochemistry and confocal microscopy as well as molecular biological techniques, like transcriptomics and epigenomics, which aims at the investigation of the molecular mechanisms of normal and pathological development and their practical application in biotechnology. Assisted reproduction technologies like in vitro fertilization, intracytoplasmic sperm injection, freezing of ovarian tissue and stem cell technology have become established methods to bridge one generation to the next *ex soma*. In domestic animals, techniques such as cloning by somatic cell nuclear transfer and recently CRISPR/Cas9 have made possible genetic modifications that offer the prospects of modifying animals so that they produce valuable proteins, serve as models of human diseases, or provide organs for xenotransplantation in the future and even to produce artificial gametes. All of these prospects depend upon a thorough knowledge of veterinary embryology and many of the results obtained during embryological studies have a great impact on biotechnology and reproduction medicine.

NIGELLA SATIVA – A PLANT WITH PERSONALITY IN BIOCHEMISTRY AND EXPERIMENTAL MEDICINE RESEARCHES

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Keywords: *biochemistry, experimental medicine, Nigella sativa.*

Introduction: Since the ancient there are data that *Nigella sativa*, known as black cumin, was used in experimental medicine, being a way of treatment and prevention. Due to its content in active principles, it is a valuable plant and can be used in pharmacology, medicine and food technology. The anatomical parts of the plant – used as health enhancement and benefits – are seeds and fresh whole plant.

Chemical composition. The seeds of black cumin contain various biological active principles, most of them quinoidic phenolic compounds, from which the thymoquinone is the most important for biomedical reasons. Also, the seeds contain phenols; fatty acids and sterols; terpenoids; vitamins such as: ascorbic acid, tocopherols, retinol, ergocalciferol, phyloquinone and menaquinone; and minerals (copper, manganese, zinc, iron, cobalt, chromium).

Medical and pharmacological benefits. *Nigella sativa* was proved that has effective in different medical disorders, such as: hypertension, diarrhea, digestive diseases, liver and renal tonic, inflammations, bacterial infection, analgesic, appetite stimulant, cancer, bronchodilator, spasmolytic and diabetes. Antioxidant activity is important due to thymoquinone content and it was tested on different parts of plant (shoots, roots and seeds used as extracts), results demonstrated strong antioxidant activity.

Toxicological researches. International literature data reported researches results on the toxicological studies in relation with ingestion on seeds, root and shoots water or alcoholic extracts, or oil of black cumin. *In vivo* experiments were also performed using injection administration of thymoquinone, and the results proved no toxicity for this biochemical compound.

THERAPEUTIC EFFICACY AND SAFETY EVALUATION OF ERYTHROCYTE CONCENTRATE USED IN DOGS

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Keywords: *dogs, erythrocyte concentrate, hematocrit, immune-mediated hemolytic anemia, transfusion therapy*

Introduction: The minimum dose of whole blood products as well as erythrocyte concentrate has been under a lot of debate, new equations for calculating the optimal dose being made up from a large variety of hematologists.

Aim: The therapeutical efficacy of erythrocyte concentrates in dogs with different types of anemia by measuring the hematocrit level 6 hours after the transfusion and a complete blood count 5 days post-transfusion therapy.

Materials and methods: Blood tests were performed with ADIVA hematological analyzer; the 6 hour post-transfusion hematocrit was determined by a micro hematocrit. On admission every patient received a routine blood test that included 40 hematological parameters and 21 biochemical parameters. In addition, a detailed examination of the blood smears was also performed by the ADIVA hematological analyzer with 26 parameters that mostly referred to red blood cell and white blood cell morphology. Blood typing was done using the RapidVet quick test kit. Patients received only type specific blood and to limit transfusion reaction occurrences, in addition, a crossmatch test was performed before every transfusion. Statistical analysis was accomplished with GraphPadInStat 3.0 and the graphical depiction of the obtained results was made using the Origin 8.5. graphics program.

Results: Statistical analysis reveal that the total red blood cell count underwent very significant changes ($p=0.0052$) as well as the hemoglobin ($p=0.0085$). The hematocrit had an extremely significant evolution ($p=0.0002$). As far as the other hematological parameters are concerned, none underwent statistically significant evolutions from first day of transfusion (T0) until five days post-transfusion therapy (T5).

Conclusion: The erythrocyte concentrate can be used safely even in critically ill or immune-suppressed patients and even in patients with an exaggerated immune response. A clear dosage of this blood product has not been set yet, every administration has to be tailored to the patient's needs.

CORRELATIVE ANALYSIS OF THE FREEZING POINT AND OF THE MICROBIAL CONTENT OF MILK PRODUCED BY INDIGENOUS COWS BRED IN A SUB-CARPATHIAN MOUNTAIN AREA

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Keywords: *milk, freezing point, total number of germs, sub-Carpathian mountain areas*

Introduction: Mountainous geo-climatic conditions exert major beneficial influences on the health and welfare of lactating cows and by default on the compositional and microbiological parameters of milk and also on the sensory characteristics of traditional milk products from those areas.

Aims: Through research in this paper we propose to analyze new criteria for evaluation of freshness and health of milk obtained in conditions of sub-Carpathian mountain areas, based on the freezing point - TNG (total number of germs) correlation.

Materials and methods: During a time of 2 years there were investigated physicochemical (analyzer Ekomilk M) and microbiological (with automatic system Soleris) milk samples commodity from the mountain area Gurghiu Valley. Milk samples were taken from cows of indigenous breed belonging to traditional households (n=650), to microfarms (n=11) and commercial farms (n=2). From each source were analyzed 10 samples of milk each month, having a total of 240 sample/lot or 720 per entire amount of processed milk. According to the followed objectives, the interpretations were mainly focused on development of the freezing point and of TNG. Statistical analysis was focused on the correlations between these parameters and seasonal influences.

Results: The evolution of the freezing point was characterized by insignificant statistically differences ($p = 0.071$) and very close mean values (between -0.566°C and -0.565°C) among 3 samples and by significant statistically differences ($p = 0.0001$) between winter seasons with the highest values (-0.560°C) and autumn, with the lowest levels (-0.571°C). Regarding the evolution of the microbial content of raw milk is important to note the oscillations of TNG, which are influenced by variables: sampled and season. At the level of the lot, TNG has reached higher levels (71210 CFU/ml) in the case of milk from individual farms. The evolution of the seasonal influences revealed minimal levels (64300 CFU/ml) in summer and the maximum levels in the autumn (76720 CFU/ml), with statistically significant differences ($p = 0.0001$).

Conclusions: We believe that seasonal patterns, with statistically significant differences, marked by significant decreases of the freezing point during autumn, associated with minimum values of TNG in summer and maximal in autumn, support the implementation of the freezing point - TNG correlation in the evaluation of the freshness and health of milk obtained in mountainous areas.

RESEARCH REGARDING THE CARCASS QUALITY OF LAMBS RESULTED FROM TSIGAIA PUREBRED COMPARED WITH HYBRIDS OF TSIGAIA EWES CROSSED WITH BMC RAMS

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Keywords: *carcass, Blanc du Massif Central hybrids, meat quality, Tsigaia*

Introduction: Tsigaia breed has good characteristics regarding the meat production and is suitable for crossing to obtain F1 hybrids according to the market demands. (Pascal and Nechifor, 2014). The quality of the sheep meat is influenced by many factors including genetic and environmental factors (Bâia, 2005).

Aim: The aim of this research was to compare some quality parameters of Tsigaia lamb meat and Tsigaia crossed with Blanc du Massif Central lambs.

Materials and methods: After slaughtering, the carcass weight was assessed and the best cuts of the carcass were weighted and registered. Then the rapiers bones- muscles, muscles-fat was assessed. Probes were collected from the carcass in order to be analyzed with the Food Scan Lab. The chemical analysis was performed with a Food scanner which can accurately detect protein content, water, fat, and collagen percentage from the carcass. (Mihaiu *et al.*, 2015)

Results: the bones-muscles rapport was superior in the crossed lambs compared to the purebred lambs. Also the muscles-fat rapport was assessed and better results were registered for the crossed lambs. The most valued parts of the lambs had the highest percent in the carcass. Also the organoleptic analysis of the meat revealed that the crossed lambs had better characteristics than the purebreds Tsigaia lambs.

Conclusion: The quality of meat parameters (bone-meat ratio, meat-fat ratio, chemical content of the carcass, organoleptic analysis) evaluated was correlated with the fattening status of the carcass and was better in the hybrid lambs than in the purebred lambs.

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PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY PROFILES OF PATHOGEN ISOLATED FROM BOVINE MASTITIS MILK IN TRANSYLVANIA, ROMANIA

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Keywords: antimicrobial agents, bovine mastitis, etiology, milk

Introduction: Mastitis in cows, one of the most common and economically important infectious diseases of dairy cattle, all over the world, with significant impact due to economic losses, occurs when the udder becomes inflamed because the leukocytes are released into the mammary gland usually in response to bacteria invasion of the teat canal (Cervinkova, *et al.*, 2013).

Aim: The main objective of this study was to evaluate the *in vitro* antimicrobial susceptibility of bacteria isolated from milk in order to design specific control programs for bovine mastitis in this area.

Materials and methods: A total of 204 milk samples aseptically collected both from farms and private owners were processed during May 2014 and March 2016 within the Microbiology Laboratory of the Faculty of Veterinary in Cluj-Napoca, Romania. The microbiological examination was carried out by inoculation on blood agar, MacConkey and SDA. After the overnight incubation in aerobic conditions, the identification of the isolates was performed using microscopic, cultural and biochemical methods. Biochemical identification was based on API 20 Biomerieux system. Susceptibility to antibiotics was evaluated using Kirby Bauer disk diffusion method on Mueller-Hinton agar; the antibiotics were represented by Amoxicillin and Clavulanic Acid, Ceftiofur, Florfenicol, Mastidiscs, Enrofloxacin, Penicillin and Tetracycline.

Results: *Staphylococcus* spp. was the most common isolated pathogen, in 53.8% of the specimens, followed by *Streptococcus* spp. in 15.3%, *Escherichia coli* in 8.9%, *Klebsiella* spp. in 7.9%, *Bacillus* spp. in 6.5%, *Arcanobacterium* spp. in 3.1%, *Pseudomonas* spp. in 2.9% and *Candida* spp. in 1.6%. The most frequent associations were represented by staphylococci-streptococci in 62.7% of the samples, followed by streptococci-bacillus in 19.8% of the samples. The most important etiological agents identified were *Staphylococcus aureus*, *S. hyicus*, *Streptococcus agalactiae*, *S. disgalactiae*, *S. uberis* and *Escherichia coli*. Antimicrobial susceptibility test for the total isolates revealed good sensitivity to Enrofloxacin (86.8%), Mastidiscs (74.6%) and Amoxicillin and Clavulanic Acid (68.9%). Resistance was observed for Penicillin and Tetracycline.

Conclusions: The major mastitis pathogens identified was *Staphylococcus aureus*, while recurrent mastitis treatment was based on systemic and local administration of Enrofloxacin and Mastidiscs respectively.

BENZIMIDAZOLES PHARMACODYNAMICS IN EQUINE STRONGYLES

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Keywords: *benzimidazoles, chemoresistance, equines, strongyles*

Introduction: The study of equine strongyles is an important topic due to the very high morbidity (up to 99%) and the serious, sometimes fatal, repercussions determined by these species (Cernea M *et al.*, 2010; Smith M.A. *et al.*, 2015).

Aims: The research aimed to assess the effectiveness of four benzimidazoles: Albendazole (ABZ), Fenbendazole (FBZ), Mebendazole (MBZ) and Thiabendazole (TBZ) against equine strongyles.

Materials and Methods: The tests were performed between March 2015 and May 2016, on samples obtained from 20 horses and 8 donkeys living in Harghita County. *In vivo*, Faecal Egg Count Reduction Tests (FECRT) was used to evaluate FBZ. *In vitro*, Egg hatch assay (EHA) and Larval development assay (LDA) were used to evaluate ABZ, FBZ, MBZ and TBZ.

Results: The predominance of small strongyles species was observed, mostly *Cyathostomum* type A. In the horse group, before treatment, the average intensivity was 1595,5 EPG, the maximum value being 4000, and extensivity 55%. 14 days after treatment, all samples were negative. In the donkey group, before treatment, the total number was 6550 EPG, intensivity of 935,7 and extensivity of 87,5%. 14 days after treatment the average intensivity was 150 and the extensivity 50%. In the horse group, EHA proved the efficacy of FBZ (0,0192%), ABZ (0,3740%) and TBZ (11,62%) and a major risk for inducing adaptive phenomena for MBZ (Y parameter 1009,92). In the donkey group, all benzimidazoles had limited effectiveness: TBZ (73,93%), MBZ (87,51%), FBZ (94,05%), ABZ (111,67%). All benzimidazoles inhibited larval development.

Conclusion: For all tested benzimidazoles, the predictive risk comparative analysis for resistance induction highlights the benefit of their use provided that the treatment protocol allows sufficient contact time.

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THE PREVALENCE OF *PSEUDOMONAS AERUGINOSA* STRAINS IN INFANTS WITH CYSTIC FIBROSIS WITHIN A HOSPITAL IN NORTH EASTER OF ROMANIA

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Keywords: cystic fibrosis, prevalence, *Pseudomonas aeruginosa*

Introduction: Cystic fibrosis (CF) is the most common autosomal recessive genetic disease caused by mutation of the CFTR gene. In Romania, CF disease has an estimated a prevalence of 1 case per 2500 live births. Approximately 50% of children die in early life, so the exact number of CF patients in our country remains unknown as no national patient registry exists. This situation has limited our knowledge about the disease progression. Complicated with *P. aeruginosa* is giving long progressive diseases and often aggravates morbidity and mortality.

Aims: The aim of the study was to phenotypically frame the *P. aeruginosa* strains, according to their antibiotic susceptibility profile in order to administer more precisely the antibiotics and to avoid development of multidrug-resistant strains.

Materials and Methods: After the diagnosis of CF, the patients return to a medical control at every 3 months. The sputum samples are collected from these patients, in order to perform the bacteriological examination and the DST test. This study was performed during 1 year (01.01-31.12.2015), and all the sputum samples were cultivated on usual and on special culture media to establish more precisely the type of isolated bacteria. The confirmation was performed using the API 20 NE biochemical test and classified in resistance phenotypes according to CLSI 2014 standards.

Results: The study population was represented by 85 infants with CF, from which we isolated 364 bacterial strains. 10.16% of the total of bacterial strains were represented by *P. aeruginosa*.

Conclusion: A major problem represents the repeated antibiotic treatments, this being favourable for the emergence of resistant strains. Antibiotic resistance is currently one of the most important problems faced by clinicians. Multidrug-resistant (MDR) strains of *P. aeruginosa* were identified in this study and we highlighted that this strains limits the antimicrobial treatment and is shortening the patient's life.

DETERMINATION OF BIOFILM PRODUCTION IN ANIMALS ORIGINATED PSEUDOMONAS AERUGINOSA STRAINS

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Keywords: animal strains, biofilm, Congo Red Agar, *Pseudomonas aeruginosa*

Introduction: Biofilm are defined as microbial derived sessile communities characterized by the cells that are irreversibly attached to a substratum or to each other, are densely packed multicellular communities of microorganisms attached to a surface or interface.

Aims: testing of *Pseudomonas aeruginosa* MDR strains able to producing biofilm and checking the correlation between the production of biofilm and resistance profile.

Materials and Methods: Biofilm detection was tested by Congo Red Agar method (CRA). These method is rapid, sensitive and reproducible, this method is suitable for detection of biofilm formation in the present study. For the detection of biofilm formation method, total 56 clinical isolates viz. *Pseudomonas aeruginosa* were used. Clinical isolates were identified as per standard microbiological procedure. Antibiotic susceptibility test of biofilm producing bacteria was performed by using the Kirby-Bauer disc diffusion technique.

Results: Out of 56 isolates, CRA method detected 17 (30,35%) as high biofilm producer, and 39 (69,65 %) biofilm non-producer. Antibioresistance an ever growing panel of antibiotics is not strictly influenced by the *Pseudomonas aeruginosa* bacterium property to produce biofilm.

Conclusion: According to the antibiotic susceptibility test, higher antibiotic resistance was observed in biofilm producing bacteria than non-biofilm producers and biofilm-producing *Pseudomonas* strains have been isolated from a chronic infection, as a consequence of inadequate treatment. For our samples, statistical assays have shown that there are no significant differences between the resistance profiles of *Pseudomonas aeruginosa* strains biofilm producers and non-producing biofilm

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EPIDEMIOLOGICAL ASPECTS AND DIFFERENTIAL DIAGNOSIS OF THE ROUND CELL TUMORS IN DOGS

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Keywords: *dog, epidemiology, round cell tumors, skin*

Introduction: Round cell neoplasms (RCN) are frequent cutaneous lesions in dogs, with high percentages among skin tumors. In this category are included histiocytoma, mast cell tumor, plasmacytoma, lymphoma and transmissible venereal tumor.

Aims: In this paper, it has been done an epidemiological study concerning the cutaneous RCN in a period of 10 years in the Department of Pathology (Faculty of Veterinary Medicine, Cluj-Napoca, Romania). Additionally, in the recorded cases with RCN we described the main histological and cytological features.

Materials and Methods: The epidemiological data were collected from the records of Pathology Department between 2005-2014. The investigation included dogs diagnosed with cutaneous RCN, following necropsy analysis or assessment of biopsies or cytological samples. All collected specimens were analyzed by histopathological and/or cytological techniques. The staining used for histological investigation were Hematoxylin-Eosin, Masson's trichrome and Toluidine Blue, whereas Diff Quik and Wright methods were utilized in cytological specimens. The distribution of the cutaneous RCN in relation to age, breed and sex was also assessed.

Results: The most frequent RCN type was the mast cell tumor (19.54%) followed by histiocytoma (11.33%) and lymphoma (1.98%). The RCN recorded were equally distributed in both males and females. Concerning the distribution of RCN by age (average age), histiocytoma occurred in 5 years old subjects, mast cell tumor in 11.9 years old subjects, and lymphoma in 6 years old subjects. Mast cell tumor was more frequent in stray dogs and Boxer breed, while histiocytoma occurred more commonly in stray dogs. Histological and cytological analysis was mandatory to perform the differential diagnosis between RCN. Microscopic details concerning cytoplasm and nucleus of tumoral cells, together with the displaying mode in histological specimens may reveal the type of RCN.

Conclusion: Cutaneous round cell tumors had an increased incidence, aspect observed in other reports too. The differential diagnosis has to rely on some specific microscopically features that can suggest the type of RCN.

COMPARATIVE STUDY OF THORACIC LIMB SKELETON IN CAMEL, COW AND MARE

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Keywords: bone, camel, cow, mare, skeleton

Introduction: The camel (*Camelus Dromedarius*) is one of the oldest domesticated mammals and one of the first ever domesticated. This animal has a history of 15 million years old and lives in a geographic area, from southern Atlantic to Pacific, playing a very important socio-economic role in some countries.

Aims: Taking into account the above stated reasons, we were interested in performing this comparative study regarding the thoracic limb skeleton in camel, cow and mare. The obtained results can serve for teaching, research, private practice, food inspection service, research and/or paleontological studies.

Materials and Methods: The current study was performed on 6 bodies coming from: 2 cows and 2 mares and 2 camels. The bones were obtained through classical anatomical techniques (tissue removal, boiling and bleaching). Pictures were taken and interpretation was done by a group of specialists.

Results: The ratio between the supraspinous and infraspinous fossa of the scapula was different in all the three species. The acromion was present only in cow and camel and the coracoids process in camel was located at mid distance between glenoid cavity and supraglenoid tubercle. The humeral head was large and rounded in all the three species and the bicipital groove was double in mare and simple in the camel and cow. Three interosseous spaces of the forearm (one proximal and two distal) were noticed in camel. The carpal skeleton consisted of 7 bones in camel and mare and 6 bones in cow. The metacarpus of the camel presented peculiarities at the level of the distal epiphysis, each articular condyle being divided by a sagittal ridge on its palmar aspect. Only one digit (the third) was present in horse. The cow had four digits out of which only the second and the fourth were completely developed, and the camel had two digits (third and fourth) with the mention that the small sesamoid bone was absent.

Conclusion: These three species have developed in parallel starting 54 million years ago. The appendicular skeleton of dromedary camel showed similarities to both species taken as the benchmark, but clearly it was closer to cattle.

POST-SURGERY PAIN CONTROL IN RATS USING THE RAT GRIMACE SCALE METHOD

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Keywords: *pain induction model, pain evaluation, Rat Grimace Scale*

Introduction: From the moment that the idea that animals can suffer was unanimously accepted, methods for pain recognition and quantification were developed. A model of pain evaluation in experimental models is Rat Grimace Scale (RGS).

Aims: The purpose of this study was to evaluate the efficiency of an analgesic protocol, by grading the changes in the animal's facial expression.

Materials and methods: A number of 5 Wistar rats were used. As a pain model, ovariectomy was performed on 4 of the rats. Tramadol was administrated subcutaneously as it follows: 1 pre-surgery dose of 25 mg/kg, 2 post-surgery a dose of 25 mg/kg and a 50 mg/kg dose. The evaluation of pain was done across at the time 0, 2, 4 and 6 hours post-surgery using the scores of 0, 1 and 2, 0 representing the absence of pain, 1 a moderate level of pain and 2 a high level of pain.

Results: The results of the study revealed that the control rat presented the highest level of pain (1.25 - 1.75). The pre-surgery analgesia enhanced the narcosis effect, but analgesia had a short term effect, with a moderate to high level of pain (1 - 1.5). In the animal treated with a dose of 25 mg/kg post-surgery, a moderate pain level was observed (0.5 - 1.25) and in the animal with the highest dose an optimal analgesia was determined (0.25).

Conclusion: The expected analgesic effect was put forward by the 50 mg/kg dose of Tramadol and the RGS method was determined to be ideal for the assessment of animal suffering in various experimental protocols.

STUDY ON SENSITIVITY OF BACTERIA'S ISOLATED FROM MASTITIS AT *LAVANDULA ANGUSTIFOLIA* AND *ECHINACEA PURPUREA* EXTRACTS

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Keywords: *clinical mastitis, bacterial sensitivity, Echinacea purpurea, Lavandula angustifolia*

Introduction: Mastitis is an endemic disease considered to be one of the most common and most costly of milk production industry. The devastating effect of mastitis in farms, the economic losses and animal welfare is a topical issue and a problem still unsolved. The resistance of pathogens to the commonly used antibiotics require testing of new active principles, effective for controlling these diseases.

Aims: The purpose of the study was to test the antimicrobial activity *in vitro* of 2 plants using aqueous, alcoholic and oily extract of comfrey Echinacea (*Echinacea purpurea*) and the alcoholic extract of lavender (*Lavandula angustifolia*).

Materials and methods: The biological material was harvested from 20 cows with clinical mastitis. The milk samples were plated on blood agar, and for the identification of species we used micro test type system API. In order to determine effectiveness of the plant extracts and the sensitivity it was used diffusion method according to CLSI 2013, adjusting for natural extracts.

Results: The results showed that most commonly isolated bacteria were *Staphylococcus* genus. The most sensitive strains tested to plant extracts were *Vibrio fluvialis*, *Aeromonas hydrophila* / *caviae*, *Escherichia coli*, *Staphylococcus aureus* ATCC 6538P. Plant extracts have been found to be most effective for alcoholic extracts, first of all the lavender. The sensitive bacteria to the aqueous and oil extracts were *Escherichia coli*, *Staphylococcus aureus* ATCC 6538P and *Staphylococcus xylosus*,

Conclusions: These extracts were more effective on Gram negative bacteria isolated from mastitis, which can constitute the natural and effective alternative in the treatment of mastitis in cows.

PATHOLOGICAL FINDINGS IN ACCIDENTAL ELECTROCUTION IN A HORSE (CASE REPORT)

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Keywords: *accident, electrocution, forensic medicine, horse*

Introduction: Recently, the veterinarians are dealing with a number of cases that require forensic expertise. Such a circumstance could be the accidental electrocution in animals, one of the causes of unnatural death.

Aims: There is a scarcity with reference to the pathological findings in veterinary forensic medicine. In this paper, we present the main lesions that occurred in a horse with accidental electrocution that was presented for complete necropsy survey.

Materials and Methods: A horse corpse was sent to the Pathology Department (Faculty of Veterinary Medicine, Cluj-Napoca, Romania) for a full medical survey.

Results: Preliminary results and external examination: the body was in rigor mortis; from the nasal cavities drained out reddish foam and in the mouth was observed the presence of ingested feed (straw) that was not chewed, suggesting a quick death. The findings detected after internal examination of the carcass were poor blood coagulability, haemorrhagic diathesis throughout the body, with hemorrhages of various sizes in different body regions (e.g., muscles of the withers, in the gluteal muscle, the mucosa of epiglottis, larynx, trachea, in the interstitium of the lung, and ecchymosis in the left kidney). Some other lesions detected were infarcts and hemorrhages in the fundic region of the stomach's mucosa.

Conclusion: In electrocution, hemorrhages are most often located in the respiratory tract, aspect observed in our case too. However, the diagnosis of electrocution has to corroborate the necropsy findings (which are not specific), with some other data such as the fulminant death and inspection of power source.

NUTRITIONAL MANAGEMENT OF OVERWEIGHT AND OBESITY IN DOGS AND CATS

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Keywords: *diet, management, obesity, overweight*

Introduction: Some of the most common nutritional disorders are overweight and obesity, a proportion of approximately 59% of dogs and cats being affected. A permanent challenge for vets is weight management, including the prevention and treatment of overweight and obesity (Brooks *et al.*, 2014).

Aims: Corporeal score and body-weight loss in dogs and cats have been monitored by feeding various diets.

Materials and Methods: The study was conducted on a total of 10 animals (6 dogs and 4 cats), monitoring the effect of three types of food for dogs and two types for cats suffering from overweight and obesity. Cooked food, dry food diet and premium dry food were investigated. The quality and gross chemical composition of food were determined. Corporeal score, weekly weight loss percentage and the number of calories consumed daily were measured. We also appreciated the quality of life and activity level of the animals at the beginning and at the end of the trial.

Results: Nutritional management of investigated diets for overweight and obesity in dogs and cats revealed that through the smallest caloric restriction, dry food diet presented the highest efficiency, dogs and cats losing weight steadily without losing muscle mass. Although the satiety effect occurs when the animals reach their ideal weight, the Rebound effect was not present.

Conclusion: Following the protocol results we can assert that the best results we have achieved by the administration of dry food that is more appropriate in overweight and obesity in dogs and cats as compared to cooked food. Diet food must be associated with adjusting the level of activity and exercise whenever needed.

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RESEARCH THE ANTIBIOTIC OXYTETRACYCLINE HYDROCHLORIDE RESIDUES IN THE FRESH AND COOKED CHICKEN AND THE STUDY OF THE KINETICS OF THE MOLECULE

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Keywords: *antibiotics, residues, livestock, chicken, meat*

Introduction and aims: Use repeated and misuse of antibiotics as a growth factor in broiler farms had as consequence the presence of residues in meat of these chickens for human consumption. It is for this reason that the regulation sets LMRs and timeouts before slaughter for each antibiotic.

Material and methods: It took 20 rearing chicks (to 35 days old), 15 are treated with HCL OTC at high doses for 5 days and remaining 5 have nothing received (negative control). Among the 15 treaties, 5 are cooked at 115 ° C for 35 minutes, 5 others are cooked 145 ° C for 20 minutes, and the 5 remaining are uncooked. The detection of residues of HLC OTC was performed using two different methods: turbidity is based on the measurement of the absorbance of UV rays of a solution that contains bacterial colonies and a HPLC method.

Results: Solution H.OTC (-) is opaque, the absorbance is highest, so does not contain an ATB. The H.OTC (+) solution is clear and represents the lowest absorbance compared to the absorbance of the standard HCL OTC 100 µg/ml This confirms that the ATB residues in this solution (+) have a concentration of more than 100 µg/ml. H.OTC (+) 115 and 145 solutions are less clear and their absorbance lies between the values of the dilutions of the standard, so the concentration of residues of ATB in these two solutions lie between the 10 µg/ml and 100 µg/ml.

Standard solution injection gave a peak after 2 minutes of analysis. The injection of the H.OTC (-) gave no peak which confirms the absence of residues in this solution. H.OTC (+) 115 and 145 gave peaks with an area less than that of H.OTC (+). Calculations gave the concentration in H.OTC (+) are 145 µg/mg in H.OTC (+) 115 is 73.71 µg/mg or a reduction of 49.40% and H.OTC (+) 145 is 66.03 µg/mg or a reduction of 54.68%.

Conclusion: This study can conclude that the HCL OTC residues are degradable thermo and heating at a certain temperature for a time may decrease its inhibitory effect. Bake at 145 ° C during 20 minutes is enough to destroy almost 55% of the initial quantity of residues in chicken.

USING CROSSMATCH TESTS FOR SEROLOGICAL COMPATIBILITY ASSESSMENT INTRA- AND INTERSPECIFIC AT DOGS AND CATS

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Keywords: *quick tests, crossmatch, xenocompatibility, dog, cat*

Introduction: Selecting compatible blood is essential for the safety and efficiency of transfusion therapy both in cats, which can show preformed alloantibodies, and in canines, which usually do not have such antibodies. Correct performing and repeating crossmatch tests can prevent both immediate and delayed immune reactions caused by sensitization of patients. In the cats' case, it is called into question solving low availability of sources of compatible blood donors by using canines, if it would be possible dog-cat xenocompatibility.

Aims: The aim of this study is to comparatively analyze serological intraspecific and interspecific compatibility on samples of dogs and cats in order to evaluate the possibility of implementing transfusion therapy with canine blood to feline patients.

Materials and Methods: There were conducted crossmatch tests on blood samples (n=42) collected (on EDTA) from dogs (n=36) and from cats (n=6) from the FMV Cluj-Napoca clinics and from a private veterinary clinic. There were performed 156 crossmatch tests, predominantly through quick technique on smears and in some cases (15%) the method based on separating the plasma and preparing hematies suspension (5%) from the previously washed red blood cells concentrate.

Results: Intraspecific compatibility on dogs was predominantly negative. Remarkable is the case of a canine patient on which we registered all 24 crossmatch major tests high positive intensity (3+), corresponding to a patient with preformed alloantibodies, without a historical therapy with blood products. Regarding the intraspecific compatibility tests, as we had expected, all 30 xenocompatibility dog-cat tests showed high positive reactions, both for major and minor crossmatch. (3+/4+).

Conclusions: The intraspecific evaluations revealed a high level of blood compatibility in the case of dogs unsensitized through previous blood transfusions, yet without excluding the possibility of some atypical sensitization for clinical interest. Having all the interspecific tests exclusively highly positive, we can not sustain a probable xenotransfusion.

COMPARATIVE ANALYSIS OF ELECTROPHORETIC PROFILE OF MAJOR PROTEINS OF MILK FROM ALPINE AND CARPATHIAN GOATS

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Keywords: *goat, milk, proteins, SDS-PAGE*

Introduction: Milk is a functional aliment because it contains proteins with special functions, like binding Ca, Fe and other minerals, subsequently inducing antimicrobial effect, antihypertensive, antioxidative. Milk's proteins provide nutritious, biologically active, and essential in human nutrition. In case of goat's milk, the concentration and quality of proteins represent basic indices for the evaluation of nutritional and biological value.

Aims: Therefore, we intend to bring new data regarding the characterization of the protein profile of milk from goats of two different breeds, French Alpine and Romanian Carpathian, which will sustain the correlation of accentuated polymorphism caseins with low allergy levels.

Materials and Methods: During March – April 2016 there were conducted two monthly collecting's of raw milk from Carpathian (n=10) and Alpine (n=10) goats, grouped in two distinct lots I. and II. The animals were selected from a livestock of 60 goats from a microfarm, being clinically healthy, fed and held in similar conditions. The proteic composition of goats' milk was determined through SDS-PAGE after a previous evaluation of the total protein concentration through Bradford method.

Results: Quantitative data obtained had similar values for the main proteic fractions separated based on their molecular weight and plated on polyacrylamide gel of 12% with SDS. From the comparative analysis of the electrophoretic profile of major proteins, the proportion expressed as a percentage of the different protein bands of goat milk revealed differences in the β -CN., k-CN., and β -lactoglobulins: β -CN = 30.56% lot I. > 26% lot II., k-CN = 15.4% lot I. > 12.5% lot II., β -lact. 17.9% lot I. < 24% lot II. The other protein fractions values were almost identical.

Conclusion: The statistical analysis of the obtained data did not reveal significant differences between the two breeds. This study revealed that the proteic profile of the studied milk can be influenced by breed, but the major impact in this regard belongs to the genetic polymorphism, to the feed ration, lactation period and the geographic area.

A CASE OF SEVERE BABESIA SSP. INFECTION IN A HORSE: PATHOLOGICAL AND MOLECULAR FINDINGS

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Keywords: *Babesia caballi*, cytology, PCR, *Theileria equi*

Introduction: *Babesia spp.* are intraerythrocytic protozoan organisms also known as piroplasms, spread by arthropods (ticks, phlebotoms), transplacentally, and by blood transfusions causing hemolytic anemia in horses, cattle, dogs, cats and various nondomestic animals. *Babesia caballi* and *Theileria (Babesia) equi* infect horses and other equids in tropical and subtropical areas all around the world.

Aims: The purpose of this study is to emphasize the gross lesions, as well as the methods and tools used for establishing a definitive post-mortem diagnosis.

Materials and Methods: The study was carried out on an 8 year old, mix breed, male horse from Alba County, Romania. The owner-reported clinical signs included anorexia, a decrease and impairing in movement. The horse also had a history of being fed with fungi contaminated hay a month before death. For establishing the diagnosis, a full necropsy exam was carried out at the Pathology Department of the Faculty of Veterinary Medicine Cluj-Napoca, during which a cytological exam (blood, brain and kidneys smears) was performed and multiple tissue samples (blood clot and heart muscle) were harvested for PCR.

Results: The gross lesions found were represented by cachexia, jaundice, haemoglobinuria, hemorrhagic diathesis, hydropericardium, systemic lymphadenopathy, and a brownish discoloration of the cerebrospinal liquid. Cytological examination revealed the presence of intraerythrocytic pear-shaped bodies, morphologically compatible with *Babesia spp.* The presence of such bodies was not confirmed in leukocytes. The PCR technique revealed an intensive positive result for the blood clot sample, but the extraction from the heart muscle tissue sample was of no success, thereby we recommend sending the mentioned above samples for diagnosis when a babesiosis suspicion is made.

Conclusion: As observed, infection with *Babesia spp.* produced both intravascular and extravascular hemolysis that caused a wide variety of lesions throughout the body, making the clinical diagnosis often difficult.

IN CLINIC USE OF HORSE GRIMACE SCALE AS A PAIN ASSESMENT TOOL

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Keywords: *horse grimace scale, pain*

Introduction: The recognition and ease of pain in animals is essential for their welfare. Horse grimace scale (HGS) was developed as a pain assessment tool and is based on the facial expression changes that occur when an animal senses pain (Dalla Costa *et al.*, 2014). Unlike Composite Pain Scales (Bussieres *et al.*, 2008), HGS targets 6 specific facial action units: stiffly backwards ears, orbital tightening, tension above the eye area, prominent strained chewing muscles, mouth strained and pronounced chin, strained nostrils and flattening of the profile, using a 3-point scale (Dalla Costa *et al.*, 2014).

Aims: This study desires to show the relevance of using HGS for the evaluation of acute and chronic pain in horses.

Materials and Methods: We assessed 17 horses admitted to the Equine Clinic of the Faculty of Veterinary Medicine Cluj-Napoca, using the HGS. The assessment was done on pictures taken at the time of admission, by 3 veterinary surgeons that underwent training for HGS. The assessment was not part of the clinical evaluation, nor influenced the course of treatment. We tried to correlate the score obtained with the clinical diagnosis and the complexity of treatment, including the type and amount of analgesics that were used during the hospitalization.

Results: The results obtained with HGS were from 0 to 12, and the clinical diagnosis included traumatic myopathy, intestinal volvulus, right colon displacement, exuberant granulation tissue. There was a correlation between the pain score and the types of analgesics and length of treatment.

Conclusion: The study showed that HGS is a useful tool to assess pain in horses and could also be used to predict the analgesics used and duration of treatment. Further study is needed in order to evaluate the perception of non-specialists working with horses on the intensity of pain shown by horses.

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BODY WEIGHT EVOLUTION OF TSURCANA PURE BREED LAMBS AND TSURCANA CROSSED WITH BLANC DU MASSIF CENTRAL LAMBS (F1)

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Key words: *body weight, Blanc du Massif Central, daily weight gain, Tsurcana*

Introduction: In the EU market the demand for the local breed meat, such as Tsurcana breed, is low; so many breeders choose to cross the pure breed ewes with meat rams to improve the quality of the lambs (Pascal *et al.*, 2014). The Blanc du Massif Central breed is a rustically French meat breed of sheep, and it was not used before in our country to produce F1 lambs for the market (Kukovics *et al.*, 2013).

Aim: The aim of this study is to evaluate the body weight evolution of the resulted lambs F1 with the body weight evolution of the pure Tsurcana lambs, daily weight gain from birth to 3 months.

Materials and methods: the research was conducted on two selected Tsurcana batches. The first batch consisted on a flock of purebred Tsurcana lambs and the second one consisted on a flock of F1 lambs (Tsurcana ewes and BMC rams). The lambs were kept in similar conditions (nutrition, housing, etc). The body weight of the lambs was evaluated at birth, at 21, 50 and 90 days. The results were statistical analyzed. The analysis regarded the daily weight gain, the comparative evaluation of body weight concerning the age, sex and purebred lams with F1 crossed lambs. (Mireșan *et al.*, 1979)

Results: Following the statistical analysis, we obtained superior results for the F1 crossed lambs compared with the purebred Tsurcana lambs concerning the daily weight gain and the body weight evolution between the two batches.

Conclusion: Concerning the birth weights, at 21, 50 and 90 days the results showed a difference between the pure breed lambs and the crossed lambs. The daily weight gain was superior in the crossed lambs compared with purebred lambs. The research confirmed the superior weights of lambs obtained in the first generation between the BMC and Tsurcana breed.

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HUMAN-ANIMAL RELATIONSHIP: A COMPARATIVE STUDY IN WORKING AND BREEDING HORSES

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Keywords: *behavioural tests, breeding horses, human-horse relationship, working horses*

Introduction: The importance of a good human-horse relationship in every equestrian discipline is recognized by the specialists all over the world.

Aims: The aim of the study was to comparatively assess the behavioural response towards humans in different horse categories, in two seasons.

Materials and Methods: The human-animal relationship was investigated during a year, in two different seasons in working horses (171 in the winter, 168 in the summer), stallions (62 in the winter, 66 in the summer) and broodmares and young horses (137 in the winter, 146 in the summer). Using specific methods, the general attitude of the horses was evaluated (apathetic or alert) and their reactions (aggressiveness, fear/avoidance, indifference, friendliness) to the: (1) assessors' approach (2) walking besides and (3) the attempt of touching the animal. The data were analyzed using the SPSS statistical software (Kruskal-Wallis and Wilcoxon test). The value of minimal significance was considered at $P < 0.05$.

Results: The proportion of the apathetic horses recorded in this study varied from 0% to 3.23% depending on the assessed category and season, without statistically significant differences ($P > 0.05$). For the behavioural responses (aggressiveness, fear, indifference or friendly response), statistically significant differences ($P < 0.05$) were found among the assessed horse categories. The season had no significant influence on the variability of responses in the behavioural tests in none of the horse categories included in the study.

Conclusion: The results indicate an inadequate human-animal relationship in all the studied horse categories, with negative implications on the welfare of the animals. This problem has low remedial possibilities, because it needs human mentality change of those working with horses.

THE INFLUENCE OF SOLAR RADIATION ON THE ANTIOXIDANT SYSTEMS IN BLOOD OF DAIRY COWS AND THE PROCESSING OF THE DATA USING WAVELETS TRANSFORM

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Key words: dairy cows, solar radiation, antioxidant enzymes, wavelet transforms

Introduction: The antioxidant systems have the role to control the forming and accumulation in the organism of the oxygen reactive species (ORS).

Aims: The purpose of this paper is to observe if in cattle, exposed to the solar radiation, could be noticed a certain reaction of the organism related to the oxidative stress.

Materials and Methods: The study was made in the period May - August 2014, on a group of 16 Romanian Simmental dairy cows, kept on pasture during the day. The determination of SOD was made using NBT method, the catalase activity was made using photometric method with $K_2Cr_2O_7$. The peroxidase dosing was made using the guayacol method. The processing of the determined data were made using wavelet transforms (In-Place Fast Haar Wavelet Transform).

Results: The results showed that when Temperature Humidity Indexes (THI) are higher than 72 (the superior limit for thermal comfort in cattle), the oxidative stress appears in dairy cows. This oxidative stress is mainly manifested by the increasing of superoxide dismutase with 95% in August compared to May, followed by the increasing of the catalase with 79% and of glutathione peroxidase with 13%. The increasing of the antioxidant enzymes level was directly co-related with THI.

Conclusion: the determination of the antioxidant enzymes level could be an appropriate model for studying the influence of hot environment on the oxidative status of dairy cows. The wavelet transforms can be easier applied to practical data.

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RESEARCH CONCERNING IN VITRO SENSITIVITY OF SOME MICROORGANISMS AT HYDROXYQUINOLINE AND CUPRIC DERIVATIVES, DEPOSITED ONTO HYDROXYAPATITE

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Keywords: *microorganisms, sensitivity, hydroxyquinoline, hydroxyapatite, copper*

Introduction: The preparations based on hydroxyquinoline, in various combinations, are used in medicine, being shown to have an inhibitory effect against bacteria, molds, fungi, parasites, and viruses, but also having other beneficial effects mentioned in other medical conditions (anti-cancer, anti-degenerative, anti-inflammatory).

Aims: In vitro susceptibility testing of microorganisms: bacteria (Gram positive and Gram negative), yeast (*Candida* spp.) and unicellular algae (*Prototheca* spp.) at the preparations based on hydroxyquinoline (HQ) and its cupric derivatives deposited on hydroxyapatite (HAP).

Materials and methods: There were tested microbial strains of the following genera: *Escherichia*, *Staphylococcus*, *Micrococcus*, *Bacillus*, *Candida*, and *Prototheca*. The tested products (developed in the Laboratory for Nanobiomaterials Synthesis, Center of Physical Chemistry, Faculty of Chemistry and Chemical Engineering, UBB Cluj-Napoca) were developed in three versions: 1) HQ – Cu²⁺ – HAP; 2) HQ – Cu²⁺ – KNO₃ – HAP; and 3) NHQ – Cu²⁺ – KNO₃ – HAP, where NHQ stands for nitrohydroxyquinoline. Determination of the inhibitory effect was conducted by diffusion technique in nutrient agar, according CLSI 2013 standards, with necessary adaptations for testing of products made in the form of suspensions.

Results: Following interpretation, it was found that the inhibition zones, arising from the antimicrobial effect of the tested products showed variability in size, depending on the test product and the microbial strains: *Escherichia coli* (8-10 mm), *Staphylococcus* spp. (17.6 to 23.2 mm), *Micrococcus* spp. (24.4 to 27.6 mm), *Bacillus* spp. (14.0 to 16.0 mm), *Candida* spp. (20.4 - 25.2 mm), *Prototheca* spp. (20.8 to 30.0 mm). From the three tested products, the best efficacy was found at the product no. 3 (NHQ – Cu²⁺ – KNO₃ – HAP), followed by no. 1 (HQ – Cu²⁺ – HAP) and no. 2 (HQ – Cu²⁺ – KNO₃ – HAP).

Conclusions: The inhibitory effect was bactericidal, manifested more intensively against Gram-positive bacteria, yeasts, and prototheca. Such products, prepared in the form of suspensions, may have practical application in the prevention and treatment of skin or hooves disorders. No resistance phenomena are recorded, nor resistant colonies in the inhibition areas.

MICROSYSTEMS DEVELOPED FOR THE CONTROLLED DELIVERY OF RESVERATROL IN THE DIABETIC RETINOPATHY THERAPY

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Keywords: *resveratrol, retina cells, polyelectrolyte microcapsules*

Introduction: Diabetic retinopathy (DR) is one of the most severe ocular complication that causes visual impairment and blinding due to retina and optic neuronal path damage. During recent years, there was expressed a general interest in using resveratrol (RV) (3,5,4'-trihydroxystilbene) for prevention or complementary therapy for eye diseases. However current challenges in RV delivery and bioavailability require a targeted delivery strategy.

Aims: Our current approach is to load RV as a cargo molecule, into polyelectrolyte multilayer microcapsules (PEM) and deliver it to retina pigmented epithelial cells (RPE cells). Mimicking the hyperglycemia physiology which occurs in DR patients by using D407 cells as a platform for an *in vitro* experimental model for this eye disease, we assessed the therapeutic potential of RV-loaded PEM.

Materials and Methods: The synthesis process of the RV-PEM complex is based on a simple layer by layer assembly approach. The RV-loaded PEM obtained by this procedure were characterized using scanning electron microscopy method. Quantification of the RV released from microcapsules was assessed by HPLC-ESI-MS.

Results: The obtained microcapsules have 1–5 µm diameters, with a spherical shape, a rough surface a homogeneous coating entrapped with a high efficiency RV. The RV entrapment efficiency was determined in order to determine the amount of therapeutic agent who reaches the target site. TEM analysis showed that RV-loaded PEM were internalized into D407 retina cells, and proved to have no cytotoxicity at the dose used (10 RV-loaded PEM /cell).

Conclusion: The results obtained show a promising strategy to enhance the bioavailability of RV and to increase its solubility, stability and release, by developing a delivery system for RV specifically targeted toward retina.

Acknowledgements The financial support of UEFISCDI (Executive Agency for Higher Education, Research, Development and Innovation Funding) through grant with code PN-II-RU-TE-2014-4-1135, 14/01.10.2015 is highly acknowledged. The authors would like to thank Dr. Maria Suci for help with the SEM and TEM microscopy experiments.

CLINICAL EVALUATION IN ISOFLURANE AND SEVOFLURANE ANESTHESIA IN RAT

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Keywords: *anesthesia, isoflurane, sevoflurane*

Introduction: There is a permanent concern in utilizing less and less invasive surgical techniques, accompanied by rapid recovery from anesthesia. For most of the anesthetics, recovery time and the manner it unfolds are of major importance. Beside the fast recovery from anesthesia, the side effects that can emerge under the action of anesthetics are particularly important. Among the minor side effects of inhaled anesthetics we mention: emesis, vomituration, dizziness, drowsiness, headaches, shakiness or cough.

Aims: The proposed objectives were assessing induction, maintenance and emergence after inhaled anesthesia and comparison of anesthetics times between isoflurane and sevoflurane.

Materials and Methods: We used 12 Wistar female rats divided in 2 groups anesthetized with either isoflurane or sevoflurane. We maintained a concentration of 1.5% isoflurane and 2% sevoflurane, respectively for 2 hours long. We registered the moment when the first signs of recovery appeared, the moment when the rats became active, as well as the moment of full recovery from anesthesia. For statistical analysis we used GraphPad Software, applying Student's t-test.

Results: Induction unreeled without excitation signs and the anesthesia installed in 1-2 minutes for both anesthetics. The difference between the registered times in the two groups was not statistically significant for the first recovery signs or activity of the animals, whereas in the case of full recovery it was statistically significant ($p < 0.05$). Thus, emergence from anesthesia was faster after sevoflurane in comparison to isoflurane. Recovery from anesthesia took place gradually, without excitation signs. No animals presented clinical signs that would suggest irritation of the respiratory airways, but most of the rats presented horripilation during recovery.

Conclusion: Induction of anesthesia with isoflurane and sevoflurane in rats was rapid, without excitation signs. Recovery from anesthesia took place faster after sevoflurane administration in comparison to isoflurane, being accompanied by horripilation in the case of both anesthetics taken into study.

NON-INVASIVE ASSESSEMENT OF SENTINEL LYMPH NODES WHICH DRAIN THE TUMORAL MAMMARY GLANDS IN FEMALE DOG

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Keywords: *ultrasonography, femele dog, mammary gland tumour*

Introduction: Mammary gland tumours occupy a significant place in the pathology of this species. It is well known that the main predisposing factor involved in tumour appearance is the absence of early female sterilization. Most tumours metastasize on the distance via the lymphatic system. In these conditions, the sentinel lymph nodes of the mammary glands must be assessed prior to surgical treatment.

Aims: Considering the insufficient knowledge of non-invasive investigative methods of the sentinel lymph nodes, the aim of this study is to describe the sonographic anatomy of the lymph nodes that drain the mammary gland tumours in female dog.

Materials and Methods: Twelve dog females presenting tumours of the cranial and caudal abdominal mammary glands (A1 and A2), inguinal mammary gland (I) and cranial thoracic mammary gland (T1) were examined. The axillary and superficial inguinal lymph nodes were evaluated using an algorithm composed by grey scale ultrasound, Doppler technique, contrast enhanced ultrasound (CEUS) and real time elastography. Surgical excision of the sentinel lymph nodes was performed and samples for histopathological examination were taken.

Results: Hypoechoic pattern, rounded shape, hilus absence and heterogenicity revealed by the grey scale ultrasound examination were suspected for the metastatic infiltration. Doppler technique showed an aberrant and mixed vascularisation of the lymph nodes, while the CEUS revealed incomplete enhancement of lymph nodes parenchyma. On real time elastography, the presence of blue areas in more than 50% from the lymph nodes parenchyma led us to conclude that the lymph node stiffness was caused by metastatic infiltration. Histopathological examination confirmed the presence of the metastatic infiltration in 97% of the examined lymph nodes.

Conclusion: Using the algorithm composed by grey scale ultrasound, Doppler technique, CEUS and real time elastography the metastatic infiltration of sentinel lymph nodes of mammary gland can be assessed. More extensive studies are needed to validate the proposed algorithm.

EFFECTS OF PRE AND PROBIOTIC ON GROWTH PERFORMACE AND HAEMATOLOGICAL PARAMETERS IN PIGS

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Keywords: *prebiotics, probiotics, pigs, growth, performance.*

Introduction: The efficacy of antibiotics as growth promoters in pigs is well documented in numerous studies. Because of the increasing concern regarding implication of antibiotics in the development of resistant bacteria, alternative methods to improve health and efficiency of growth in pigs are widely investigated. So far researches showed mostly a poor efficiency of these additives. (Cromwell, 1991; Chen, 2005) The lack in alternatives to antibiotics makes further studies of probiotics and prebiotics important.

Aims: The present study investigates the effects of dietary supplementation with prebiotics and probiotics in pig performance, the feed conversion ratio and haematological parameters.

Materials and Methods: The research was conducted on hybrid pigs [(Yorkshire × Landrace) × Duroc] in a farm from Sălaj County, Romania. Pigs of 11 weeks (n = 200) were divided into 4 equal groups: a group fed with the probiotic, a prebiotic-fed group, a control group and a symbiotic trated group. The control group was fed with a feed without food additives. Probiotic treated group received the same type of feed with the additive BetaPlus® Ultra (Biochem) containing: a dose 5.12×10^{12} CFU / kg *Bacillus subtilis* DSM 5750, a dose 5.12×10^{12} UFC / kg *Bacillus licheniformis* (DSM 5749) and 921 g of betaine. Prebiotic group had added to the feed an extract derived from the cell wall of *Saccharomyces cerevisiae* (TechnoMos® - Biochem). The prebiotic was administered in an amount of 1 kg / tonne of feed, and the probiotic 250 g / ton of feed. the weight of pigs in each compartment was recorded daily. 5 rectal swabs were collected on day 11 and day 77 from each investigated group. Growth rate, feed consumption and some haematological parameters were measured.

Results: The body weight, average total weight gain and feed conversion rate were increased by the dietary inclusion of the both pre and probiotic. In the compartment treated with prebiotic the weight of the pigs has increasd by 1030 g/day compared with 982 g/day value recorded in the control group. The average feed consumption was 3.21 kg/day in the control group while the group treated with prebiotic was only 2.99 kg/day. Microbiological examination has confirmed the presence of the bacteria *Bacillus spp.* in the groups treated with the probiotic. *E. coli* detected in all collected samples.

Hematological parameters varied in physiological limits of species.

Conclusion: These products show promising effects as an alternative for antibiotics in order to eliminate the use of these drugs as growth-promoting additives.

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CONFOCAL LASER AND DARK-FIELD CORRELATIVE IMAGING FOR TISSUE DETECTION OF GOLD NANOPARTICLES IN SYSTEMIC TOXICITY STUDIES

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Keywords: *confocal and dark-field microscopy, gold nanoparticles, surface plasmon resonance.*

Introduction: There is growing interest for introducing gold nanoparticles (GNP) in biomedical applications as photoactive molecules or drug vectors (1). Despite recent progresses, the identification of GNP in biological environments remains a major technical challenge, limiting the overcome of toxicological studies and thus the medical employment of their proprieties (2).

Aims: The present study aims to employ the confocal laser and dark-field microscopy as analytical methods for GNP detection and quantification in systemic toxicological studies.

Materials and Methods: Solubilized GNPs were intraperitoneally given as single 0,5 ml dose in male C1 mice. The GNP distribution and tissue changes associated with their presence were assessed in paraffin embedded tissues by classical histology (H-E stained) and by dark-field microscopy coupled with confocal scanning laser microscopy (CSLM).

Results: Based on the surface plasmon resonance proprieties of GNP, the confocal laser microscopy was able to specifically identified the cellular presence of GNP. The usage of dark-field microscopy aids the association between the GNP presence with the cell response assessed by classical histology.

Conclusion: The surface plasmon resonances of GNP offer a strong optical signal which can be employed for their detection on biological samples by CLSM and dark-field microscopy.

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Acknowledgements The research was conducted with the support of PN-II-PT-PCCA-76/2012 (VACCINAN) and PN-II-PT-PCCA-2013-4-1232 (RETSTEM) grants.

DISEASES OF CETACEANS FROM THE BLACK SEA: AN OVERVIEW FOR EPIDEMIOLOGISTS AND PATHOLOGISTS

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Keywords: *Black Sea, brucellosis, cetaceans, necropsy, toxoplasmosis.*

Introduction: The main species of cetaceans in the Black Sea are the porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*) and bottlenose dolphin (*Tursiops truncatus*). Our geographical area of the sea provides the necessary conditions for breeding, growth and development of these species. The examination of stranded carcasses and disease monitoring is an important part of international conservation strategies as proposed by ACCOBAMS.

Aims: The main pathologies encountered in the previously mentioned species are infectious diseases such as Brucellosis (*Brucella ceti*), morbillivirosis (Morbillivirus) and quite frequent parasitic pathology, toxoplasmosis (*Toxoplasma* spp.). The three diseases are responsible for the deaths of cetaceans and therefore we try to create an epidemiological overview by which the cause of death and incidence of diseases listed above are established.

Material and methods: The necropsy examination was performed on cetaceans carcasses stranded on the Black Sea shore. The necropsy technique and sampling protocol for marine mammals was in accordance with requirements well established by the European forum. The results were recorded in an international database.

Results: In the carcasses examined we found nonspecific lesions such as: pulmonary edema, brain congestion and hemorrhage, liver steatosis, orchiepididymitis. The cause of death was represented by drowning in all of the cases. We also observed signs of massive parasitic infestation in these dolphins inner ear with *Stenurus* spp. In our research we found tow positive samples for morbillivirus, one from the brain and the other from the left lung, both being confirmed by PCR.

Conclusions: It is very important to know the pathologies present in the Black Sea to enforce general rules on the conservation of marine mammals, in order to ensure and enable the development of these species and to avoid the extinction of such animals in our country. After establishing an epidemiological status of the main diseases, we can provide important data for helping the conservation process of this species and prevent an outbreak of diseases.

METASTATIC MELANOMA OF THE PITUITARY GLAND IN A DOG

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Key words: *melanoma, metastases, pituitary gland*

Introduction: Melanoma is a malignant tumor of the pigment-containing cells known as melanocytes. It is frequently encountered in dogs, especially skin and mouth melanoma. Metastases are common, especially in lymph nodes, but pituitary melanoma, although frequent in humans, to the author's knowledge, has never been reported in dogs.

Aim: We intended to report the presence of systemic metastases following a skin melanoma, including the cerebral and pituitary ones.

Materials and methods: A 7 year old female Bucovina Shepherd Dog presented to the clinic with nonspecific symptoms: apathy, loss of appetite and severe muscle weakness (with a rapid onset). X-ray examination and CT scan were performed, revealing a mass in the mediastinum. The definitive diagnosis was made subsequent to the necropsy exam, cytology and histopathology.

Results and discussions: During the necropsy examination we observed several nodular formations in the thorax and the abdominal wall, and also in the cerebrum and the pituitary gland. The axillary lymph nodes were enlarged and blackened. The spleen was enlarged and presented multiple, confluating infarcts in the parenchyma. The mediastinal lymph nodes were also hypertrophied and with a brown-black color. The cytology revealed tumoral cells, abnormal nuclei, with multiple nucleoli, kariomegaly and an increased number of mitoses. The tumoral cells contained black granules in the cytoplasm, this confirming they were tumoral melanocytes. The histological examination performed on the nervous tissue showed an infiltrative, aggressive melanoma. Other lesions encountered were represented by moderate gastritis, diffuse meningeal fibrosis, bronchopneumonia and necrotic, fibrinous pleuritis, most probably *ab ingestis* pneumonia consecutive to the paralysis caused by the metastatic melanoma.

Conclusions: The importance of this case report is related to the uncommonly found pituitary metastasis of a primary skin melanoma.

SECTION 9: VETERINARY MEDICINE - CLINICAL SCIENCES

EVALUATION OF CRURAL RELEASE AND ISCHIAL OSTEOTOMY FOR RELIEF OF TENSION IN THE REPAIR OF LARGE SEGMENTAL URETHRAL DEFECTS IN MALE CATS

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Keywords: *crural release, ischial osteotomy, urethral defect*

Introduction: Large segmental urethral defects that cannot be repaired primarily and require an additional reconstructive procedure, may result from urethral or prostatic tumor resection, revision of urethral strictures, congenital urethral defects or urethral trauma.

Stricture formation is a complication of urethral anastomosis and may be inherent to the urethral healing process, tension on the anastomosis and failure to appose the mucosa during repair. Tension of the urethral anastomosis might also cause dehiscence of the suture line.

Aim: To examine if the tension at the site of a urethral anastomosis can be relieved by performing either a crural release technique or an ischial osteotomy technique.

Materials and Methods: 18 male Cat cadavers were divided into 2 groups; crural release (n = 9) and ischial osteotomy (n = 9). In each group, 20%, 25%, and 30% of the pelvic urethra was excised in 3 cats. The length of the urethral defect was measured after excision of the urethral segment, and after approximation, before and subsequent to the tension relieving technique performed. Two clinical cases are described.

Results: Both CR and IO were both effective in relieving the tension encountered at the anastomosis after the removal of 20% of the urethral length. Ischial osteotomy was more effective in relieving the tension encountered at the anastomosis after the removal of 25% and 30% of the urethral length. Two male cats, with large urethral defects as a result of vehicular trauma, were successfully treated with a similar technique to those described in this study.

Conclusion: Anastomosis of the urethra, without tension, can be achieved even in long urethral defects. The application of these techniques, in clinical cases, should only be considered in situations in which the alternate techniques are associated with high morbidity and mortality.

CRICOID CARTILAGE MORPHOLOGY IN NORMAL AND BRACHYCEPHALIC DOGS

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Keywords: *Brachycephalic syndrome, cricoid cartilage, laryngeal collapse*

Introduction: Laryngeal collapse associated with brachycephalic syndrome is thought to be mainly secondary to the turbulent airflow and chronic high negative pressures in the pharynx. Laryngeal collapse is thought to progress over time and is characterized initially by everted laryngeal sacculles (Grade 1), followed by medial displacement of the cuneiform processes of the arytenoid cartilages (Grade 2), with subsequent collapse of the corniculate processes and loss of the dorsal arch of the rima glottidis (Grade 3).

Aims: The arytenoid cartilages articulate with and are supported by the cricoid cartilage. We hypothesised that the loss of support of the cricoid cartilage contributes to the collapse of the arytenoid cartilages in cases of laryngeal collapse. The aim of this study was to compare the morphology of the cricoid cartilage in normal and brachycephalic dogs.

Materials and Methods: We used Computer Tomography (CT) scans of the head and neck, of brachycephalic dogs and weight matched control dogs, performed for reasons unrelated to this study. CT scans of three breeds of brachycephalic dogs, Pekingese (n=10), French Bulldog (n=11) and Chinese Pug (n=10), and a control group consisting of normocephalic dogs (n=10) with a similar weight range (2-12 kg) were used in this study. CT scans were included if they were performed in the transverse plane of the neck, included the entire larynx, and the cricoid cartilage could be clearly identified. Two or three consecutive images of the cricoid cartilage were selected from each CT scan and saved on a personal computer. The images were imported into ImageJ and the circumference, surface area and long and short diameters of the cricoid cartilage were measured. The long and short diameters were used to calculate a cricoid ratio which was compared between groups.

Results: There was a statistically significant difference ($p=0.00042$) in the cricoid ratio between the normal group (n=10) 1.15 ± 0.11 and all the brachycephalic dogs (n=31) 1.72 ± 0.20 . The cricoid ratio in the Pekingese group (n=10) $p=0.007$, French Bulldog group (n=11) $p=0.00029$ and Chinese Pug group (n=10) $p=0.014$ were all significantly different from the cricoid ratio in the normal group.

Conclusion: We were able to show that the morphology of the cricoid cartilage in brachycephalic dogs differs significantly from the morphology of the cricoid cartilage in normal dogs. We do not know, however, if the differences that we observed are primary or secondary to laryngeal collapse. The change in shape is likely to result in an increase in the negative pressure in the lumen of the larynx and may be an additional factor contributing to laryngeal collapse.

EQUINE EMERGING VIRUS INFECTIONS

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Keywords: *horse, OIE, infectious diseases*

Monitoring of and alerting for potentially harmful infectious diseases in equids are principally the duties of the OIE. Weekly the occurrence of OIE-Listed diseases and infections are reported on-line. A problem is that not all outbreaks are adequately reported by each country and parallel structure also report relevant outbreaks on their own.

Currently emerging virus diseases has come to the attention of epidemiologists. Dramatic changes in the environment have resulted in a closer contact of domesticated animals and man with wild animals living in tropical rain forests and carrying specific pathogens. Some of these pathogens can easily jump the species barrier causing an emerging disease with a significant impact on animal or public health. The latest relevant example for equines is the Hendravirus Infection in Australia. It is a RNA virus of the family Paramyxoviridae, genus Henipavirus and is closely related to the Nipah virus of Malaysia and Singapore. Large bats (*Pteropodidae; Megachiroptera*) are the reservoir for both viruses. The Nipavirus has mainly infected swine and man, but may infect many other domestic animals including dogs, cats, goats and horses. The disease causes severe often lethal respiratory problems, as does Hendra virus in horses, cats and man, and occasionally causes nervous signs in pigs.

A disease of growing concern is African horse sickness, principally restricted to sub-Saharan Africa. Nevertheless, a few outbreaks have occurred outside Africa in the Near and Middle East (1959–1963), Spain (1966, 1987–1990), Portugal (1989), Yemen (1997) and the Cape Verde Islands (1999). The recent northward expansion of *Culicoides imicola*, the main African vector provides increased chances of transmission. The Bluetongue virus is transmitted by the same vector and has already caused problems in the Mediterranean Basin of Europe and even in Western Europe. A similar doom scenario is thinkable for AHS. Equine Influenza (EI) was adequately controlled by vaccination, but new mutant strains have arisen and the vaccine industry has not adequately responded in updating their vaccine strains as is usual in human influenza protection strategy. Mosquito's infected with West Nile virus and serological evidence of human subclinical infection has been recently reported for Austria. So far clinical disease in horses has not occurred. Local outbreaks of clinical and subclinical WNV are reported yearly for Italy, South of France, Greece and some other Balkan countries.

CONGENITAL PERITONEOPERICARDIAL HERNIA IN A 1 YEAR OLD DOG

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Keywords: *dog, peritoneo pericardial hernia*

Introduction: Peritoneopericardial diaphragmatic hernia is a common congenital anomaly in dogs and cats. In animals with peritoneopericardial diaphragmatic hernia, abnormal development of the transverse septum results either in a gap in the ventral portion of the diaphragm or unusually thin ventral diaphragmatic tissue that ruptures. Peritoneopericardial diaphragmatic hernia is usually present at birth, although affected animals may remain asymptomatic and undiagnosed for many years.

Aims: This article presents the clinical features, surgical management and pathological findings in a 1 year old intact female dog with peritoneo pericardial hernia.

Materials and Methods: The dog was presented for consult due to little resistance to effort and elevated values of specific liver enzymes. The clinical examination revealed muffled heart sounds ventrally and increased bronchovesicular sounds cranially, with no sounds present caudally. Based on the history that suggested no trauma, the radiological examinations and echocardiography that revealed a hypoechoic area surrounding the heart and no continuity of the diaphragmatic line, the presumptive diagnosis of congenital diaphragmatic hernia was made. Surgery was recommended and the owner gave his consent for the procedures.

Results: The peritoneo pericardial hernia was a surgical incidental finding. In the pericardium, surrounding the heart, the spleen, 2 hepatic lobes, caudal part of the stomach and duodenum with pancreas were identified and replaced in the abdominal cavity. Due to its size, the spleen had to be removed via a total splenectomy. Before suturing the diaphragm a pericardial catheter was placed, to avoid a cardiac tamponade after closure. Part of the pericardium was used as a biological mesh for the diaphragmatic closure. The dog did not recover after surgery and the pathological postmortem findings showed hepatic cirrosis.

Conclusion: Radiographic and ultrasonographic findings in pericardoperitoneal hernia are equivocal. The disease might represent an incidental finding during exploratory thoracotomy.

RESEARCHES REGARDING FIRST LINE ANTIBIOTHERAPY FOR STAPHYLOCOCCAL SKIN INFECTIONS IN CATS AND DOGS

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Keywords: *antibiotherapy, dermatology, staphylococcal, cats, dogs*

Introduction: Piodermatitis is one of the most common complication encountered in veterinary pathology, usually on the background of allergic and endocrine diseases. Rapid establishment of a targeted treatment helps avoiding of some unmanageable consequences, the most important being **selection of resistant antibiotic bacterial strains**.

Aims: Directing the veterinary clinicians to a first line antibiotherapy in skin staphylococcal infections, demonstrated by *in vitro* testing. Another objective was to achieve a comparative study regarding the evolution in time of susceptibility pattern to antibiotics.

Materials and Methods: The samples were from the 85 dogs and cats diagnosed with dermatitis and ear infections, patients of some of the veterinary clinics from the NE region of Romania. Initial identification of *Staphylococcus* genus, followed the next steps: cultivation Blod agar and Chapman culture media, catalase and coagulase tests .*Staphylococcus* species were identified by using Rapid Staph Plus Panel Remel and Latex agglutination Staphytect Plus. Antibigrams were performed by Kirby-Bauer method, for ten classes of antibiotics.

Results: *In vitro* antibiotic resistance testing results, were: CN 4,7%, K 31,76%; N 51,76%; S 23,52%; Nor4,7%; Enr 1,17%; Mar 9,4%; Am 65,88%; Ax 57,64%; Ox 23,52%; Amc 60%; Va 5,88%; Ts 9,4%; E 43,52%; Da 22,35%; T 45,88%; Do 40%; Mi 28,23%; C 5,8%; Fox 34,11%; Fd 11,76%; Fos 5,88%.

Conclusion: Beside the VRSA(5) and MRSA(29) strains, were detected 15 inducible MLSB strains. We demonstrated that in a certain area according to commonly used antibiotics over a period of time, sensitivity profile changes, so the bacterial strains involved in this pathology must be periodically tested *in vitro*. For the first line antibiotherapy we recommend: Rifampicin, Enrofloxacin, Gentamicin, Marbofloxacin, Chloramphenicol, Trimethoprim + Sulfadiazine.

CUTANEOUS FLAPS FOR CLOSING SKIN DEFECTS IN DOGS

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Key words: *flap, cutaneous, skin, defect, dog*

Introduction: Cutaneous flaps are used for closing wounds caused by traumatic accidents, oncological surgery (tumor removal), and burns (thermal, chemical, radiations). Skin grafting has the advantages of requiring just only one surgery for closing the defects once the wound bed is adequately prepared.

Aims: The objective of the study was to describe and asses the efficiency of cutaneous flaps for closing skin defects in dogs.

Materials and Methods: Seven dogs underwent reconstruction of soft tissue wounds resulted from traumatic lesion or after large tumors removal. Skin defects were located on the trunk and limbs. Cutaneous local flaps (advancement and rotational) were created by surgical preparations and mobilization the full thickness skin fold to enabling closure of adjacent defects. After wound debridement or tumoral removal a very careful atraumatic and aseptically preparation of the flaps were performed to preserve vascularization for adequate blood supply.

Results: Cutaneous local flaps proved effective for closing large defects in all dogs. Partial marginal necrosis of a portion of the flap occurred in one dog because of procedure and technique errors, but the concurrent remanent defects were adequate to primary closure. The wounds ultimately healed, without major complications.

Conclusion: The skin local flaps (advancement and rotational) are a versatile technique that could be use in a variety of locations, depending on skin defects shape and localization. The clinical results are comparable with those reported for advanced reconstructive procedure.

INDUCTION AND ESTROUS SYNCHRONIZATION DURING THE NON-BREEDING SEASON IN SAANEN GOATS

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Keywords: *estrous, goat, pregnancy, synchronization*

Introduction: For the efficiency of the synchronization, the hormonal treatment must facilitate: small costs, zero influence for the milk and meat production, initiates the estrous phase for a bigger number of animals in a short time and the most important, the estrous must be followed by the ovulation with a high rate of fecundity.

Aims: The purpose of this study was to perform the induction and estrous synchronization of Saanen goats in the non-breeding season.

Materials and Methods: The study was conducted from July 2014 - April 2015 on 77 Saanen goats, aged between 1.5 to 5 years, in Sălaj district. The goats were divided into three experimental groups: in group I (n=37 goats) intravaginal sponge (Ovigest/Hipra) containing 60 mg of MPA was left in the vagina for 14 days. Immediately after sponge removal the animals received two injections: prostaglandin (Prosolvin/Intervet) at the dose of 0.75 mg (1 ml)/animal and PMSG hormone (Folligon/Intervet) at the dose of 500 IU/animal. In group II (n=20) induction and estrous synchronization was performed using synthetic prostaglandin (Proliz/A&S - 1 ml containing 0.2 mg isopropyl ester of cloprostenol and 9 mg benzyl alcohol) at the dose of 0.5 ml/animal. The group III (n=20) was considered the control group and estrous synchronization IN was performed using fertile bucks.

Results: In group I the results showed that all goats expressed signs of estrous. The average value of the Interval of estrous onset was 33 hours with variations between 30-40 hours after ending hormonal treatment. The average of estrous duration was 20 hours with the following individual variation: in the case of 21 goats estrous was expressed for 17 hours, 9 goats expressed estrous for 19 hours and 7 goats presented signs of estrous for 24 hours. The number of kids obtained in group I was 94, and prolificacy was $P(\%) = 2.54$. In group II and III was not observed occurrence of estrous.

Conclusion: Induction and estrous synchronization show economic benefits by shortening the time needed for pregnancy installation, possibility of births grouping, preparation and organization of mating, only if we use a hormone associated protocol and we rigorously respect therapy steps.

IMPLICATION OF UTILIZING PHYTOESTROGENS INFESTED FODDER ON FERTILITY AND HISTOLOGICAL STRUCTURE OF OVARIES AND OVIDUCT IN SOW

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Keywords: *mould, ovary, oviduct, sow*

Introduction: In swine breeding, reproductive performance is decisive in ensuring a corresponding economical rentability and is sometimes influenced at a high extent by compounds that mimic estrogen hormones. Phytoestrogens are such compounds with hormonal action, present in fodders, sometimes in large quantities.

Aim: The aim of this study was highlighting the influence of fodder quality on fertility, as well as ovary and oviduct morphology in sows.

Materials and Methods: The study was carried out in a farm in Bihor County, with a total head count of 137 pigs, among which 45 mares, over one year period. Farmers confronted with reproduction problems: repeated estrus (weakly expressed), small number of farrowed piglets (average: 3 piglets/sow) and low fertility rate (48.8%). Sows which were not gestating after 3 artificial inseminations were sacrificed and samples from ovaries and oviduct were harvested in order to carry out the histopathologic examination.

Results: Monitoring the way of depositing the corn, as well as processing and storing the combined fodder, revealed the fact that elementary hygiene rules were not met. These precarious conditions favoured the development of mould on corn and combined fodder. The histological examination highlighted an exaggerated ovarian activity, the cortex being filled with ovarian follicles, distributed throughout the whole section surface. Follicles were in different evolution and involution stages, without an ovulatory tendency. No yellow body was observed, which suggests that the situation lingered for a certain period of time. The only plausible explanation is an exaggerated and persistent estrogenic stimulation caused by the phytoestrogens elaborated by the moulds in the fodder. The oviduct presented a marked congestion and a pseudostratification tendency of the epithelium on relatively large areas without a generalized aspect. We also observed the increase of the ciliated cells' number.

Conclusions: Sows were confronting a persistent hyperestrogenism situation because of the moulds from fodder with continuous mobilisation of follicles from the follicular pool, but blocking ovulation.

SURVEILLANCE AND MANAGEMENT OF ESTROUS CYCLE IN AWASSI AND LACAUNE EWES DURING OUT OF SEASON

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Keywords: *estrus, ewes, pregnancy, synchronization*

Introduction: Estrus synchronization is a valuable management tool for increasing the pregnancy rate in ewes. Modern sheep husbandry has improved the efficiency of extensive production and controlled the reproductive process for intensive production.

Aim: The purpose of this study was to increase fertility in sheep by applying modern biotechnology: induction and synchronization of estrus in non-breeding season.

Materials and Methods: The study was conducted during April 2013 - February 2014 on 63 Awassi and Lacaune ewes, aged between 11 months and 6 years, in Lakonia region, Greece. The ewes were divided into 3 equal batches. In all batches intravaginal sponge (Veramix/Intervet) containing 60 mg of MPA was left in the vagina for 14 days. Immediately after removal of the sponge, an injection of prostaglandin (Dinolytic/Pfizer) at the dose of 12.5 mg (2.5ml)/animal was administered in batch II. Batch III received two injections: PMSG hormone (Folligon/Intervet) at the dose of 500 IU/animal and prostaglandin (Dinolytic/Pfizer) at the dose of 12.5 mg (2.5 ml)/animal.

Results: Interval of estrus onset presented the lowest average value in batch III (32.38 hours), followed by batch II (34.76 hours) and batch I (36.57 hours). At the batches that were administered progesterone and prostaglandin or prostaglandin and PMSG there was a shorter duration of estrus (group III - 18.85 hours, group II - 22.47 hours) compared to batch I (28 hours). The results showed that while 76.20% of the ewes in batch I and 85.71% in batch II were diagnosed pregnant, the statistic for batch III was 100% after first estrus clinical expressed. After the second estrus all the sheep included in the experiment were diagnosed pregnant. The number of lambs obtained in the first batch was 24 ($P = 1.14\%$), in the batch II the prolificacy was $P = 1.38\%$ with a total of 29 lambs and in batch III were 39 lambs ($P = 1.85\%$).

Conclusion: From the results obtained it follows that induction and synchronization of estrus in non-breeding season showed economic advantages by shortening the time needed for the installation of gestation, the possibility of lambing distribution, preparation and organization of mating.

ENVIRONMENTAL INFLUENCE ON HEALTH STATUS IN DOMESTIC ANIMALS AND RODENTS

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Key words: *environmental influence, domestic animals, rodents*

Introduction: In the intensive and extensive type of breeding animals are exposed to various influences of environmental pollutants.

Aims: Of the study was monitoring environmental pollutants and biological contamination of health status in domestic animals and rodents.

Material and Methods: on farms of high-yield dairy cows and pigs, we controlled biological and chemical pollutions. Small ruminants in extensive type of breeding and rodents are exposed to chemical pollutions. We took various types of samples from farms and animals and send to bacteriological, virusological, chemical, parasitological and genetic laboratories for analyses.

Results: We determined presence of pathogenic microorganisms, in domestic animals, influence of chemical contaminants on hereditary basis at domestic animals and rodents.

Conclusion: Our recommendation is to work on reducing the effects of chemical contaminants, introducing monitoring of quality of raw materials and finished products as well as the application of adequate protector from toxic effects of these agents.

Acknowledgment: This work is supported by a grant from the Ministry of Education, Science and Technological Development, Republic of Serbia, Project number TR 31071.

NEW ALTERNATIVE TECHNOLOGIES ON CRYOPRESERVATION AND STORAGE OF MAMMALIAN SEMEN

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Keywords: *Sperm cells, cryopreservation techniques, storage protocols*

Objective: The present study was aimed at reviewing of the current cryopreservation and storage techniques of mammalian sperm.

Materials and Methods: Sperm cells are cryopreserved or stored with some upper technological methods as well as conventional systems. These techniques includes liquid nitrogen vapour, dry ice, dried-freezing, encapsulation, directional and solidification methods. On cryopreserving with these techniques, successful rates on sperm parameters are still changeable. In this review, we explain the deep procedures of these techniques, their advantages-disadvantages and studies performed.

Results: In this study, we review the current techniques of sperm cryopreservation and storage, and focuss on performed studies.

Conclusion: Cryopreservation and storage techniques should be improved for increasing the sperm parameters and fertility.

LIQUID STORAGE OF BUCK SEMEN USING STANDARDIZED AND ORIGINAL EXTENDERS

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Keywords: *buck, liquid storage, semen, skimmed milk, Triladyl®*

Introduction: Implementation of artificial insemination in goats with chilled semen is still sporadic, research in this area aiming at improvement of semen processing and artificial insemination protocols.

Aims: The aim of our study was to evaluate the ability of various semen extenders to maintain motility and viability of buck spermatozoa during liquid storage at 4°C for 7 days.

Materials and Methods: The study was performed with semen collected by electroejaculation from three common breed bucks. After evaluating the motility, viability and concentration, suitable semen samples were processed for liquid storage at 4°C, in several steps. Extenders used were: milk powder 1.25% fat (PUHT), UHT skimmed milk 0.1% (UHT), and Triladyl® (TRIL), each of them with or without egg yolk. Extended semen was checked for motility and viability at different checkpoints (0h, 3h, 24h, 48h, 5 days and 7days).

Results: The best results were obtained with TRIL which maintained the desired characteristics at a satisfactory limit (over 50%) for 7 days. Also, satisfactory results were obtained with the UHT extender, which managed to maintain mobility and viability over 50% for 5 days. All +EY extenders proved to be unsuitable, even 3 h after processing, as shown by other studies (Pineda and Dooley, 2003).

Conclusion: TRIL and UHT extenders used for buck semen liquid storage at 4°C, maintained satisfactory motility and viability of spermatozoa for 7 and 5 days respectively. These results need further confirmation by conception rate evaluation after artificial insemination.

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A COMPARISON BETWEEN RITUAL AND CONVENTIONAL SLAUGHTER IN REGARD TO ANIMAL WELFARE AND MEAT HYGIENIC QUALITY

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Keywords: *ritual slaughter, kosher meat, animal welfare, hygienic quality*

Introduction: The slaughter process in its current form is responsible to numerous physiological impacts on the animal and as a consequence affects the quality of the meat which is produced. The kosher slaughter is performed by a Rabbi (a certified Jewish religious priest) employed by the meat processing facility.

Aims: The aim was to compare different types of slaughter methods and restraining techniques in order to determine the positive and negative sides of each method and to assess the hygienic quality of the meat produced from this method of slaughter

Material and methods: The information regarding kosher slaughter was gathered from one slaughterhouse located in Israel, Haifa city, and specific aspects related to the conventional slaughter technology, was acquired from a slaughterhouse located in Maramures County, where we critically observed the cattle slaughter technology, with focus on stunning and bleeding steps. In order to compare the hygienic quality of kosher beef with conventional beef the research material consisted by 40 samples of beef, half of the samples were represented by kosher beef and the other half (conventional beef) were used as control. Total viable and Enterobacteriaceae count were performed from the collected samples according with standards methods.

Results and discussions: In case of conventional slaughter, with respecting of good hygienic practices (GHP), bleeding will not open the esophagus and trachea, preventing thus the possibility of contamination. Stunning performed in conventional slaughter could increase the risk of contamination of carcasses with prions in case of penetration of the skull. In case of kosher meat, the results regarding total plate count revealed values between $2.78 \pm 0.6 \log \text{cfu/cm}^2$ and $3.40 \pm 0.2 \log \text{cfu/cm}^2$. In case of Enterobacteriaceae germs, we noticed that 3 samples shown a negative results. For the rest of the samples, the microbial load ranged between $2.54 \pm 0.62 \log \text{fcu/cm}^2$ and $3.1 \pm 0.32 \log \text{fcu/cm}^2$. In comparison, the conventional meat (control), present an elevated total microbial load, ranged between $4.77 \pm 0.56 \log \text{cfu/cm}^2$ and $5.34 \pm 0.21 \log \text{cfu/cm}^2$. The Enterobacteriaceae load ranged between $4.1 \pm 0.56 \log \text{cfu/cm}^2$ and $5.33 \pm 0.2 \log \text{cfu/cm}^2$.

Conclusions: Ritual kosher slaughter is a humane way of sacrificing animals for human consumption although there are many parameters which need to be carefully monitored in order to guarantee the welfare of the slaughtered animals. And thus, inherently this method is prone for animal welfare violation. Microbiological risk regarding total plate and Enterobacteriaceae count in case of kosher compared with conventional meat is low.

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DIAGNOSIS OF HEREDITARY RETINOPATHY AND INBORN GLAUCOMA WITH OPTICAL COHERENCE TOMOGRAPHY

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Keywords: *Retinopathy, Early diagnosis, OCT, Prevention, Glaucoma*

Introduction: The glaucoma is a disease caused by higher amount of aqueous humor builds up within the eye, than eligible, which elevates the intra ocular pressure while decreasing the oxygen diffusion, which causes the atrophy of the ganglion cell layer (GCG) and later the optic nervous fibrosus layer (ONF). The retinopathy is a dysplasia and degeneration of the rod and cones layer. The clinical picture of both diseases are very similar, so without an Optical Coherence Tomography (OCT) it's easy to mistake these two with each other.

Aims: Our goals to find out how to differentiate diagnose the retinopathy and the glaucoma with the use of OCT, since it is important to distinguish between these two in the clinical practice.

Material and Methods: The OCTs principal of operation is similar to the ultra sound systems, but instead of sound it applies a special laser light to scan, which let us examine the retinal layers in vivo with 5um resolution (Schuman et al.). In our clinical practice we performed the OCT examination of 320 dogs, between the age of 3 months and 12 years old. For anesthesiology we used a mixture of Ketamin-Xylavet-Dexdomitor and for pupil dilatation Mydrum eye drops. For control purposes we utilized fundus camera, 'Tonovet' intra ocular pressure meter, ophthalmologic ultra sound and pachimeter.

Results: During our study we find that the average retinal thickness is $208 \pm 8 \mu\text{m}$, while the inner retina's is $63 \pm 4 \mu\text{m}$.

In case of early hypothesized decreased oxygen diffusion stages the average thickness of the retina is $109 \pm 4 \mu\text{m}$, the inner retina's is $53 \pm 6 \mu\text{m}$. In these cases after 14 ± 3 days later without treatment of any kind the intra ocular pressure got elevated by 34-27Hgmm and thus the clinical signs of glaucoma appeared (dilated pupil, corneal edema, and light avoidance).

In case of retinopathy the damaged layer of rod and cones has the average thickness of $198 \pm 3 \mu\text{m}$. At this state the GCG and the ONF are unaltered. There is no other symptom, but the loss of vision.

Conclusion: The OCT is suitable for differential diagnosis of both retinopathy and glaucoma, even in early stages, thus for preventive meanings too.

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TENOSYNOVITIS IN A FLOCK OF BROILER BREEDERS CHICKENS, CAUSED BY *ENTEROCOCCUS SPP.* BACTERIA

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Key words: tenosynovitis *Mycoplasma synoviae* infection, chicken,

Introduction: Infectious diseases of the locomotor system of chicken often have sporadic character and they are associated with some other pathological conditions. Sometimes they can take an enzootic character due to a larger number of sick individuals in a flock, as in cases of arthritis and tenosynovitis caused by *Mycoplasma synoviae* infection, avian retrovirus and *Enterococcus cecorum*. In the intensive and extensive type of breeding animals are exposed to various influences of environmental pollutants.

Aims: Monitoring locomotor system in chicken.

Material and Methods: In a flock of 9000 birds, Hubbard flex 6 weeks of age, they were observed individuals that lie and cannot stand up. Clinical examination revealed swelling of ankle joints.

Results: In the necropsy of dead birds, serous swelling of loose connective tissue around the mentioned joints were discovered. In the synovial cavities and at the articular cartilages were not detected pathomorphological changes. From synovial bursas were isolated yellow, elastic, rubbery content - amyloid deposits. From the altered tissues they were isolated bacteria *Enterococcus spp.*

Conclusion: Treatment with amoxicillin through drinking water during 5 days, gave good results. Until the end of the treatment period there were cured all sick individuals in the flock. *Enterococcus spp.* bacteria, particularly *Enterococcus cecorum*, often are isolated from osteomyelitis lesions of caudal thoracic vertebrae of broilers and broiler breeders. *E. cecorum* belongs to physiological intestinal flora of chickens. It was assumed that sudden increase in number of cases of diseases caused by these bacteria, lies in several possible factors: an increase in the virulence of the causal agents, a high selection and changing nutritional demands of new hybrids and the cessation of the use of certain additives in poultry nutrition.

MONITORING OF LAWSONIA INTRACELLULARIS PRESENCE IN SERBIA

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Keywords: *Lawsonia intracellularis*, Real-Time PCR, economic losses

Introduction: *Lawsonia intracellularis* is an obligate intracellular bacterium that causes proliferative enteropathy (PE), mostly in pigs. In Europe, PE's estimated economic losses are from 0,50 to 1,00 euro per affected growing pig (McOrist, 2005).

Aims: Considering that prevalence of *L. intracellularis* in Serbia sounding countries is in the range from 46,6 % in West Romanian to 93,55 % in Hungarian herds, we assumed that infection has impact on Serbian swine production too.

Materials and Methods: Pooling faecal samples were taken from subclinical infected postweaned piglets, total numbered 760, younger than 11 weeks, from 3 pig farms in north part of Serbia. One sample represents a pooled sample taken from the box with 20 piglets. DNA was extracted from feces by commercial extraction kits (Peq-lab set). Quantification of *L. intracellularis* DNA copies in all samples were performed by Real-Time PCR. Positive control was pure DNA of *L. intracellularis* supplied by the Technical University of Denmark.

Results: In all three farms *L. intracellularis* presence was confirmed. In the first farm only 33,33% of samples were positive while in other farms more than half of samples were positive, respectively 58,34% on second farm and 87,5% on third farm.

Conclusion: *L. intracellularis* causes major economical losses in swine industry worldwide, as in Serbia. Taking into account that transmission of infection cannot be prevented by vaccination (Jacobson et al. 2010), increased biosecurity levels on farms and application of alternatives to antibiotics such as phytobiotics are highly recommended strategies to control the PE.

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MOLECULAR IDENTIFICATION AND PREVALENCE OF *SARCOCYSTIS SUIHOMINIS* IN PORK MEAT INTENDED FOR PUBLIC CONSUMPTION

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Keywords: meat, PCR, risk, *Sarcocystis*, traditional

Introduction: Protozoa of the genus *Sarcocystis* are among the most prevalent parasitic forms found in pork (Hajimohammadi *et al.*, 2014; Nateeworanart *et al.*, 2004). Because of absence of visible differences between species, a molecular method to detect and identify *Sarcocystis suihominis* is much needed in order to rapidly assess the risk that it represents in human consumption of contaminated meat.

Aims: The study aimed at characterizing the prevalence of *Sarcocystis suihominis* in pork obtained in the traditional households through PCR – RFLP method.

Materials and Methods: The material was represented by seventy nine samples of diaphragmatic pillars collected in the period October 2014 – December 2014 from two local sanitary veterinary units of Alba and Cluj. The samples were processed first by trichinelloscopic compression method. All the positive fragments for *Sarcocystis* spp. were examined through PCR-RFLP method. The method applied by us, using the *AluI* restriction enzyme, has successfully differentiate the *Sarcocystis suihominis* from other *Sarcocystis* spp. prevalent in pork meat.

Results: By inspection of the muscle tissue by compression, in all examined samples (n = 79), the presence of *Sarcocystis* spp. cysts was identified in a high percentage (72.15%). The prevalence of *Sarcocystis suihominis* in the examined samples was 26.58%. According with this result we conclude that humans are exposed to a high risk of contamination when consuming contaminated pork, raised in a traditional system.

Conclusion: In the present research work, we demonstrated that this method used for molecular identification of *Sarcocystis suihominis* has high accuracy and can be successfully applied for obtaining a certain diagnostic.

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SURGICAL MANAGEMENT BY STANDING LAPAROSCOPY AND INGUINAL CELIOTOMY APPROACH OF THE CRYPTORCHID CANADIAN PONY STALLION – CASE REPORT

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Keywords: *cryptorchidectomy, inguinal celiotomy, laparoscopic, stallion pony*

Introduction: Laparoscopic surgery has become an accepted method of identification and removal of intra-abdominal testes in the horse. Wilson and Madison – 1989 describe the use of laparoscopy to diagnose an abdominal retained testes. Since then numerous laparoscopic cryptorchidectomy techniques have been described.

Aims: In the encountered specialty literature there are few reports in which standing laparoscopic cryptorchidectomy could not be performed in stallions including miniature horse too. Because there are no informations regarding laparoscopic surgery in large animals in romanian literature this report describes the surgical management of a Canadian pony diagnosed with partial abdominal unilaterally cryptorchidism at which laparoscopic castration has failed and the removal of the retained testicle has been made through inguinal celiotomy.

Materials and Methods: A 4-year-old unilaterally cryptorchid Canadian pony was admitted for castration. The left testis was in the scrotum, but neither the right testis nor the right epididymis could be located by external palpation of the right inguinal canal. The proposed treatment was laparoscopic cryptorchidectomy with pony standing in stock. With a long-handled forceps inserted into the abdominal cavity, the testis cord is gently grasped and moderate traction without success in bringing the testicle into the abdomen - retained testis. After the failure of laparoscopic cryptorchidectomy but having an exact diagnosis - partial abdominal unilaterally cryptorchidism, we have proceeded to open cryptorchidectomy via inguinal approach with pony anesthetized and positioned in dorsal recumbency.

Results: This case report reveals that the major disadvantage of the cryptorchidectomy by flank approach is the inability to remove an inguinally retained testis.

Conclusion: If the location of the testis is unknown, the standing laparoscopic diagnose can be decisive. Cryptorchidectomy via inguinal approach and noninvasive method for identifying and everting the vaginal process by traction of the inguinal extension of the gubernaculum testis are commonly facile procedure.

TREATMENT OF DOGS WITH ORAL MELANOMA RECURRENCE BY DIODE LASER EXCISION

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Keywords: *canine oral melanoma, diode laser*

Introduction: Treatment of oral melanomas utilizes the surgical excision-resection (Culp et al., 2013) and/or radiation therapy (Proulx et al., 2003), chemotherapy with carboplatin (Brockley et al., 2013), immunotherapy (Ottod et al., 2013). Treatment based on surgical excision is usually palliative (Freeman et al., 2003).

Aims: In the literature even though there are data concerning the prognosis of oral melanomas in dogs after surgery, are missing data after laser excision. Taking into account these findings we wished to present our experience regarding three cases of oral melanoma recurrence and immediate and long term laser surgery results.

Materials and Methods: The casuistry consisted of three dogs with recurrent oral malignant melanomas, subjected to surgical reintervention. The initial diagnosis was melanotic melanoma in stage I or II. The animals were brought back at different time intervals from originally excision with electric scalpel. Before reintervention, dogs were subjected to clinical, paraclinical exam and biopsy. Excision of the tumor mass was made with an optical fiber having a diameter of 400µm, at a power of 10W and a wavelength of 940 nm with a diode laser. At 1, 2, 3, 6 and 12 months after laser reintervention the dogs were reexamined.

Results: Average time in which appeared canine oral melanoma relapse was 58.6 days. After reexamination all cases where reinstatement in stage I. Operators times were held in conditions of comfort with wide access, minimum bleeding, effective hemostasis. After surgery at 24 hours on the intervention place a slight local redness, without swelling and bleeding was observed. Palpation revealed initially also a slight local sensitivity which completely disappeared in 48 hours. There were no grasping and chewing disturbances. Macroscopic healing occurred in 7-9 days. At last recheck performed at 12 months there were no evidences of tumour recurrence or metastasis.

Conclusion: Diode laser excision of oral malignant melanoma in dogs can be an alternative palliative procedure to invasive surgical resection procedures. The average of free recurrence and metastasis time after laser surgery has exceeded 360 days in these three cases.

COMPARATIVE STUDY OF DOG SPINE EVALUATION USING COMPUTED TOMOGRAPHY AND RADIOGRAPHY

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Keywords: *Computed Tomography, dog, vertebrae, spine*

Introduction: Spine and vertebral column examination prove to be rather difficult, evaluation of the spine include evaluation of the bone and soft tissue (Meiji and Bergknut, 2010). Radiographic examination and myelography are useful tools in evaluation of the spine but present limitation in evaluation of the medullary canal. Danger for permanent neurologic trauma due to acute spinal cord compression requires an expedited localization and characterization of the process in order to be surgically treated (Kent *et al.*, 2011). The limitation of classic radiographic techniques is bypassed using Computed Tomography (CT) examination or Computed Tomography myelography (Dennison *et al.*, 2010).

Aims: Taking in consideration the frequent affection of the spine cord due to disc or other kind of compression, the aim of this study is to compare the radiographic and CT examination technique in evaluation of vertebral column and spinal cord in dog.

Materials and Methods: The biologic material was represented by 10 dogs, medium and large breed, having between 4 and 10 years of age, who presented locomotors problem due to spinal cord affection. The imaging evaluation of the spine was conducted using a Temco GRS digital X-ray device and a Siemens Somatom CT.

Results: From the total number of dogs, 5 of them were subjected to radiographic examination and the other 5 undergo CT examination and radiographic examination. Radiographic examination of the second group haven't shown major changes that could justify the symptoms, therefore CT evaluation was performed. CT examination has shown the changes that were located in the medullary canal.

Conclusion: In case of compressive lesion of the spine the best result for diagnostic were obtained by CT evaluation. Radiographic evaluation is useful when the changes are located in the exterior of the vertebral body.

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IS BORATE- BASED BIOACTIVE GLASS A NOVEL SOLUTION FOR HARD AND SOFT TISSUE HEALING ? – A REVIEW

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Keywords: *bioactive, biomaterial, borate, glass, wound*

Third generation biomaterials are synthesized as composites, bioactive glasses, hybrids or macroporous foams. Bioactive glasses are of major interest in bone regeneration research because of their main key- features: osteoconductivity, osteostimulation, ionic dissolution, controllable degradation rate and high mechanical strength.

There are several types of bioactive glasses which have been synthesized and studied in an attempt to find a biomaterial capable of meeting the necessary requirements to achieve bone regeneration.

Borate- based bioglasses showed superior features regarding the rate of conversion to hydroxyapatite (HA) and proved to be an excellent carrier for bioactive molecules and therapeutic drugs. In addition to their well-known osteostimulating activity, recently borate-based bioglasses proved an effective angiogenic activity, which may be useful in wound healing and soft tissue regeneration.

This review emphasizes on researches done on borate- based bioactive glasses that highlight those key- features that make them usable both in wound healing and also in bone regeneration. The paper discusses the possibility of reaching more targets in tissue regeneration by using a drug- loaded borate- based glass, combined with growth factors and analyzes the methods used to enhance its activity.

SURVEILLANCE AND QUALITY CONTROL OF MILK AND DAIRY PRODUCTS FOR THE EVALUATION OF SUPPLY CHAIN MANAGEMENT IN A REGIONAL AREA

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Keywords: *dairy products, milk, risk analysis, supply chain.*

Introduction: The supply chain is considered to be an integrated system and in case of dairy chain there are a number of entities (i.e. farmers, processors, industrial customers, distributors, retailers) that work together to ensure that the raw material used is of optimal quality.

Aims: In this paper the basics of the supply chain quality management of milk destined for direct selling is described by performing microbiological analysis. The analysed supply chain has a monitored management of the product (milk) and dairy products processed from it. The study holds great relevance within the risk management also given that the product analysed presents a wide range of food-borne risks, some common, some less known, posing a serious threat to public health and an obstacle to international trade of animal origin food.

Materials and methods: In order to achieve the aim of the study, the parameters of hygienic quality of raw milk and products for direct sale were analysed, taking into account also the risks that may occur in the supply chain. The material was represented by 26 samples of raw milk, 21 samples of cream and a total of 97 samples of cheese.

Results: Regarding the assessment of raw milk's quality destined for direct selling, it was revealed that some of the milk samples were non-compliant for the total bacterial count (TC) and somatic cells count (SCC) parameters. In assessing of microbiological parameters in the samples of products processed from raw milk (cream, cottage cheese, cheese), the values recorded for *Salmonella* spp., *Listeria* spp. and *Staphylococcus* spp. were not concerning. The identification of *E. coli* germs in these types of products, analysed by high precision (horizontal method for the enumeration of *Escherichia coli* in β -glucuronidase positive) revealed a wide variation in their number not exceeding the maximum allowed limit for this microbiological parameter.

Conclusion: The risk posed by the products obtained in the studied supply chain for the public health is average in gravity and low in probability of occurrence.

ARTERIAL PRESSURE MONITORING: CURRENT TRENDS AND FUTURE PERSPECTIVES

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Keywords: *arterial line, blood pressure, monitoring, waveform analysis*

Blood pressure represent a core parameter in the assessment of small animal patients with unstable clinical conditions, in both the operating room and critical care units (Esper and Pinsky, 2014). The invasive measurement of arterial pressure is, among other hemodynamic variables, an important component of classical hemodynamic monitoring in order to maintain adequate tissue perfusion (Bigatello and George, 2002). In mechanically ventilated patients, the reliable analysis of respiratory changes in arterial pressure was found to be a good predictor of fluid responsiveness (Michard, 2005). Recently introduced technologies for continuous monitoring by using arterial waveform analysis has gained a large interest in the overall assessment and management of the critically ill (Esper and Pinsky, 2014), and are valuable in the care of many patients, such as those with cardiovascular dysfunction, trauma or undergoing major surgery (Manecke, 2005), septic shock (Bourgoin *et al.*, 2005) and profound hemodynamic instability (Gödje *et al.*, 2002). Some of the technology already has been tested under research conditions on small animals, and most probably will represent in future standard techniques in clinical practice.

The purpose of the present study was to review the available literature regarding blood pressure monitoring in dogs and cats, and to provide a brief overview of the significant literature currently published on the topic. Available human research data related to arterial wave analysis with demonstrated benefits or potential future benefit for small animals are included. We performed a search based on the Google Academic platform using relevant keywords such as blood pressure, invasive blood pressure, oscillometric blood pressure, arterial line, monitoring, waveform analysis, hemodynamic instability, dog, cat, and select articles considered significant.

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STUDIES REGARDING THE INDUCTION OF ANGIOGENESIS IN ASEPTIC NECROSIS OF THE FEMORAL HEAD IN DOGS

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Keywords: *femoral, head, necrosis, aseptic, angiogenesis*

Introduction: Aseptic necrosis of the femoral head in dogs occurs because of a decrease in the local blood supply, which can have various causes.

Aim: The aim of the paper was to evaluate the efficiency of a new method for angiogenesis stimulation in dogs with aseptic necrosis of the femoral head.

Materials and Methods: This study was conducted on a number of 8 dogs (n=8) of different breeds (mostly small and medium sized dogs), aged between 7 and 15 months, suffering of aseptic necrosis of the femoral head with different degrees of severity. The patients were previously subjected to various treatments with anti-inflammatory drugs and analgesics. Aseptic necrosis of the femoral head diagnosis was assessed based on radiological examination. In all of the patients, in order to stimulate local angiogenesis, two holes were made in the femoral head, with a length approximately equal to the femoral head thickness. The holes were made with 3 mm. diameter drills that are commonly used in osteosynthesis. In four of these patients (50%), hydroxyapatite powder was placed inside the drill holes, while in the rest of the cases (50%) no active substances were introduced into the created holes. Postoperative evolution was monitored for 2.5 months.

Results: There was found an improvement and a partial recovery of the affected tissue in the patients with hydroxyapatite powder added in the drill holes, in comparison with the patients without any active substances added in the holes. In these last cases, a more efficient healing and recovery of the articular surfaces was observed. These aspects were assessed by radiological examination and morphometrical measurements.

Conclusion: The method performed proved to be an effective alternative for stimulating the angiogenesis in dogs with aseptic necrosis of the femoral head.

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SURGICAL MANAGEMENT OF A CERVICAL SPINAL INTRADURAL TUMOR IN A NINE YEAR OLD BEAGLE DOG

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Keywords: *dog, intradural, spinal cord, tumor*

Introduction: Meningioma is the most common primary nervous system tumor of the spinal cord in the dog (Levy *et al.*, 1997; Petersen *et al.*, 2008).

Aims: In this paper, the authors present the case of a Beagle dog with focal intradural / extra-axial C6 mass.

Materials and Methods: a 9 year-old intact male Beagle dog was presented for evaluation of progressive tetraparesis. At the level of the sixth cervical vertebra, magnetic resonance imaging demonstrated an intramedullary, extra-axial well-circumscribed mass. The lesion was hyperintense in T2-weighted sequences. Spinal cord neoplasia was suspected. The dog was anaesthetised and a dorsal laminectomy was performed. Using fine surgical instruments a durotomy was performed to expose a single mass which did not appear to infiltrate the cord parenchyma. The mass was removed completely using gentle dissection and submitted for histological evaluation.

Results: A diagnosis of intramedullary spinal cord meningioma/astrocytoma was suspected histopathologically. No chemotherapy protocol was administered. The dog responded favorably to surgery, with progressive improvement in neurologic function and it was clinically normal 3 months after surgery.

Conclusion: Results of this case report confirm that surgical removal of a focal intradural mass in cervical spine is effective and improve survival in affected dogs.

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GLUCOSE-6-PHOSPHATE DEHYDROGENASE, GLUTATHIONE PEROXIDASE, TOTAL GLUTATHIONE AND REDUCED NICOTINAMIDE DINUCLEOTIDE PHOSPHATE IN MILK CELLS OF SUBCLINICAL MASTITIC COWS

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Keywords: *Glutathione peroxidase, Subclinical mastitis, milk cell glucose-6-phosphate dehydrogenase*

Introduction: Mastitis is the most important economic problem in dairy herds and is characterized by physical, chemical and bacteriological changes in the milk and pathological changes in the glandular tissue of the udder. Whereas subclinical mastitis is a common animal welfare problem in dairy herds and causes diagnostic difficulties due to the lack of visible symptoms.

Aims: In this study, it was aimed to determine milk cell glucose-6-phosphate dehydrogenase (G6PD) and glutathione peroxidase (GPx) activities, total glutathione (tGSH), reduced nicotinamide-dinucleotide phosphate (NADPH) and total protein levels in subclinical mastitic cows.

Material and Methods: Milk samples from each udder were collected and classified by California Mastitis Test results. Somatic cell count was performed and the groups (n=15 each) were re-scored as control (5-87 x 10³ cell), group 1 (154-381 x 10³ cell), group 2 (418-851 x 10³ cell), group 3 (914-1958 x 10³ cell) and group 4 (2275-8528 x 10³ cell). Milk cells were separated from milk serum washed with phosphate buffered saline and then homogenised by sonication. After centrifugation, supernatant G6PD and GPx activities, tGSH, NADPH and total protein levels were determined. Microbiological diagnosis was also conducted.

Results: In mastitic milk cells, G6PD and GPx activities, tGSH, NADPH and total protein levels significantly decreased compared to control (p<0.001). In addition, positive correlations were determined between total protein (r=0.347, p<0.01, n=75), NADPH (r=0.380, p<0.01, n=75), G6PD levels (r=0.643, p<0.001, n=62) and milk somatic cell count. Furthermore, there were positive correlations between GSH (r=0.354, p<0.01, n=75), NADPH (r=0.239, p<0.05, n=75) levels and total protein levels. There was a negative correlation between GSH levels and GPx activities (r=-0.306, p<0.05, n=75). As regards microbiological analysis, the ratio of the pathogens were as follows: *Coagulase Negative Staphylococci* 66.6%, *Streptococcus spp* 9.5%, *Bacillus spp* 9.5%, Yeast 4.8% and mix infections 9.5%.

Conclusions: It was found that milk cell G6PD and GPx activities, tGSH, NADPH and total protein levels were changed in subclinical mastitic cows. Together with the correlation between these parameters and somatic cell count, these parameters are suggested to be useful markers for diagnosis of subclinical mastitis.

A SURVEY OF CANINE ANAESTHESIA IN VETERINARY PRACTICE IN CLUJ-NAPOCA

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Keywords: *anaesthesia, monitoring, private practices, survey*

Introduction: The ability to restrain animals using a drug or drug combinations plays a central role in veterinary practice enabling veterinarians to make animals more tractable for examination, to provide general anesthesia for surgery and to provide analgesia when needed (Nicholson and Watson, 2001). Many of the animals anesthetized at veterinary college hospitals have chronic illnesses or conditions that may affect their responses to anesthetic drugs, whereas many private practices deal mainly with young healthy animals undergoing elective procedures such as ovariohysterectomy and castration. One concern related to these trends is that the anesthesia training offered to veterinary students may not be applicable to the types of animals and procedures requiring anesthesia at most private veterinary practices (Wagner and Hellyer, 2000).

Aims: To find out how canine anesthesia is performed in veterinary practices in Cluj-Napoca.

Materials and Methods: We have developed a questionnaire that was presented to 24 veterinary private practices in Cluj-Napoca.

Results: Of those veterinarians who answered this questionnaire, 18.2% are equipped with a machine for inhalation anesthesia, 27.3% do not use any monitoring during anesthesia and no one use methods of monitoring blood pressure. All the veterinarians graduated the Faculty of Veterinary Medicine Cluj-Napoca. Ketamine and alpha 2 agonists remain the most used anesthetic substances in private practices. Postoperative analgesia is used constantly by 81.8% of veterinarians. The mortality rate in veterinary practices in Cluj-Napoca for two years was 0.25% (1:403).

Conclusion: The lack of standard protocols for implementation and monitoring of veterinary anesthesia creates discrepancies between private offices but especially between them and the teaching hospital.

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CHANGES IN URINE ELECTROLYTES IN DOGS, A COMPARISON WITH HEALTHY INDIVIDUALS

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Keywords: *electrolytes, dogs, urine analysis*

Introduction: Urine examination is one important step that comes to complete the clinical examination and the rest of paraclinical exploration for establish the correct diagnosis. In this examination we try to determine the changes of electrolytes in the urine and to see if there is correlation with changes in blood electrolytes.

Aims: Because in human medicine exist studies that show alteration in urine electrolytes, we try to determine changes produced by different disease on those components.

Materials and Methods: We examined two groups of dogs: 5 dogs with subclinical cystitis and other 5 with different alteration on blood biochemist and hematology. These groups were comparing with 10 health dogs. In group of dogs with cystitis no clinical signs of cystitis were obvious such as polydipsia, polyuria or pain during urination, hematuria, pain in the abdominal area and fever. During ultra-sonographic examination the margins of the urinary bladder were reacted and increased amount of sediment was obvious. Urine was examined under microscope, struvite crystals and increased number of epithelial cells was detected in all of the cases and also leukocytes were detected 2 individuals. Proper clinical diet was suggested for all cases and antibiotic treatment, for dogs with increase leukocytes was prescribed enrofloxacin for 14 days. All dogs were re-examined later again and all were detected in good condition and we recheck the electrolytes from urine sample.

Results: The values of Na⁺ in the urine of the dogs with cystitis varied from 89,7mmol/l to 274,5mmol/l with mean value of 172,06 ± 90,34mmol/l. The values of K⁺ in the urine of the dogs with cystitis varied from 87,8mmol/l up to 181mmol/l with mean value of 120,82±38,95mmol/l. The values of Ca²⁺ in the urine of the dogs with cystitis varied from 0,12mmol/l up to 1,73mmol/l with mean value of 0,60±0,66mmol/l. The values of Na⁺ in the urine of the sick dogs varied from 57mmol/l up to 152,5mmol/l with mean value of 100,35±41,54mmol/l. The values of K⁺ in the urine of sick dogs varied from 114mmol/l up to 136mmol/l with mean value of 123±9,83mmol/l. The values of Ca²⁺ in the urine of sick dogs varied from 0,07mmol/l up to 0,81mmol/l with mean value of 0,29 ± 0,35mmol/l.

Conclusion: In the present research, we demonstrated that this method can be used for detecting changes in urine electrolytes that is not all the time correlated with changes in blood electrolytes.

RELEVANCE OF ULTRASOUND EVALUATION OF THORAX IN DOGS AND CATS, A COMPARISON STUDY WITH OTHER IMAGING TECHNIQUES

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Keywords: *thorax, ultrasound, dog, radiography, CT*

Introduction: As technology evolve, ultrasonography begin to have an increased role in diagnostics of non-cardiac thoracic affection. Thoracic ultrasound examination can represent an advantage in thoracic evaluation and add a plus to radiographic examination, helping the clinician to orient the diagnostic (Reichle and Wisner, 2000). Ultrasonographic evaluation is also a powerful tool in percutaneous fine needle aspiration of the intrathoracic formation (Reif, 1974).

Aims: The aim of this study was to evaluate the capacity of ultrasonography to identify changes at the pulmonary and thoracic level in dogs and cats, being known that ultrasound produce artefact in contact with air from cavities.

Materials and Methods: The biologic material was represented by 5 dogs, and 5 cats' medium and large breed, having between 4 and 10 years of age, who presented respiratory problems. The ultrasound was performed using a MindRay DC6 ultrasound machine, with a linear probe of 7-10 MHz, the radiography was performed using a TEMCO GRX X-Ray with a DR flat panel acquisition component. Computed Tomography evaluation of the thorax was done using a Siemens Somaton Scope with 16 slices, performing a helical and constant angle acquisition. For CT examination the patient were sedated and placed in dorsal recumbency. Radiography examination were performed with the patient in lateral and dorsal recumbency.

Results: Ultrasound evaluation of the thorax and lungs put in evidence changes in the normal aspect of the artefact produce by the air in the lungs that indicate modification of the parenchyma. Those changes are easy to be identified when they are in close contact with the thoracic wall. Ultrasound investigation give a plus of information in evaluation of the formation (consistency, adherence to the thoracic wall) identified through radiography. Using CT, the identified changed can be pinpointed with more accuracy.

Conclusion: Ultrasonography is a cheap and fast method that can be used to identify changes in the lung parenchyma, or liquid collection at the thoracic level, but for a correct diagnostic the results should be completed with a radiography or CT examination.

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HYGIENIC QUALITY ASSESSMENT OF PORK CARCASSES OBTAINED IN INDUSTRIAL AND TRADITIONAL SLAUGHTERING UNITS

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Keywords: *hygienic quality, pork, slaughterhouse*

Introduction: Despite the fact that many types of foods can be sources of food borne illnesses, meat and meat products are very important sources of infection in people with a wide variety of pathogens that cause food poisoning. Among this there are: *Salmonella spp.*, *Campylobacter jejuni/coli*, *Yersinia enterocolica*, *E. coli verotoxigenă*, *Listeria monocytogenes* (Algino *et al.*, 2009). The most common chain of events leading to diseases that are caused by meat consumption involves meat supplying animals that are healthy but carrying pathogens that are subsequently transferred to humans through production, handling and consumption of meat and meat products (Bonardi *et al.*, 2008).

Aims: The aim of this study was to conduct an assessment of meat hygienic quality and configuration by assessing the microbial load and the presence of pathogens.

Materials and Methods: The material under investigation was represented by 40 samples of pork meat collected in stages, between 2015-2016, from slaughtering units both from the traditional system and the industrial system. Samples were analyzed at the Department of Food Safety and Control of Animal Origin Products.

Results: Total viable count in samples taken from the carcasses, in 2016 presented values similar to those in 2015, ranging from a minimum of $2.74 \pm 0.36 \log \text{cfu/cm}^2$ in January and December and a maximum $3.73 \pm 1.13 \log \text{cfu/cm}^2$ recorded in February, without showing significant differences between the samples processed in the studied period ($p > 0.05$). The results regarding contamination of swine carcasses (surface) with germs from *Enterobacteriaceae* family were non-compliant, exceeding the maximum permissible limit of $3.0 \log \text{cfu/cm}^2$ in all 12 samples examined (33.33%).

Conclusion: In the case of the samples taken from pork carcasses the results regarding germs from *Enterobacteriaceae* family were non-compliant, 29.16% of the samples examined during the period under study were found to exceed the maximum limit, which showed deficiencies regarding the hygiene requirements.

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PRE AND POSTPRANDIAL THERMOGRAPHIC PROFILE OF GREEN IGUANAS (*IGUANA IGUANA*)

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Keywords: *green iguana, temperature, thermography.*

Introduction: Thermography is an imagistic method of assessing the temperature of objects or organisms. Medical thermography is a noninvasive method in evaluating the changes in body temperature.

Aims: Evaluation of the body temperature in Green Iguana (*Iguana iguana*) before and after food offering. It is known that herbivore reptiles in particular after feeding prefer warmer places to facilitate the digestion (Harlow *et. al.* 1976).

Material and Methods: In this study were used a total of 10 clinically healthy Green Iguanas kept in similar conditions. The pictures were taken in the morning at 8:00 am and 10:00 am, when the temperature of the vivariums was taken in 3 different spots (under the light, where the feeding bowl was and the coldest spot). The light was turned on every day at 7:15 am and switched off at 9:00 pm. There were made a total of 6 measurements in six different days on a period of 2 weeks, 3 before feeding (8:00 am) and 3 at 2 h after the food was offered (10:00 am). The temperature range at the time of measurement was between 22-32°C. The pictures were taken with a thermographic camera FLIR E6 at a room temperature of 21-24°C. The animals were not let to acclimatize, and the pictures were taken at an interval of 2 minutes after they were taken out of the vivariums. Leather gloves were used to decrease the temperature changes from the handler's hands.

The pictures were analyzed with the program FLIR Tools.

Results: All the animals had the upper nose area and the eye colder than the rest of the body. If the animals did not eat, the temperature of the head and the body was the same $\pm 0.7^\circ\text{C}$. After the animals ate, there was a significant change between the temperature of the head and the temperature of the body of about $0.7\text{-}2^\circ\text{C}$.

Conclusions: It was already known the fact that herbivore reptiles seek for warmer places after feeding because an herbivorous digestion needs more energy and time than a carnivore one. The difference between the temperature of the head and the temperature of the body can be related to an increased blood flow of the organs in the coelomic cavity or because of the fermentative processes.

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REVERSE PDA – LESS COMMON TYPE OF PATENT DUCTUS ARTERIOSUS - CASE REPORT

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Keywords: *bubble study, congenital heart disease, echocardiography, reverse PDA*

Introduction: PDA represents one of the most frequently diagnosed type of congenital heart disease. Ductus arteriosus is a normal structure in foetal life, which permits shunting of oxygenated blood from pulmonary artery into aorta. Failure of sealing after birth is an abnormal condition and is called patent ductus arteriosus. In normal PDA, due to fact that systemic pressure is fivefold higher than pulmonary circulation, blood is shunted from aorta into pulmonary artery. In reverse PDA, pulmonary artery pressure does not drop after birth, and blood will be shunted from right to left.

Aims: We want to evaluate clinical, haematological, ECG and echocardiographic changes in case of reverse PDA.

Materials and Methods: Two years old female Bichon Frise was referred to our clinic with signs of effort intolerance, dyspnoea for more than a year. ECG was performed in right lateral recumbency using a digital device and echocardiography was done with Esaote MyLab40 Vet with a phased array transducer matched with the size of the dog (7.5 MHz).

Results: We identified a dog with a good body score, quite alert without any sign of illness. Haematological investigation underlined polycythemia and very high PCV. ECG revealed normal sinus rhythm with deep S wave, changes consistent for right ventricle enlargement. Echocardiographic we found right atrial dilation and right ventricle hypertrophy. Right ventricle free wall was hypertrophied and interventricular septum was flattened, changes consistent for right heart high pressure. Left heart was small. Positive diagnosis was done, performing “bubble study” and identification of contrast bubble within abdominal aorta.

Conclusion: Reverse PDA is a rarely diagnosed congenital heart disease. Polycythemia in young dogs could raise the suspicion for reverse PDA. For positive diagnosis, echocardiography and bubble study are required. ECG is not a sensitive tool for diagnosis.

MICROBIOLOGICAL QUALITY EVALUATION OF VARIOUS TYPES OF TRADITIONAL ROMANIAN CHEESE THROUGH ADVANCED METHODS

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Keywords: *cheese, milk, quality, PCR*

Introduction: Raw milk represents a nutritive environment for a number of pathogens, like *Salmonella enteritidis*, *Escherichia coli* O157: H7, *Staphylococcus aureus* etc. This fact can cause a serious of foodborne outbreaks associated to the consumption of contaminated milk and derived products. The traditional processing of raw milk in poor hygiene conditions can pose a serious microbiological risk. Until now a series of foodborne illnesses associated with the consumption of cheese manufactured from raw milk has been established as being caused by *Salmonella*, *Campylobacter*, *Staphylococcus aureus* and *E. coli* O157: H7 (Zottola and Smith, 1991; De Buyser et al., 2001).

Aims: The study aimed at evaluating the incidence of pathogen bacteria in ripened traditional cheese by advanced biochemical and molecular methods in order to reveal the possible risk of consumer exposure.

Materials and Methods: The study was applied on 150 samples of ripened cheese from the following types: “Telemea” cheese, „Burduf” cheese and „Năsal” cheese.

Results: The traditional “Telemea” cheese presented an average value of the total *E. coli* count in between 11.06 ± 0.52 - 38.33 ± 2.76 cfu/g. The risk represented by the presence of *E. coli* and *Staphylococcus aureus* is low within the first steps of ripening, being absent after 28 months of ripening in the “Telemea” cheese samples. The *Staphylococcus aureus* load was in between 3.82 ± 0.12 log cfu/g for the first period of ripening in „Cas” cheese and 0.27 ± 0.56 log cfu/g after the second period of maturation, following a descendant pathway towards the last period of ripening. In „Năsal” cheese we isolated the specific *Brevibacterium linens*, which give the characteristics of this type of cheese, but also *Micrococcus* spp., in 35% and lactic streptococci in 20%.

Conclusion: The traditional cheese evaluated represent a low risk of contamination given that no sample investigated has exceeded the maximum limits allowed by the legislation and no pathogen bacteria isolated.

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MICROBIOLOGICAL HAZARDS ASSESSMENT OF PSYCHROTROPHIC MICROFLORA IN BEEF CARCASSES SLAUGHTERED IN NORTH WEST ROMANIA

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Keywords: *microbiological hazards, psychrotrophic bacteria, bovine carcasses, slaughterhouse*

Introduction: The Gram negative bacteria have the greatest capacity to alter the meat if kept under aerobic conditions, therefore the members of the genera *Pseudomonas*, *Acinetobacter*, *Psychrobacter* and *Moraxella*, will form the dominant microflora. The psychrotrophic microflora contamination level was assessed at beef carcasses in order to reveal the ways in which the results could be used to improve the slaughtering process.

Material and methods: The research was carried out during January-December 2015, in two slaughterhouses from North West Romania. The research material was represented by a total of 288 meat samples (slaughterhouse A, n=144, slaughterhouse B, n=144). Weekly, 3 samples were collected at four sites from warm and refrigerated carcasses, and examined for total psychrotrophic counts (TPC), Enterobacteriaceae, *Pseudomonas*, *Aeromonas*, *Yersinia*.

Results: From the statistical processing the mean log TPC from the surface of warm carcasses was established at different values, ranging between 3.80 ± 0.60 log ufc/cm² in first trimester and 5.01 ± 0.30 log ufc/cm² in the third trimester. After statistical processing of results by ANOVA test, we can estimate there were distinct differences ($p \leq 0.01$), regarding psychrotrophic bacteria in warm beef carcasses, higher level of contamination being recorded in unit B. Initial surface microflora of bovine carcasses was represented by germs from the following genera: *Staphylococcus*, *Micrococcus*, *Aeromonas*, *Acinetobacter*, *Pseudomonas*, *Yersinia*, *Serratia*, *Hafnia*, *Proteus* and *Escherichia*. In the case of refrigerated bovine carcasses, the mean log TPC has presented different values, ranged between 3.70 ± 0.20 log ufc/cm² in the first trimester and 6.90 ± 0.43 log ufc/cm² the third trimester. In refrigerated carcasses microbial configuration is modified, predominating the Gram negative germs: *Pseudomonas*, *Aeromonas*, *Psychrobacter*, *Acinetobacter*, *Yersinia*, *Serratia*, and *Hafnia*.

Conclusions: Microbiological hazard assessment reveals the key role of psychrotrophic microorganisms in the spoilage of meat, if the monitoring system of the slaughtering process is not functioning properly.

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SECTION 10: LAND MEASUREMENT, NATURAL AND HUMANISTIC SCIENCES

HYDROLOGY FROM THE GRACE SATELLITE MISSION: APPLICATIONS TO THE DANUBE RIVER BASIN

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Keywords: *Danube River Basin, GRACE, Ground water, Hydrology*

Introduction: The Gravity Recovery And Climate Experiment (GRACE) satellite mission has provided invaluable insight into climate change and anthropogenic related activities since its launch in 2002. GRACE is a tandem pair of satellites orbiting at about 450km with the inter-satellite range-rate sensitive to temporal changes in the Earth's gravitational field. A K-band microwave device measures the range-rate allowing analysts to infer the mass change.

Aims: The GRACE mission will be introduced with a number of examples from the cryosphere and hydrosphere presented to illustrate the importance of the mission to science. Over polar regions GRACE allows estimates of ice mass change while over the continents GRACE data gives a measure of the total water content including snow cover, soil moisture and ground water. By use of land surface parameters to model snow and soil moisture, the residual signature reflects the change in ground water. This ground water can be further geocorrelated by using the geographical extent of river basins and catchments.

Results: By using the mass-concentration technique (mascons) ground water signatures across the Danube basin will be presented for the period 2002 to the present day at 10 day intervals. The effect of the 2006 flood on the GRACE signatures will be shown.

Conclusion: This presentation will introduce the GRACE mission and highlight the utility of the results to large catchments such as the Danube River Basin.

EVALUATION OF A NEW LIGHTWEIGHT INSULATION MATERIAL PREPARED FROM HEMP SHIVES

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Keywords: *absorption coefficient, hemp, insulation materials, lasting development, thermal conductivity*

Introduction: Hemp-based composite materials represent an important resource for the constructions sector. They are considered ecological and effective in improving buildings' energy efficiency, carbon dioxide absorption and in limiting pollutant emissions during the production process, due to a reduced waste volume. (1)

Aims: The purpose of the present study is to identify an insulation product able to ensure adequate hygrothermal and acoustic conditions.

Materials and Methods: The lightweight insulation materials were obtained by mixing two main compounds in variable proportions: hemp shive (C) and hydrated lime (V). It resulted into 3 mixtures in which the hemp volume was gradually increased in relation to the lime volume. (a. sample C1+V1, with a hemp-lime ratio 1:1, b. sample C2+V1 with a hemp-lime ratio of 2:1, c. sample C3+V1 with a hemp-lime ratio of 3:1).

The samples resulted from the mixtures were tested to two parameters: the acoustic absorption and the thermal conductivity, by using specific apparatus, property of the Transylvania University of Brasov, respectively the Faculty of Civil Engineering of the Technical University in Cluj-Napoca.

Results: The centralization and the analysis of the results provided by the three mixing formulae point out that a positive variation of the hemp volume triggers an increase in the sample lightness, a result which supports the aim of the present study. The coefficient of acoustic absorption generates the highest value on the interval of frequencies 0-6400 Hz for the sample C3+V1, with a hemp-lime ratio of 3:1. The values indicated by the thermal conductivity coefficient show minor differences between the samples. Nevertheless the highest value is associated to the C2+V1 sample, for which the value of the coefficient is 0,16 W/mK. **Conclusion:** The hemp-based composite materials may have a significant impact on the constructions sector when it comes to providing new sustainable materials able to reinforce the connection between human being and nature.

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PRELIMINARY STUDIES ON THE USE OF THE TECHNICAL PLANTS IN CONSTRUCTIONS

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Keywords: *acoustic absorption coefficient, hemp, mechanical strength, sustainable materials*

Introduction: The present study has focused on developing new building materials based on the use of technical plants. The scientific literature considers hemp an entirely renewable technical plant which provides: seeds for the food sector, fibers for the textile industry, for paper and car panels, and hemp shive for constructions. Hemp is viewed as an important generator of economic benefits due to its low-maintenance crop.(1)

Aims: The purpose of the study was to identify new products aimed to enrich the range of building materials which use technical plants, to satisfy the need for sustainability by the agricultural sector and to support a sustainable economy.

Materials and Methods: The experimental program focused on obtaining new composite materials by mixing hemp, two types of volcanic rocks: perlite and vermiculite and polyvinyl acetate as binder. By mixing the previous elements in variable proportions three mixing formulae were obtained, where the hemp - polyvinyl acetate ratio was 1:2 and volcanic rocks-polyvinyl acetate 1:4. The mixtures (a. sample C3+P2 with 60% hemp and 40% perlite, b. sample C3+V2 with 60% hemp and 40% vermiculite and c. sample C3+PV2 with 60% hemp, 20% perlite, 20% vermiculite) were tested for acoustic absorption, mechanical and fire resistance. The determination of the acoustic absorption coefficient was realized using the apparatus property of the Transylvania University in Brasov, the classification of the reaction to fire at the Rigips Factory in Turda and the mechanical properties at the Technical University of Cluj-Napoca.

Results: The results have indicated that for the mechanical and fire resistance parameters, the mixture C3+P2 generated the highest values. The results are slightly different in the case of the acoustic absorption coefficient. It reaches its maximum value at 0,4 of absorption coefficient for the interval of frequency 0-6400 Hz in the case of the C3+PV2 mixture and the lowest values for the same frequency interval, in the case of the C3+V2 mixture.

Conclusion: According to the preliminary studies conducted, the hemp products developed adequately may represent a sustainable alternative for the building materials market..

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LAND COVER TYPOLOGY USING GEOGRAPHIC INFORMATION SYSTEMS FOR VITICULTURAL LANDSCAPE

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Keywords: *ecosystem services, land cover, land use, semi-natural elements*

Introduction. Viticultural landscapes traditionally consist of a diverse mosaic of different elements of agricultural and semi-natural ecosystems providing a variety of ecosystem services (Wratten *et al.* 2012).

Aims. Digitise the landscape buffer of VineDivers Romanian vineyards ecosystems.

Materials and Methods. In the context of VineDivers landscape ecology there were two approaches for determining representative landscape units: (1) in Spain, Austria and Romania a landscape buffers of 750 m in diameter were delimited around the centroid of the studied vineyard parcels, (2) in France the proportion of vineyards and semi-natural elements were determined for all possible landscape buffers in the vineyard region and vineyard parcels to study were chosen with respect to their proportion of vineyards versus semi-natural elements within this buffer.

Results. The results of landscape mapping are parameters such as percentage of semi-natural elements, mean size of vineyard parcel, and complexity index. In Romania were studied sixteen vineyards ecosystems from Târnave Viticulture Region – Transylvania. Detailed delimitation of non-perennial features was implemented following fieldwork and mapping, databases building and digitalizing.

Conclusion. Landscape mapping will offer a better understanding of spatial information and structural inventory of agroecosystems. Also, it should be possible to study the effects of landscape pattern upon species composition and biodiversity.

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THE USE OF GEOSTATISTICS IN AGRICULTURE

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Keywords: *Agriculture, geostatistics, GIS*

Introduction: In the last years the crops grow in a specific location, farmers use precision agriculture and data can be acquired from sky by satellites and drones and all these facilities lead to create geographic information systems used to monitoring and predict the crops and yields. All these facilities generate a very large amount of data that must be processed in order to create and explore the geographic information systems

Aims: The aim of this paper is to emphasize how statistics is used to process the raw data in order to create a geographic information system and how the geostatistics is used to monitorize and predict the studied phenomenon..

Materials and Methods: Using satellite free data provided by US Geological Survey it will be developed and applied specific statistics and geostatistics procedure to achieve the above aim.

Results: After the processing of the raw data will be created the geographic information system (GIS).

Conclusion: The geographic information system is a useful tool for modern agriculture.

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ASPECTS REGARDING THE SCALE COEFFICIENT FOR MEASUREMENTS OF DISTANCES IN A GEODETIC NETWORK

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Keywords: *Geodetic network, linear intersections, scale coefficient*

Introduction: A geodetic network, achieved in a particular projection system, is characterized by a scale coefficient given by the coordinates of old points. In the case of network thickening using the multiple linear intersections method, the scale of the measurement instrument is different from the network scale and in this case it requires that the measured values to be brought to the scale of the geodetic network by introducing a scale coefficient. Although in the specialty literature is mentioned that between old points the distances are not measured (Moldoveanu, 2002; Dima, 2005), for determining the scale of the network it will be measured the distances between the old points.

Aims: This paper aims to highlight the importance of determining the scale coefficient for measurements of distances in a geodetic network, and the way of determining this coefficient.

Materials and Methods: For performing instrumental observations, between the old points 250, 252, 253 and the new point which was recently placed, it was used a Leica 805 total station and round prisms which were positioned vertically using some metal tripods. In the equations of corrections, which were established between the old points, will appear as unknown the scale coefficient and the free terms will be obtained as a difference between the calculated and measured values. In the case of corrections equations established between old and new points, besides the scale coefficient it will also appear the corrections of the new points.

Results: The values of the new points coordinates fall within the tolerances allowed compared to the coordinates of the same points but obtained using the classical method for designing the distances on the reference surface and after that on the projection plan used. After this step are calculated the provisional coordinates, the corrections of the provisional coordinates and in the end the precision indices.

Conclusion: Using the scale coefficient, through which the measured elements are brought to the network scale, eases the calculus stages for obtaining the coordinates of the new points. In case the precision of the measured elements is greater than the precision of positioning the old points, will bring the network scale to the scale of the total station.

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MODERN TECHNIQUES FOR THE MAPPING AND THE DELIMITATION OF SOME PROTECTED AREAS IN TIMIS COUNTY

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Keywords: *elevation, geo- referentiation, maps, nomenclature, natural area*

Introduction: The vegetation accounts for that part that produces biomass of this cover made up of incompatible elements with life by the aid of solar energy. The overexploitation of the natural resources represents the most important way of the biodiversity degradation, leading to the extinction of a large numbers of species. The natural vegetation plays a decisive role in the conservation of the plants diversity, of the animals and of the biocenosis and of the ecosystems. The drawing up of the vegetation maps or of another type, knowing the eco-systemic live cover of the life environment which is very necessary.

Aims: The goal of the study was the mapping and the delimitation of some protected areas in Timis county, areas of national interest that correspond to the IVth IUCN category (International

Union for Conservation of Nature).

Materials and Methods: The measurements on the field have been carried out by means of the technology and of the tools GNSS through RTK method, as working method being the most indicated from the point of view of precision and fastness for recording all the details on the field. The following steps of the project were taken into consideration: field recognition, filed measurement, office works.

The methods used in the mapping process are modern methods and allow the delimitation of the studied areas and their transposition in a compatible format and used in many sectors of activity: CAD or GIS.

Results: The result of this study highlights directly the areas that have been referred to starting from the reminiscence of the old moors that covered till the middle of the VIII th century all these lands, from clusters to trees, as well as the vegetal covers, developing in tight interdependence, and being constituted in this respect the permanent base of the vegetation maps.

Conclusion: The maps regard the protected areas, Lunca Poganisului, the Moors from Murani, the Moors Satchinez, which is the object of this paper as well as other areas on the territory of Romania that played an important role in terms of knowing one of the important components of our life environment – vegetation, valuable economic sources that preserved the environment conditions and biodiversity. The practical usability of those maps can be proven permanently, in different areas such as forestry, grassland farming, the ecological set-up of the territory or formation of the network of reservations Natura 2000.

THE STUDY RELATED TO THE EXECUTION OF A TRIANGULATION NETWORK IN THE DUMP OF ROVINARI PIT, IN ORDER TO BE RESTORED TO THE ECONOMIC CIRCUIT

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Keywords: *design, geodesic network, measurement, mining basin*

Introduction: The lignite mining extraction within the mining perimeter in Rovinari is carried out through mining works in the open, by using large equipments for the excavation, transport and storage of the mining material. These surfaces are currently being set up in the area of level two of the dump, the west and north-west part of Rovinari pit. In order to carry out the set-up works and of follow-up of the stability of the pit levels it is necessary to maintain the triangulation network.

Aims: To avoid subsequent negligences in the execution of the geodesic and topographic works that can have serious consequences in carrying out investments resulted in undesired accidents or modifications and expensive repairs.

Materials and Methods: A geodesic or topographic network is a support base that allows to meet some important objectives. In order to appreciate the quality of a network as well as in order to improve precision it is necessary to prepare a study related to the propagation of errors in the geodesic and topographic networks. According to the development and the importance of networks, they can be reported to different reference surfaces: ellipsoid, the sphere of average radius or plan. The topographic works that will be executed shall consist in the execution of some topographic networks of laying-out in order to meet the objectives specified in the project. The determination of the point coordinate shall be carried out through the method of the coordinate variation, using for this purpose the triangulation points related to the mining field from E.M. Rovinari, Rovinari pit.

Results: The geodesic and topographic networks from the mining basins are prepared in order to create the support base for all the works that shall be executed in this sector. According to the quality of these networks expressed by the precision of the coordinates of the geodesic and topographic points, topographic and geodesic works have been executed for the purpose of design, the exploitation of the mineral resources, of carrying out effective investments as well as the cadastral registration of the goods in the heritage, and, in some special cases, the temporally follow-up of their behavior.

Conclusion: The opening, preparation and exploitation work influence to a large extent the type and volume of geodesic and topographic works that will be carried out.

ASPECTS REGARDING THE MANIFESTATION OF SUBSIDENCE AND THE GEODETIC AND TOPOGRAPHIC METHODS USED TO ESTABLISH THE SPECIFIC PARAMETERS OF THE DISPLACEMENTS

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Keywords: *Displacement angles, exploitation perimeter, safety pillars, subsidence*

Introduction: To ensure effective security in conducting the extraction process, an important requirement is of knowing and ensuring the stability of underground and surface excavations related to deposits of useful minerals. Analyzing the factors that influence the movement of the package of rocks from the mined area to the surface, under different conditions of deposits, it appears that a particular importance has strength and the structure of the rocks, the geometric parameters of deposits, the mining methods used and how the pressure is guided.

Aims: This paper analyzes the manifestation of subsidence in coal deposits, ores and salt. The paper has on its basis the experience gained by the authors in research in various mining basins in the country.

Materials and Methods: The effects of subsidence manifested on the surface of mining perimeters is manifested by the formation of sinking areas or subsidence cones, which are monitored through geodetic and topographic methods. For establishing the specific parameters for the process of movement and deformation of surface, are materialized tracking stations, consisting of transverse and directional alignments, related to a sector, or to the whole exploitation area. The geodetic and topographic measurements consist in determining the planimetric and altimetric coordinates of the landmarks.

Results: The processing of measurements in tracking stations is accomplished through Least Squares Method, using indirect measurements or conditional measurements of same precision or of different precision. Based on specific parameters of the displacement and deformation process (sinking, tilting, horizontal movement and horizontal deformation), calculated based on measurements, are established the angles of movement and tear, downstream, upstream and directional. The angles determined will serve to establish the areas of influence of the underground exploitation on the surface and to dimension the safety pillars which are necessary to protect civil and industrial targets within the perimeters of exploitation.

Conclusion: In the present research work, we analyze the manifestation of subsidence, which is of great importance in order to protect the civil and industrial objectives and avoid catastrophic phenomena.

STUDY REGARDING DIFFERENT SUBSTRATES FOR GREEN ROOFS

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Keywords: *green roof, leaks, substrate, water retention*

Introduction: “The ideal substrate has to achieve the seemingly miraculous combination of being highly efficient at absorbing and retaining water while at the same time having free-draining properties. It should also be able to absorb and supply nutrients and retain their volume over time, as well as provide anchorage for the plants of the green roof” (Dunnet and Kingsbury, 2004). Many companies used different type of soil mix that has been developed by the manufacturer and is an integral element of the system. It contains a special mixture of minerals and organic material, based on extensive research and development (Osmundson, 1999)

Aims: This study aims is to create the ideal substrate use on green roofs.

Material and Methods: The experiment was conducted on the roof of Faculty of Agricultural Science and Veterinary Medicine of Cluj-Napoca and it was done from April to July 2015. In 9 pots was seeding grass with different type of substrate. In the pots were used three different mixed types of ground substrates: perlite, substrate turf, expanded clay and broken tiles in different proportions.

Results: After analyzing the mixed types of ground substrates it was found that one of the mixes substrate tested were consistent. The soil mix with a higher proportion of perlite reduced leakage which means that the mix of 5: 3: 1: 1 respectively, turf substrate, perlite, expanded clay, broken tile has a consistent, porosity and water retention great for meeting the requirements of substrates for green roofs.

Conclusion: In the present research work, we demonstrated that the soil is very important in this system of green roof to reduce the water leaks. Determination of soil edaphic conditions is necessary for the increasing of plants biomass.

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STUDY ON DETERMINATION OF LOSSES SEDIMENT FOLLOWING SURFACE EROSION

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Keywords: *land cover, soil loss, slope, water*

Introduction: Soil erosion occurs when soil is worn away by the natural action of water, wind, glacier and gravity (AHN et al., 2015; OSMAN, 2014). Soil erosion by water involves complex interaction between rainwater and soil (RATTAN, 1999).

Aims: The main objective of this study is to observation of the influence by land cover prevention soil erosion by water.

Materials and Methods: For the study were identified 3 slope with a total of 9 sqm of surfaces covered with vegetation, vegetation-free area, area covered in 50% with vegetation and area covered in 100% with vegetation.

Results: The largest amount of sediment was recorded at surface without vegetation 24.26 t/ha/year. Considering on the field observation, it was noted that on surfaces covered with 100% vegetation soil losses are insignificant, regardless of the recorded quantity of precipitation. In the variant of soil loss from the surface devoid of vegetation cover due rainfall of 24.2 l/sqm, it was recorded a difference of 13.27 t/ha/year significant compared to the control, this being by 76.1% higher in relative terms.

Conclusion: The amount of soil losses caused by rainfall relative to devoid of surface vegetation cover is 24.26 t/ha/year. The standard deviation of the difference is 5.69 t/ha/year deviation from the average. The quantity of soil losses caused by rainfall relative to the 50% surface covered with vegetation cover is 11.00 t/ha/year. The standard deviation of the difference is 2.72 t/ha/year deviation from the average.

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DIGITAL MODELING OF THE DISPLACEMENT PHENOMENON OF THE TERRESTRIAL SURFACE

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Keywords: *Digital Terrain Model (DTM), exploitation, surveying*

Introduction: With the development of the specialized software applications was realized possibility of approaching and solving complex problems concerning automation and process optimization are used field data. Computer representation of the shape and size of the earth requires a detailed mathematical modelling, known as the "digital terrain model".

Aims: This paper aims to present the achievement of digital terrain model at Vulcan mining exploitation, Hunedoara County, Romania.

Materials and Methods: Modelling consists of a set of mathematical equations defining in detail the shape of the Earth's surface and has an approximate surface rigorously mathematical actual land area. Therefore, the digital terrain model is meant digital representation of the earth's surface through a mathematical model that approximates land surface terrain modelling that can be used in various applications civil, industrial and land-based data. To achieve digital terrain model of data recorded using linear and nonlinear interpolation method based on the support points that highlights the physical surface area studied.

Results: Given the complexity of this work is absolutely necessary detailed knowledge of all topographic elements in the work area, without which the actions to be undertaken to design and workmanship would not be possible. To achieve digital terrain model, within a specialized software were set appropriate parameters needed to achieve this case study. After operating all the steps we obtained the digital terrain model of the Vulcan mining exploitation, Hunedoara County, Romania.

Conclusion: Digital terrain model is the product of complex that holds characteristics that are equivalent to specialists using satellite images and information stored in a digital model is easier to use.

POSTER PRESENTATIONS

SECTION 1: AGRICULTURE

INFLUENCE OF GAMMA IRRADIATION OF MINIMALLY PROCESSED PARSLEY (*PETROSELINUM CRISPUM*) ON CONSUMER PREFERENCE DURING THE SHELF-LIFE

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Keywords: *preference map, principal component analysis, sensory analysis*

Introduction. Minimally processed fresh herbs are popular because consumers dedicate less time preparing of their meals. Several methods are applied to extend their limited shelf-life: washing with chlorinated water, modified atmosphere packaging, refrigeration and irradiation. Thus, the effect of these treatments on the sensory properties of herbs influences consumer preference.

Aims. The aim of the present study was to evaluate the effect of irradiation processing on consumer preference by generating consumer preference maps.

Materials and Methods. Fresh parsley (*Petroselinum crispum* (Mill.) Fuss var. neapolitanum) was minimally processed as previously described. Samples were gamma irradiated with absorbed doses of 0.7 ± 0.1 kGy; 1.4 ± 0.1 kGy; 2.0 ± 0.2 kGy; 2.7 ± 0.3 kGy. A 22-day shelf-life was taken into account. Sensory analysis (color, texture, and flavor) was performed using a 5-point grid previously developed. Principal component analysis and cluster analysis were performed (XLSTAT software, Addinsoft, New York, USA, Version 2016.03.30706) to generate the consumer preference map.

Results. The consumer preference map showed the effects of each dose on the acceptance of parsley. The two selected factors accounted for 82,43% of the total variability. The main contributor to F1 were total quality (18,34%), quality numbers (16,82%) and color (8,57%), all positively correlated with F1. On the other hand, F2 consisted of texture (21,83%) - positively correlated with F1 – and taste (12,28%) – negatively correlated with F1. The majority of 0.7 kGy samples (40%) were grouped in 80-100% preference area, followed by 1.4 kGy samples (30%) and control, 2.0 kGy and 2.7 kGy samples (10%).

Conclusion. An absorbed dose between 0.7 kGy and 1.4 kGy is recommended to no treatment from a consumer preference point of view. Principal component analysis showed the connection among quality parameters subsequent to irradiation and their evolution during storage in relation to consumer preference.

CONSERVATION AND DISINFECTATION OF SOYBEAN NODULES FOR LONG TIME USING DIFFERENT METHODS

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Keywords: conservation, disinfection, soybean nodules

Introduction: Preserving soybean nodules over a long period of time is an option worthy of consideration given that fresh material is difficult to obtain. For this purpose, disinfection of the nodules in view of bacterial isolation plays an extremely important part.

Aims: The present study aims to evaluate three different methods for conservation and disinfection of soybean nodules, isolation of rhizobial strains, study of morphological characters of nodules and study of morphological and tinctorial characters of rhizobial isolates.

Materials and Methods: The biological material was represented by soybean nodules from 25 varieties (*Glycine max* L. Merr.). Three different methods of conservation were studied: by keeping nodules in the ground, by keeping nodules at room temperature in silica gel and by keeping the nodules in the refrigerator. Also, other three methods of disinfection were studied: by using sodium hypochlorite, mercuric chloride and Tween 20. The morphological characteristics of the nodules, as well as morphologic growth characteristics of rhizobial isolates were studied.

Results: The results yielded by the preservation methods, indicates that the best method is to keep the nodules in silica gel at room temperature (84% of nodules were not affected by contaminants, compared to 36% not affected for the other two conservation methods). The results obtained from disinfection methods indicates that, in the case of the sodium hypochlorite method, even if the bacterial development is good (52% compared to 44% yielded by the other methods), it also presents the most numerous contaminants (8), which might indicate that the action power of the disinfectant is too weak. The most efficient method is the one using 0.1% HgCl₂ (only 2 contaminated dishes). In terms of morphological characteristics, on culture media, rhizobial isolates present convex white-pink mucilaginous colonies with a round regular shape. Nodules analyzed have spherical shape and size between 2.5 - 5.5 cm.

Conclusion: When fresh material is difficult to obtain, the storage of nodules at room temperature in silica gel may be a good solution. For further bacterial isolation from nodules, disinfection with mercuric chloride (0.1%) ensures good results for removal of contaminants from the nodules surface.

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RESEARCH ON THE PRODUCTION AND QUALITY OF SOME SAFFLOWER VARIETIES GROWN IN THE SOUTHEASTERN OF ROMANIA

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Keywords: *Carthamus tinctorius* L., macro and micro elements, seed yield, oil yield

Introduction: *Carthamus tinctorius* L. (Asteraceae family) well-known as Safflower is an oilseed plant used in the pharmaceutical industry in various types of nutritional supplements, in the food industry as oil from seeds and for dye and natural flavor from its yellow to red flowers. **Aims:** The main aims of this study were: adaptability of three varieties of safflower: CW88OL, CW1221 and Zanzibar on environmental ecological conditions of the Experimental Field of Moara Domnească Ilfov and determinations of correlation between yield quality and yield level. **Materials and Methods:** The research was in Experimental Field of Moara Domnească – Ilfov of U.A.S.V.M.Bucharest and in laboratories of IBA Bucharest in 2014-2015. The biological material was seeds and flowers from three varieties of safflower: CW88OL, CW1221 and Zanzibar. The mineral elements of shelled seeds and flowers were highlighted using spectrometry methods: GF-AAS and F-AAS.

Results: The highest achenes yield was obtained from Zanzibar 1214.91 Kg/ha, followed by CW88OL with 1180.20 Kg/ha and CW1221 with 1106.44 Kg/ha. Research and observations results have shown that there was a positive correlation between seed yield and flowers yield of all three varieties of safflower. The highest fresh flowers yield was obtained from Zanzibar with 1039.58 Kg/ha exceeding by CW1221 with 151.43 Kg/ha and CW88OL with 115.73 Kg/ha. CW88OL variety had the highest oil yield with 370.73 l/ha, followed by Zanzibar with 361.94 l/ha and CW 1221 with 355.04 l/ha.

In the flowers of *C. tinctorius* L. among many minerals elements was identified a high content of K and in achenes composition an important content of Zn.

Conclusion: All varieties of safflower studied showed a good adaptation to the climatic conditions in the Experimental Field of Moara Domnească Ilfov. Thornless variety Zanzibar were cultivated for the first time in the climatic conditions of the Experimental Field, it proved a very good adaptability and have the advantage that the flowers and seeds can be harvested by hand. Flowers and achenes of all varieties have a rich composition in minerals and they could be used both in the pharmaceutical and food industry.

RESEARCH ON ASSESING THE POTENTIAL FOR MOUNTAIN CERTIFICATION OF VILLAGE MARISEL, COUNTY CLUJ

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Keywords: *added value, Euromontana, mountain certification*

Introduction: The quality of an authentic mountain agri food is based on its certification, it is also an important step in promoting the area, its development by creating new jobs in agriculture. Based on the measures required in regulation 1151/2012 CCE Mountain certification is achieved. Mountain certification underlies the study presented below.

Aims: The objective underlying the work, involves an evaluation socio-spatial and ecological by the authenticity of mountain products the Marisel, Cluj county.

The purpose of this objective is obtaining a Mountain certification, so the added value of these

products be growing, helping the economic development of area, and keeping the market from small farms.

Materials and Methods: Potential analysis mountain certification a food products from Belis it is designed by the European Association Euromontana, European multisectoral association for cooperation and development a upland. For this study were taken 40 family farms the Marisel villages. For mountain socioeconomic territorial diagnosis, ecological and economic indicators are representative next: definition of the area of origin; territorial delimitation of area of origin; protection elements of the area of origin; production methods processing and sale; inventory innovative methods social, environmental and economic; vertical and horizontal chains mountain farm; brand concept "Mountain product"; mountain brand protection;

Results: For Marisel area was used as a method of study a grid that took into account indicators territorial and socio-ecological, related diagnostic method Euromontana which fall within the minimum and maximum measurement scale.

Conclusion: These products must be found in a mountainous area studied, so helping to promote area, and customer awareness of eating as healthy, choosing mountain products.

The price of agricultural and food products mountain areas is higher, because both their production and distribution are more costly.

In the current economy it is necessary to create an added value for mountain products as part of a narrower niche.

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THE INFLUENCE OF TECHNOLOGICAL FACTORS ON YIELD AND QUALITY OF SPRING OATS

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Keywords: *yield, quality, quantity, seeds*

Introduction: In our country, spring oat is the most cultivated small cereal grain, the surface being around 200 thousand hectares.

Aim: The aim of our field experiences is to improve the technology of spring oats through accumulation of new knowledge which correlated to the number of sowing seeds at square meter and rational fertilizing can lead to increasing qualitative and quantitative of production.

Material and Methods: In order to achieve the proposed objectives, it was organized a three factorial experience, 2 A (number of seeds/square meter) x 2 B (doses of fertilizers) x 25 C (varieties of spring oats) with 3 replications.

Results: The tested varieties are originated from Romania (13), Germany, Czech Republic and USA. Number of seeded seeds were: 250 g.s./m² and 500g.s./m². They were used the following doses of fertilizers: N₅₀P₅₀K₀, N₁₀₀P₅₀K₀. F test showed the fact that between spring oat varieties tested genetically differences exist in terms of the level of production.

Conclusion: Duncan's ranking put on the first place varieties: Mureşana and Gramena with an average production of 6000 kg/ha in the year 2015. The sugar content of oats is between 2,47 and 3,93%, depending of varieties.

THE INFLUENCE OF COPPER SULPHATE ON GROWTH, MORPHOLOGY AND ON ANATOMY OF VEGETATIVE ORGANS OF *TRITICUM AESTIVUM* L

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Keywords: *anatomy, copper sulphate, morphology, seedlings*

Introduction: Copper is an essential micronutrient for plants. Excess of metals in soil can be harmful to plants. Due to human activities, copper contamination is a problem all over the world. Copper sulphate has been used to fight fungal diseases (Kabata-Pendias and Pendias, 2002). Fungicides applied on long-term allow the accumulation of copper in soil. Metal pollution is a problem due to the penetration of metals in food chains (Shorrocks and Alloway, 1988).

Aim: The purpose of this study was to assess the effects of the caryopses immersion of *Triticum aestivum* L, for 24 hours, in various solutions of copper sulphate.

Materials and Methods: The biological material investigated is the seedling of *Triticum aestivum* L, obtained from seeds immersed for 24 hours in solutions of different concentrations of copper sulphate (V1-0.05 g/L; V2-0.1 g/L; V3-0.5 g/L, V4-1g/L). After 14 days, the growth of vegetative organs was appreciated.

Results: The result of metabolic disturbances induced by treatment of vegetative organs was their growth inhibition in a dose-dependent manner.

Morphology: A comparative analysis of the morphology of seedlings from the variants of treatment, result in inhibition of rootedness process variants V3 and V4, causing the death of seedlings after about 8-14 days after germination.

Anatomy. The control presents a primary structure characteristic of monocots. Variants V1, V2 present no changes in the normal anatomy but instead, V3 and V4 present damage in roots; radial walls of rhizodermis cells are affected.

Conclusion: Our results suggest that the intensity of the morphological and anatomical changes highlighted at the seedlings depend on the used concentrations.

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STUDY OF THE INFLUENCE OF EXTERNAL FACTORS ON THE GERMINATION OF BEAN SEEDS

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Keywords: *darkness, germination, light, substrate*

Introduction: Bean is an important vegetable due to its high nutritional value (Bâlțeanu, 1993). Bean is a good precursor for most crops, being leguminous and weeding and yielding quite early (Gâdea, 2003).

Aims: The aim of this study was to follow the influence of substrate under conditions of light and darkness, and the influence of seeds age on the germination of some local varieties of bean.

Materials and Methods: Three local varieties: P1 (Albenghino), P2 (Cannellini), P3 (Black Turtle), grown in Maramures county. One 100 seeds of every sort, from the years 2013 and 2014, were placed in three repetitions. The energy and germinative faculty, in conditions of light and darkness, were determined.

Results: Double layer positively influences the germination faculty of the variety P1 – which is 70%, and that on simple layer - which is 60%, in light conditions. It germinates well on both layers - 93.33% and 83.33% - in darkness. The germination faculty was 83.33% for the variety P2 on double layer, in light. A germinative faculty of 93.33% respectively 100% was registered on both germinative layers, in darkness. Lower values were recorded for the P3 variety. The best results had the variety P2 (96.66%) that was provided from 2014.

Conclusion: The variety P2 had the highest germinative faculty on double layer in darkness. The values of the variety P1 range between the values of the varieties P2 and P3, and the variety P3 was negatively influenced by age.

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SOME RELEVANT ASPECTS OF MAIZE PHOSPHORUS DEFICIENCY ON ACID SOILS IN THE NORTH-WEST OF ROMANIA

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Keywords: *acid soil, long-term experiments, phosphorus deficiency*

Introduction: The setup of long-term fertilization and amendment experiments in the fall of 1961 respectively 1968 at the Agricultural Research and Development Station Livada paved the way for identifying the incriminated causes of phosphorus deficiency in maize plants.

Aims: This research aimed to quantify the impact of fertilization on the maize phosphorus deficiency and to be useful in balanced fertilization strategy.

Materials and Methods: The determinations were made in long-term experimental fields in the phase of 2-3 leaves of young corn plants, on an albic luvisol, using non-invasive methods as chlorophyll fluorescence measurements.

Results: Studying the influence of systematic fertilization with increased doses of N (nitrogen) and P, obvious P deficiency symptoms were revealed for the plots unfertilized with P or for the plots that were fertilized with a low P dose (up to 40 kg P₂O₅/ha). In these circumstances, the increased dose of N clearly intensified the P deficiency symptoms.

Analyzing the evolution of the same phenomena experienced with increasing doses of farmyard manure applied once every five years on four different funds of N and P, it is found that the effect of increased doses in the first year of manure application reduces the intensity of the P deficiency event. In the absence of fertilization with P, P deficiency symptoms are visible only up to 40 tonnes/ha.

Fluorescence measurements conducted in the second part of the growing season of maize under exacerbated drought and heat conditions in the previous summer proved that in fertilized plots where the treatment was done by following the principles of agrochemical optimization corn plants tolerated significantly better the stress induced in their photochemical system.

Conclusion: With the ability to track the effects of fertilization over a period of more than 50 due to long-term experimental field trials, we can say that in the case of phosphorus, but also other nutrients, the issue should be viewed in terms of long-term effectiveness of fertilization. Beyond the immediate effect of increasing the harvest, rational fertilization is to give sustainability to agriculture by ensuring a good quality soil.

Acknowledgement: Phd. Paul KURTINECZ, Agricultural Research and Development Station Livada

RESEARCHES CONCERNING THE DYNAMICS OF THE LEAF PATHOGENS OF WINTER WHEAT IN WESTERN PLAIN OF ROMANIA BETWEEN 2014-2016

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Keywords: *fungal diseases, leaf diseases, winter wheat*

Introduction: The climate, especially the temperature, rainfall and air humidity have a major influence on dynamics of the pathogens population in crops (Borceanu and Molnar, 2005). Diseases can diminish seriously the weath production: 20-25% the powdery mildew (Hulea and all 1975 quoted by Hatman and all 1989) and between 33-45% for septoria (Popescu, 2005). The climate in the last years was very varied, which lead a necessity to monitoring the foliar diseases. Zear 2016 was particularly favorable even to secondary diseases due to mild temperatures, high humidity and precipitation surplus.

Aims: Our objective was to monitor the dynamics of the main foliar diseases in the last three years of study, in Timiș county. To establish accurate correlations between climatic conditions and biology of pathogens.

Materials and Methods: We studied the fungal diseases in seven locations from Timis County and it was determined the frequency and intensity of foliar diseases per square meter i five points in ewery locality and was calculated the attack degree. Then was make correlations between meteorological data and the degree of fungal attack for every thre years.

Results: Year 2016 was favorable for all foliar diseases, but especially to Septoria which usually occurs in colder climates with much wetter. The degree of infection was greater than 35% in all studied areas. Unlike Septoria, powdery mildew and rusts prefer higher temperatures.

Conclusion: Moderate temperatures and lot of rainfalls are favorable to all foliar diseases. High temperatures and without rainfalls diminish drastically the pathogens attack

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HIGH NATURE VALUE GRASSLANDS FROM *ARRHENATHERION* ALLIANCE IDENTIFIED IN MUREȘ COUNTY

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Keywords: grasslands, habitats, Mureș county, Transylvania

Introduction: The knowledge importance with accurate of grasslands with a high natural value cannot be over stated. With this knowledge, policies and procedures can be established that will lead to effective enforcement of the maintenance of habitats and species dependent on agricultural management.

Aims: The goal of this study is to identify grasslands rich in plant species with a high grazing value.

Materials and Methods: The research was conducted in several areas of Mures County. To identify and describe the plant associations of *Arrhenatherion* Koch 1926 alliance, the specialized books were used. Also, phytosociological indexes were analyzed in order to get a quantitative estimation of plant species, some of them indicators of high nature value grasslands.

Results: The studied phytocoenoses were assigned for two plant associations: *Arrhenatheretum elatioris* Br.-Bl. ex Scherrer 1925 (6510 Natura 2000 habitat) and *Poo-Trisetetum flavescens* (Knapp 1951) Oberd. 1957, (6520 Natura 2000 habitat). The floristic composition of these phytocoenoses shows a high richness of plant species. Thus in the 21 phytosociological surveys, 201 taxa were identified.

Conclusions: The grasslands of *Arrhenatherion* alliance are considered among the best pastures, having a high productivity and very good nutritional value. A slight elimination of autochthonous species were observed as a result of the development of a variety of invasive species.

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STUDY THE BEHAVIOR OF SOME SPRING BARLEY LINES WITH TWO ROWS CREATED AT A.R.D.S TURDA REGARDING OF PRODUCTION CAPACITY AND QUALITY

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Keywords: *spring barley, TKW, starch, proteine, yield.*

Introduction: Spring barley follows two directions namely for the brewing industry and for animal feed, and a small part of about 6% is used in human food but the main uses of barley grain in countries cultivators, remains animal feed. In brewing, barley is used from ancient times until today, because enzymes amylase alpha and beta they are in greater amounts than in wheat and rye. Spring barley is of a superior quality for brewing compared with feed barley for several reasons, namely: spring barley grains are larger and more uniform, produce a better quality malt, husk which clothe spring barley grains are finer and more pursed, which enhances their role filter, spring barley grains have a lower protein content and rich in starch, which means better quality for brewing (ION, 2010).

Materials and Methods: Research which constitutes the study of this paper were conducted in the field of breeding of spring barley two rows from ARDS Turda, during the years 2013-2015 in a trials comparative with 25 variants. The lines were analyzed in terms of production and its stability after the method proposed by literature, but also in terms of direct and indirect indicators of spring barley quality for beer. Determinations regarding the chemical composition were made using the apparatus TANGO FT-NIR for only , 2014 and 2015.

Results: In terms of average production capacity lines in three experimental years it ranges from 43,64 to 56,8 q / ha, reflecting the production potential of these lines quite good it can be seen their suitability for brewing, most with under 12% protein. Referring to the starch content, the lines studied with some exceptions approaching the levels required for brewing it is around 60%.

Grain weight reflect on their size, therefore TKW is a direct indicator of the size of grains, spring barley lines analyzed have a TKW between 41 and 47 g, therefore we can say that these lines that meet the broad beans they are suitable brewing industry.

Conclusion: Contrary to existing opinions that domestic barley varieties have a higher protein content from this study can be seen that the genetic material analyzed corresponds to the requirements for the brewing industry. There have been observed in terms of production potential the variety Jubileu, line To 2027/10, To 2172/01.

EFFECTS OF CLIMATIC CHANGES UPON THE VARIABILITY OF SOME PRODUCTIVITY CHARACTERS IN WINTER TRITICALE (*X TRITICOSECALE* WITTM.)

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Keywords: *productivity characters, variability, winter triticale*

Introduction: Triticale (*Triticosecale* Wittmack) is a relatively new small grain cereal obtained from common wheat (*Triticum*) and rye (*Secale*). Inherited traits as adaptability from rye combine with the high level of grain yield from wheat, this species is one of the most productive small grains plants. Average global temperatures have increased over the last decades and are predicted to continue rising, along with a greater frequency of extremely hot days which causes a huge effort to achieve production plant.

Aims: to analyze the effect variable climatic conditions upon the main yield components and other morph-physiological traits which are more or less directly related to productions. Research was carried out during 2011-2015 at Agricultural Research and Development Station from Turda.

Materials and Methods: the biological material was composed from a group of Romanian winter triticale variety and perspective lines. The experimental results were processed based on the main statistical parameters and correlation between these and grain yield.

Results: changing environmental conditions during the experimental years have determine a large variability of main yield components and other analyzing traits. Grain number per spike is one of important yield components, which directly affect genetic yield potential. The results for number of grains per spike are variated and the differences between years indicated that this traits depend on the environmental conditions during the year of growing. As an important yield components weight of grain per spike is also very variable and its expression depends highly on the environmental factors.

Conclusion: investigated yield components depended highly by growing seasons and also by genetic value of analyzed varieties. In this investigation established high variability of triticale yield components.

A FORAGE MIXTURE WITH RED CLOVER IN THE FOURTH EXPERIMENTAL YEAR

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Keywords: *forage, mixture, red clover, fertilization.*

Introduction: In Transylvania Plain studies are still required in order to highlight the most suitable forage mixture for the soil-climatic condition specific to this area. Red clover in mixture with other legume and grass species provides a high-quality forage.

Aims: The present paper aims to follow the behaviour of a forage mixture with red clover in the fourth experimental year.

Materials and Methods: We followed the behaviour of a complex mixture consisting of *Trifolium pratense* (15%), *Lolium perenne* (20%), *Festulolium* (25%), *Festuca arundinacea* (25%) and *Phleum pratense* (15%) under the influence of mineral fertilization in the climatic conditions specific Plateau of Transylvania, Romania. Experience was installed in the spring of 2012 in experimental fields located inside the Agricultural Research and Development Station Turda. The experimental area is characterized by an average annual temperature of 10.4°C and average annual rainfall of 523.2 mm. Soil type is faeoziom vertic clay. The mixture was sown on 2 densities namely 12.5 cm and 25 cm distances between rows and they were fertilized in early March with complex NPK and ammonium nitrate (33.3%) in four different doses: V control variant, unfertilized, V1-N50P60K80, V3- N75P60K-N100P60K8080. The experimental parcels were mowed 3 times /year.

Results: An interesting evolution of the forage mixture was observed in the fourth experimental year. Fertilization with N75P60K80 seemed to have a favourable influence on forage mixture productivity.

Conclusion: The results showed that the forage mixture studied can generate high productivity and quality even in the fourth experimental year.

ALLELOPATHIC POTENTIAL OF *JASMINUM OFFICINALE* ON WEED SPECIES

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Keywords: *allelopathy, plant-plant interaction, inhibiting effect*

Introduction: Allelopathy is generally defined as any direct or indirect harmful or beneficial effect of one plant on another mediated by the production of chemical compounds, called allelochemicals, which are released into the environment. Release of these allelochemicals, was already demonstrated as a major factor in regulating the plant communities structure in both natural and agroecosystem.

Aims: The aim of the present paper was to evaluate and determine the possible allelopathic potential of *Jasminum officinale* against four weed species.

Materials and Methods: The effects of root, stem and leaf exudates, were assayed on seed germination, radicle length, and coleoptile length of four common weed species : ragweed (*Ambrosia artemisiifolia*), ryegrass (*Lolium perenne*), Johnsonn grass (*Sorghum halepense*), and lady's thumb or redshank (*Persicaria maculosa*). The extracts used in performing the laboratory experiments were prepared with distilled water. For the germination experiments were used Petri dishes and the control treatment was distilled water.

Results: The aqueous leachates of roots, stems and leaf of jasmine demonstrated promising allelopathic potential by inhibiting seed germination and radicle elongation of all tested species in a concentration dependent manner. However, the weed species showed different responses to the treatment with exudates of *J. officinale*.

Conclusion: The essential role that allelochemicals play in complex interactions in the environment is being currently elucidated in the scientific progress of humanity. The more profound research in this field will eventually lead to the development of bioproducts designed for pest or weed control using allelochemicals.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CORE Project BIODIVERS PN 19 0107.

COMPARATIVE STUDY OF PROLINE ACCUMULATION OF SOME VARIETIES OF DURUM WHEAT (*TRITICUM DURUM* DESF.) UNDER WATER STRESS CONDITIONS

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Key words: *Proline value, Durum wheat (Triticum durum Desf.), water stress, resistance*

Introduction: Environmental stresses, including drought stress are one of the first factors in limiting plant growth and crop productivity. In Algeria, Wheat production is not sufficient to meet the demands of a growing population. The average consumption is estimated at more than 190 Kg per year and per person. The accumulation of proline is one of adaptive strategies triggered by the plant facing environmental constraints.

Materials and Methods: Twelve lines selected from the international trials of CIMMYT (Mexico) and five varieties originated from Algeria were sown in pot culture in field. A randomized split plot design with two water regimes and three replications was used. The water stress was applied by stopping the watering as the 06th leaf started to appear. Proline, as a marker of resistance to the abiotic constraints, was analysed by Troll and Lindsley (1955) method modified by Magne and Laher (1992). The dosage was realized on the median third of the etandard leaf.

Results: The results showed that mean values of proline accumulation was 7.70 µg/ml and 12.73 µg/ml respectively for watered and water stress conditions. Proline accumulation was significantly increased under water stress ($p < 0.01$). There was differences between varieties and their interaction with water regimes ($p < 0.001$) and 04 groups were identified. Proline accumulation has been demonstrated in many species and in different situations of stress (osmotic, water and heat) as osmolyte involved in protective mechanisms during abiotic stress (Al-Rumaih and Al-Rumaih, 2008). When plants are subjected to water stress they increase their rate of proline, this enables to improve the capacity of the cell to maintain it turgor pressure at low water potential (Tyree and Jarvi, 1982).

Conclusion: Proline accumulation can be a real biochemical mechanism of resistance to water deficit in durum wheat.

CHANGES OF MYCORRHIZAL COLONIZATION IN WINTER WHEAT DUE TO MINERAL INPUTS

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Keywords: *mineral fertilizer, phosphorus, winter wheat, symbiosis.*

Introduction: Agricultural ecosystems have evolved towards a climax dependent on technological inputs, with wide variations due to crops and applied fertilizers. Winter wheat is a plant cultivated on large areas having a lengthy history for human food production. Mycorrhizal symbiosis is a positive interaction of fungi in soil with higher plants, with a role in increasing the surface for nutrients acquisition by plants.

Aims: The aim of this paper is to evaluate the potential of mineral fertilizers to influence the efficiency of mycorrhizal symbiotic mechanism, by increasing the abundance of nutrients in easily accessible areas for plants root of winter wheat.

Materials and Methods: Colonization parameters were analyzed in relation to the basic fertilizer, represented by NPK 20-20-0 and additional fertilization based on ammonium nitrate, calcium nitrate, urea and NPK 27-13,5-0. Identified significant correlations between the level of mycorrhizas and doses of fertilizers were selected to explore the disturbances on symbiotic system. **Results:** The correlations established between colonization parameters and fertilization indicates a strong effect of nitrogen applied as a starter on the senescent network of transfer, respectively of phosphorus as starter for arbuscular circuit. Potassium plays an important role in the development of arbuscular circuit, but only when applied in doses of 120 kg ha⁻¹. Fertilization during spring has little effect on colonization, modification of mycorrhizal functional mechanism being without significance.

Conclusion: The level of fertilizer NPK 20-20-0 determines the oscillation of colonization parameters, but it was observed a reduced overall effect in the absence of a supplementary fertilization.

HISTO-ANATOMIC ASPECTS ON *ZEAMAYS* L. INFLUENCED BY HEMP SHIVES POLYPHENOLIC EXTRACT

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Keywords: *hemp shives, histo-anatomic, polyphenolic extract*

Introduction: The plant kingdom is an inexhaustible source of bioactive compounds with antioxidant character. It is known that, natural polyphenols are essential compounds in stimulating plant growth and development.

Aims: The aim of this study was to identify the internal structure changes in maize (*Zea mays* L.) seedlings, under the influence of hemp shives polyphenolic extract.

Materials and Methods: Hemp shives polyphenolic extract was characterized in terms of the total content of polyphenols and individual content by HPLC. Germination tests were carried out going through a standard procedure. In order to perform the histo-anatomical characterization, the vegetal material was fixed and preserved in alcohol 70%, following to be cut by hand microtome. The sections obtained were stained using double staining reagents: green - iodine and ruthenium red.

Results: It was observed, compared with the control, that hemp shives polyphenolic extract determines a weaker development of the absorbents bristle and increase leading bundles number and central vessels metaxylem.

Conclusions: Hemp shives polyphenolic extract in lower concentrations has positive effects on developed process of *Zea mays* L. plants that can be attributed to bioregulation properties.

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Acknowledgement: This paper was realized with the support of grant nr. 17800/3/22.12.2015

SOME PHYSIC AND MECHANICAL PROPERTIES OF DRY BIOMASS OF THE *POLYGONUM SACHALINENSE* AND *SORGHUM ALMUM*

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Keywords: *ash content, biomass, density, gross calorific value, pellet, Polygonum sachalinense, Sorghum alnum*

Introduction: Growing concerns regarding energy security and climate change caused by CO₂ emissions demand urgent development of sustainable energy alternatives. Biomass makes a major contribution to the world and nation's renewable energy portfolio. When developing technologies for biomass conversion, several important aspects such as biomass feedstock potential and quality should be considered.

Aims: The objective of this research was to evaluate some physic and mechanical properties of dry biomass of the new species *Polygonum sachalinense* and *Sorghum alnum* in Moldova's conditions.

Materials and methods: The dry biomass of the new species *Polygonum sachalinense* and *Sorghum alnum*, which were collected in the spring 2016 y. from the experimental land of the Botanical Garden (Institute) of Academy of Sciences of Moldova, served as object of study, wheat straw, *Triticum aestivum* - control variant. Collected dry biomass was milling with aperture sizes of 6 mm and pelleting by the equipment for the production of biofuels developed in the Institute of Agricultural Technique "Mecagro". The physic and mechanical properties dry biomass, milled chaffs and pelletes was determined according to European Standards.

Results: It has been established that *Polygonum sachalinense* stems defoliated and dehydrated faster than *Sorghum alnum*, the bulk density of the milled chaffs - 256 kg/m³ and 173 kg/m³, respectively. Wheat straw is characterized by the lowest bulk density (163 kg/m³). The specific density of pelletes made from *Polygonum sachalinense* and *Sorghum alnum* reaching values 1003-1008 kg/m³. The *Polygonum sachalinense* biomass were distinguished high gross calorific values 19.3 MJ/kg and low ash content 2.23 %, *Sorghum alnum* biomass – 18.6 MJ/kg and moderately ash content 3.71 %, but wheat straw low calorific value (17.0 MJ/kg) and high content of ash (5.08%).

Conclusion: *Polygonum sachalinense* and *Sorghum alnum* are promising energy crops for the production solid bio-fuel in Moldova's conditions.

DETERMINATION OF THE OPTIMUM PARAMETERS FOR THE SIMULTANEOUS SYNTHESIS & CRYSTALLIZATION OF KH_2PO_4 FERTILIZER

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Keywords: *fertilizer, monopotassium phosphate, optimization, synthesis*

Introduction: KH_2PO_4 is largely used in crop nutrition due to its high PK content and good solubility in water. It can be produced mostly by the reaction of KCl with H_3PO_4 as well as neutralization of H_3PO_4 with KOH or K_2CO_3 , under various conditions. However, these processes involve high energy consumption, use of pollutant solvents, product contamination etc. **Aims:** The aim of this work is to overcome some disadvantages of known procedures by simultaneous synthesis & crystallization of pure KH_2PO_4 , at reduced temperatures. The optimised process parameters are: reaction temperature and time, reaction mass dilution.

Materials and Methods: Analytical pure reagents were purchased from commercial sources. Experiments were performed using standard laboratory equipments: digital balance (0.01 g), hot plate magnetic stirrer with temperature sensor, vacuum filtration system and oven. FT-Raman spectra on solid samples were recorded on Bruker FT-IR Equinox 55 Spectrometer equipped with an integrated FRA 106 S Raman module (spectral resolution 2 cm^{-1}).

Results: Reaction of K_2CO_3 with H_3PO_4 in aqueous solution leads to KH_2PO_4 and CO_2 evolution. In order to run simultaneous synthesis & crystallization in good yield, the temperature and

dilution of the reaction mass was optimised. Thus, the process was run at 5°C and 20°C, respectively for five acid concentrations (25-85%). For both temperatures was proved that the process yield decreases (52-2%) with the increase of dilution. The reaction and the crystallization yields were calculated based on water content and KH_2PO_4 solubility. The results showed that the reaction yield remains constant (67%) regardless the temperature and dilution, while the crystallization yield decreases (77-3%) with the increase of dilution. Further reduction of the dilution by using K_2CO_3 as solid or slurry, increased the total yield > 52%. The lack of carbonate anion in the final product was monitored by Raman spectroscopy.

Conclusion: In our study we proved that pure KH_2PO_4 can be prepared with a reduced consumption of energy, in optimum conditions: low temperatures and high concentrations.

INSECTS SPECIES ASSOCIATED TO SUNFLOWER CROPS IN THE SOUTHERN BANAT REGION, ROMANIA

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Keywords: *Banat region, insects, faunistic study, feeding habits.*

Introduction: The sunflower productions are reduced with 20 – 30% by a wide range of specific pathogen agents and pests that attack crops from sowing to harvesting (Trotuș, 2015). In wild sunflowers, pest populations may be limited by natural enemies, especially parasitoids. Often there are several parasitoid species associated with a perennial pest, but they are not sufficient to keep insects below economically damaging levels (Charlet and Seiler, 1994).

Aims: This research aimed was to survey the insects associated to sunflower in areas of Banat, as well as provide basic biological information about useful fauna and the possibilities of its protection. **Materials and Methods:** Extensive investigations were carried out in 2 localities at different altitudes in the Banat region in 2014 – 2015 periods, at monthly interval. Insects were collected with the help of sweep net method, the Barber traps method and the method of yellow adhesive traps.

Results: Samples collected in the period 2014 - 2015 include 41 species of insects belonging to the 5 orders: *Orthoptera*, *Homoptera*, *Coleoptera*, *Lepidoptera* and *Heteroptera* and 19 families. The most representative turned out to be families: *Carabidae* (23,53%) and *Curculionidae* (12,61%). The sunflower entomofauna from the Banat region were highlighted 4 trophic groups: zoophagous, mixophagous, phytophagous and coprophagous. The zoogeographical distribution analysis established that the entomofauna in this area consists of faunal elements belonging to 11 geographical groups: Cosmopolitan, Holarctic, Palearctic, Transpalearctic, Westpalearctic, Euro - Siberian, European, Euro - Asian, Euro-Mediterranean, Mediterranean, Pontic.

Conclusion: In the present research work, we demonstrated the presence in Banat region (Timis: Romania) of a rich fauna of insects, comprising a large number of taxa.

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INFLUENCE OF PHOSPHORUS AND NITROGEN ON MYCORRHIZAS IN WINTER WHEAT

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Keywords: *mycorrhiza, colonization, fertilizer, winter wheat.*

Introduction: Mycorrhizas are an evolving expression of symbiotic interaction of superior plants with soil fungi. Installation of mycorrhizal hyphae in the root cortex of wheat stimulates the appearance of an interface for transfer of nutrients in the plant. Extraradicular hyphae produced by fungi are an elaborate system of exploration in soil, with a high ability for identifying and accessing soil phosphorus.

Aims: The aim of the paper is to evaluate the potential of mineral fertilization based on NPK 15-15-15 and NPK 18-46-0 on the development of mycorrhizal systems in winter wheat. The analysis of fungal colonization parameters is a useful tool in establishing the dependency of plants towards symbiotic partners and assessment of the stability of root structure in terms of additional reserves of nutrients in the soil.

Materials and Methods: The experimental data were obtained from a crop of winter wheat (*Triticum aestivum*) on a phaeosiom argic soil type, located in Turda area at an altitude of 400 m, 46° 34' 57.5538" latitude / 23° 47' 15.7158" longitude, Cluj County. Parameters of colonization were represented by frequency, intensity, arbuscules percentage and degree of colonization in the root system.

Results: Mycorrhizal ability of wheat plant is strongly influenced by the amount of fertilizer applied. For the initial development of the root system fertilizers applied as starter plays an important role, the formula of fertilizer defining the bellow-ground development. The application of low doses of nitrogen and phosphorus acts to reduce drastically the percentage of arbuscules formed in root cortex, while reducing the efficiency of mycorrhizal symbiotic mechanism.

Conclusion: The highest values of colonization parameters were recorded in variants fertilized with phosphorus-containing greater than that of nitrogen (N18P46).

SECTION 2: ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

SOLVENT FREE MICROWAVE EXTRACTION: AN ECO-FRIENDLY AND RAPID PROCESS FOR GREEN ISOLATION OF ESSENTIAL OIL FROM LEMON GRASS

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Keywords: citral, gas chromatography - mass spectrometry, green chemistry.

Introduction. Since the Lemon grass (*Cymbopogon citratus* (DC.) Stapf) essential oil (LGEO) has been used widely as pharmaceutical, nutraceutical and antimicrobial agent in the food industry, it is necessary to find the most suitable method for the improvement of its quality. **Aims.** Solvent-free microwave extraction (SFME) is a combination of dry distillation and microwave heating, executed without added any solvent. SFME of Lemon grass oil was compared with conventional extraction, Hydrodistillation (HD), in terms of process time, yield, chemical composition and physical properties.

Materials and Methods. SFME is clearly quicker than conventional HD. An extraction time of 15 min with SFME provides yields (0.6%) comparable to those obtained after 120 min by means of HD. The chemical composition of these oils was investigated by Gas Chromatography-Mass Spectrometry and revealed the presence of 23 and 18 compounds in the essential oils obtained through HD and SFME, respectively.

Results. The main components of both oils obtained by HD and SFME were geranial (46.16-42.59%) followed by neral (31.52-29.94%) and myrcene (7.45-10.5%), respectively. Substantially higher amounts of oxygenated monoterpenes (77.73%) were present in SFME oil in comparison with HD (73.97%). This study could be considered as the first report on the chemical composition of LGEO obtained by SFME. No significant differences were obtained in the physical and chemical properties of volatile oils.

Conclusion. SFME is a green technology and appears as a promising alternative for the extraction of essential oils from natural products.

THE FOOD PRESERVATIVE POTENTIAL OF ESSENTIAL OILS: IS LEMON GRASS THE ANSWER ?

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Keywords: essential oils, food preservative, lemon grass, orangina juices

Introduction. In spite of the use of all available means of food protection, spoilage of foods is still a major problem in different parts of the world. Yeasts and filamentous fungi are widely distributed in nature and are responsible for the microbiological spoilage of an extensive range of food. Alternative sources of safe, effective and acceptable natural preservatives need to be explored, such as essential oils. Natural antimicrobials can be used alone or in combination with other novel preservation technologies to facilitate the replacement of traditional approaches in food preservation.

Aims. The objectives of this study were to determine the chemical composition of Lemon grass (*Cymbopogon citratus*) essential oil (LGEO) and to assess its antifungal effect *in vitro* and a real food system (mixed fruit juices) alone and in combination with thermal treatment.

Materials and Methods. The antifungal activity of Algerian LGEO was evaluated against several food spoiling yeasts and molds through disc diffusion and vapour diffusion methods.

Results. The chemical profile of EO, characterized through Gas Chromatography-Mass Spectrometry (GC-MS) analysis, revealed geranial (42.2%) and neral (31.5%) as major components. LGEO exhibited promising antifungal effect against *Candida albicans*, *C. tropicalis* and *Aspergillus niger*, with different inhibition zone diameters (IZD) (35–90 mm). Significantly, higher anti-*Candida* activity was observed in the vapor phase. The yeasts *C. albicans* and *C. tropicalis* were inhibited completely by the LGEO vapors at 60 µL per disc. Moreover, the zone of inhibition increased with increasing oil volume. Furthermore, the anti-yeast efficacy of LGEO oil alone and in combination with thermal treatment was evaluated in a real food system (Orangina juices). The samples treated with a combination of LGEO at 0.2% and 0.16% and thermal treatment enhanced the reduction viability. Present results established the superior performance of integrated (thermal-LGEO) treatment over the individual exposure (LGEO alone) for Orangina juice preservation.

Conclusion. Results confirmed the effectiveness of LGEO in providing an immediate and significant protection of Orangina juice to yeast proliferation.

THE PREVALENCE OF *PSEUDOMONAS AERUGINOSA* STRAINS IN INFANTS WITH CYSTIC FIBROSIS WITHIN A HOSPITAL IN NORTH EASTER OF ROMANIA

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Keywords: cystic fibrosis, prevalence, *Pseudomonas aeruginosa*

Introduction. Cystic fibrosis (CF) is the most common autosomal recessive genetic disease caused by mutation of the CFTR gene. In Romania, CF disease has an estimated a prevalence of 1 case per 2500 live births. Approximately 50% of children die in early life, so the exact number of CF patients in our country remains unknown as no national patient registry exists. This situation has limited our knowledge about the disease progression. Complicated with *P. aeruginosa* is giving long progressive diseases and often aggravates morbidity and mortality.

Aims. The aim of the study was to phenotypically frame the *P. aeruginosa* strains, according to their antibiotic susceptibility profile in order to administer more precisely the antibiotics and to avoid development of multidrug-resistant strains.

Materials and Methods. After the diagnosis of CF, the patients return to a medical control at every 3 months. The sputum samples are collected from these patients, in order to perform the bacteriological examination and the DST test. This study was performed during 1 year (01.01-31.12.2015), and all the sputum samples were cultivated on usual and on special culture media to establish more precisely the type of isolated bacteria. The confirmation was performed using the API 20 NE biochemical test and classified in resistance phenotypes according to CLSI 2015 standards.

Results. The study population was represented by 85 infants with CF, from which we isolated 364 bacterial strains. 10.16% of the total of bacterial strains were represented by *P. aeruginosa*.

Conclusion. A major problem represents the repeated antibiotic treatments, this being favourable for the emergence of resistant strains. Antibiotic resistance is currently one of the most important problems faced by clinicians. Multidrug-resistant (MDR) strains of *P. aeruginosa* were identified in this study and we highlighted that this strains limits the antimicrobial treatment and is shortening the patient's life.

ROMANIAN INTERNATIONAL TRADE IN VEGETABLES AND POTATOES – IS THE DEFICIT REVERSIBLE?

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Keywords: *extra- and intra-EU trade, vegetables and potatoes, Romania*

Introduction. Ranking 5-th in terms of area under vegetables and 3-rd in area under potatoes among the EU Member States, Romania has an important domestic vegetables and potato production. The sector shows low productivity and higher prices as compared to other EU Member States, and the producers are practically not organised. These factors contributed essentially to the preference of the international retail chains supplying the Romanian urban population to import such products.

Aims. The paper is analysing the evolution of the Romanian trade in vegetables and potatoes both with the EU and non-EU countries, in the post-accession, as compared to the pre-accession period. The analysis is performed separately for potatoes and for the main types of fresh vegetables consumed (tomatoes, cabbage, onions, peppers etc.).

Materials and Methods. Data used for the calculations were extracted from Eurostat Comext database, CN8 classification, at 2 to 8 digit levels. Romanian exports, imports, dispatches and arrivals were examined in value and quantity terms, as well as the geographical orientation of the trade flows.

Results. Although most of the Romanian vegetable production is consumed domestically, vegetables are representing about 3.5% of the total agri-food exports and imports. Exports increased after accession, from EUR 35 to 91 million (in 2006-2015). On the other hand, vegetables imports surged from EUR 75 million (in 2006) to 275 million in 2015, resulting in a fast increasing trade deficit. A quarter of the imports are tomatoes, about 10% potatoes, 7% peppers and 6% onion, garlic and edible roots (carrots, celery etc.). Imports came mostly (81%) from the EU, and only 19% from outside the EU (mainly from Turkey).

Conclusion. In the last decade, vegetables, fruit and potatoes ranked 4-th in the product groups generating the largest trade deficits, after meat, sugar and animal feed. The vegetables and potatoes sector in Romania still lacks the production efficiency and proper chain organisation in order to be able to satisfy the domestic consumption, increase its presence on the international markets, and resist to the pressure of decreasing international prices, pushed down by the Russian trade embargo against the EU and Turkey.

USING REMOTE SENSING TECHNIQUES IN ENVIRONMENTAL MANAGEMENT

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Keywords: *GIS, satellite images, remote sensing, vegetation index.*

Introduction. The Geographical Information Systems technology is used in many fields where the spatial information is very important and relevant, that means in all fields that use a system for saving, analyzing and representing the data which are processed.

Aims. The aim of this paper is using modern technology for monitoring the environment. Geographical Information System together with remote sensing have a very important role in decision process regarding the environment.

Materials and Methods. Integration of remote sensing images in a Geographical Information System which enables complex spatial analysis is a useful and modern solution for environmental management and decision-making process. Satellite images contain various information that can support environmental monitoring, images that can be analyzed and interpreted in various ways by using the Geographical Information System tools.

Results. Based on satellite images, were calculate a series of normalized differential indexes resulting from some operations with the spectral bands, meaning they are obtained based on multispectral images (with several spectral bands). Through specific operations, it is aimed to amplify spectral signatures in the band where one particular object has the highest reflectance and diminishing signature of the certain object in the band where it has the lowest reflectance. Following these transformations, resulting are normalized indexes represented in gray scale images, where pixels have new numerical values. The data obtained is no longer byte (0-255, for 8-bit images), but floating point type, ranging between -1 and 1.

Conclusion. Using remote sensing for agricultural land management has a very high potential because of fast information of high quality that can be obtained based on satellite images on vegetation cover.

PROCESSING AND USE OF SATELLITE IMAGES IN ORDER TO EXTRACT USEFUL INFORMATION IN PRECISION AGRICULTURE

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Keywords: *remote sensing, classification, resolution.*

Introduction. Image analysis methods were developed and diversified greatly in recent years due to increasing speed and accuracy in providing information regarding land cover and vegetation in urban areas.

Aims. The aim of this paper is to process satellite images for monitoring agricultural areas.

Materials and Methods. Satellite images used in this study are medium and high resolution images taken from QuickBird and SPOT systems. Based on these images, a supervised classification was performed of a very large area, having as result the land use classes. Supervised classification can be defined as the ability to group the pixels that compose the satellite image, digitally, in accordance with their real significance.

Results. Gaussian algorithm of maximum similarity (Maximum likelihood) was used, referred to in the specialty literature as maximum likelihood method or probabilistic classification, and based on the use of probability theory (function Gaussian) to compare the spectral values of each pixel in hand with statistical "fingerprint" of each area of interest. Practically, conditional probabilities were calculated of belonging to one class or another. The points in the middle of the group have a higher probability of belonging to the certain class, probability intervals (concentric isolines or contours of equal probability) being delimited graphically by izocontours expressing spectral variations within each set of training.

Conclusion. Methods based on the analysis of satellite images allow evolutionary analysis of vegetation cover and crop structured with high accuracy.

STUDIES ON AGRO-BIOLOGICAL ATTRIBUTES OF TABLE VARIETIES GROWN IN THE TARNAVE VINEYARD

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Keywords: *agrobiological attributes, ampelographic descriptors, table grapes variety*

Introduction. Table grape varieties studied (Codreanca, Istrița, Somesan, Transilvania, Cetățuia, Splendid, Victoria, Timpuriu de Pietroasa) are grown in viticultural center Blaj.

Aims. The objective of the research was carried out to highlight the attributes ampelographic, agro biological and technological basis of these grape varieties cultivated at SCDVV Blaj and their behavior in this area vineyard.

Materials and Methods. Agrobiologic and ampelographic attributes are presented in accordance with the single methodology for describing and ampelographic variety, created by the International Organization of Vine and Wine (OIV).

Results. The data obtained through the specified methodology for young and adult leaves, rope, inflorescence, are presented in the tables.

Conclusion. The results of this study will contribute to knowledge of the specific features of table varieties grown in the vineyard Tarnave, characterization, highlighting technological attributes and behavior depending on climatic conditions

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MONITORING OF BUITURI SLAG DUMP, HUNEDOARA COUNTY IN RELATION WITH ENVIRONMENTAL PROTECTION

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Keywords: *slag dump, monitoring, environmental protection.*

Introduction. Detailed analysis of appearance and relief evolution in mining areas cannot be done without mining engineering concepts. Over time, researchers around the world have responsibly been involved in this matter necessary for the development of society, also with obvious implications and repercussions over the quality of life.

Aim. The purpose of the scientific research detailed in this paper comprises in monitoring the slag dump from Buituri, Hunedoara County using space geodetic technology. Slag dump is the result of steel production activities carried out under the steel factory Arcelor Mittal Hunedoara S.A., formerly known as the steel factory Hunedoara - Siderurgica S.A.

Material and Methods. Therefore it was decided to conduct monthly topographic measurements to monitor possible dynamic changes that may appear in the context of continuous exploitation of the above mentioned slag dump.

Results. Movements and changes in the structure of the slag dump have been determined as the result of the monthly study realized upon the benchmarks installed in the perimeter of interest. **Conclusion.** Due to modernization of techniques and technologies in the field of engineering geodetic, observations of the movements of a structure are permitted using modern surveying techniques and tools.

IRON GATES NATURAL PARK - ADMINISTRATION AND MANAGEMENT

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Keywords: *administration, conservation, management plan, Natural Park, nature.*

Introduction: Iron Gates Natural Park is essential in the conservation of the natural and cultural capital because includes the most representative and significant areas of biodiversity, but also natural and cultural values. This area represents an example of harmonious cohabitation of people and nature.

Aims: The management plan is a stable frame for integration of the biodiversity conservation problems and protection of the natural and cultural environment. This approves a socio-economic development of Iron Gates Natural Park, but also is an instrument of dialog between the institutions which coordinate this area.

Materials and Methods: Iron Gates Natural Park management plan, scientific council and park administration documents, visits and observations within park

Results: Iron Gates Natural Park has a management plan approved by H.G 1043/2013. It has the status of: natural park, Natura 2000 and Ramsar site. The forest represents 65% of the total area, 98% being a state property. Dacian and Mediterranean vegetation interact, forming a complex of plant groups that constitute the sub-Mediterranean vegetation type.

Conclusion: Analiseing Iron Gates Natural Park documents, we can conclude that the park has a good administration leaded by the scientific concilis, who also achived successful European projects.

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EFFECTS OF RHIZOBACTERIA ON GROWTH AND PHOSPHORUS CONTENT OF SOYBEAN PLANTS UNDER INSOLUBLE PHOSPHATE APPLICATION

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Keywords: *Growth, insoluble phosphates, PGPR, soybean.*

Introduction: Phosphate (Pi) deficiency is a major constraint to plant productivity in many soils of the world. Natural rock phosphates and other P amendments have been recognized as valuable alternatives for P fertilizers, but nutrient efficiency of these sources is very poor.

Aims: There are strategies to increase crops production and one of them is considered the use of PGPR which could be an effective biotechnology to promote agricultural sustainability (Adesemoye and Kloepper, 2009). The following hypothesis was tested: inoculations with P solubilizing bacteria could contribute to increase plant growth and nutrient uptake under fertilization of sparingly soluble phosphates. The aim of this study was to assess the efficacy of two rhizobacteria *Burkholderia cepacia* B36 and *Enterobacter radicincitans* D5/23T combined with insoluble phosphates in soybean vegetative growth and nutrition.

Materials and Methods: The sand culture experiment was conducted under controlled conditions. The insoluble phosphate (Ca₅P₃HO₁₃) was mixed with sand at dose 200 mg per kg. Bacteria inoculation was performed by soaking the seedlings with the suspension of *Burkholderia cepacia* B36 and *Enterobacter radicincitans* D5/23T. Plants control was not treated with PGPR. Phosphorus concentrations in the samples were analyzed calorimetrically with ammonium-molybdate-vanadate.

Results: Shoots growth displayed an early positive response to inoculation than roots. The shoot growth has increased by 22-24% in comparison to control plants (without bacteria application). It was observed that individual inoculation with *B. cepacia* or *E. radicincitans* produced significant increment in total P uptake of soybean plants compared to uninoculated control. However, much more pronounced effects were found out in case of plants inoculated with both strains *B. cepacia* and *E. radicincitans*. The combined application of these rhizobacteria significantly improved nitrogen and phosphorus nutrition of soybean plants compared to control treatment.

Conclusion: In comparative study have been verified the impact of inoculation with rhizobacteria along with sparingly soluble P source on soybean growth and nutrient concentration. Combined use of both strains *B. cepacia* and *E. radicincitans* proved to be superior to their separately application on growth and nutrition of soybean plants.

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THE EFFECTS OF FERTILIZATION ON SOIL FAUNA

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Keywords: *fertilization, soil, earthworms, Collembola*

Introduction: Soil fauna presence in agricultural soil is a key factor for maintaining soil fertility and assurance of soil ecosystem services. It is now accepted that agricultural practices like tillage and pesticide use can harm soil organisms including earthworms and springtails. Other practices like the use of green manure or animal manure have been considered as being beneficial to these soil invertebrates.

Aim: The objective of the present study was to assess the influence of different fertilizers (mineral and organic) on two species of earthworms and one species of *Collembola*.

Material and Methods: A total of 56 microcosm experiments were made with two types of soils and two hydric regimes. The microcosms were amended with four types of fertilizers: ammonium nitrate, mustard as green manure, cow manure and liquid manure. One treatment remains without any fertilizer as control. All microcosms except the control were inoculated with one individual of *Lumbricus terrestris*, one individual of *Aporrectodea caliginosa* and 200 individuals of *Folsomia candida*. After 30 days of incubation we recorded changes in earthworm wet biomass and collembolan density in all treatments.

Results: During incubation period, the wet biomass of *L. terrestris* decreased in most treatments in both soils. The decrease was more apparent in mineral treatments and in dry soil. The wet biomass of *A. caliginosa* increased for most of the treatments. The increase was more evident in cow manure and mustard fertilized soils. In mineral fertilized soil *A. caliginosa* registered a decrease of wet biomass. Significant changes in *Folsomia candida* individual numbers was observed in cow manure and mustard fertilized treatments.

Conclusion: The type of fertilizers used in agricultural soils can be an important driver for soil biological community. While mineral fertilizers seem to have a detrimental impact on soil fauna, the use of cow manure and green manure showed beneficial effects in terms of biomass and density of soil invertebrates.

Acknowledgments: This work was supported by a grant of the Romanian National Authority for Science Research and Innovation, CNCS-UEFISCDI, project number PN-II-RU-TE-2014-4-2490.

SECTION 3: FOOD SCIENCE AND TECHNOLOGY

EXTRACTION OF BIOACTIVE COMPOUNDS FROM TWO GRAPE VARIETIES USING PULSED ELECTRIC FIELD

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Keywords: *flavonoids, Muscat Ottonel, Pinot Noir, pulsed electric field, polyphenols*

Introduction: The polyphenols give grapes and products derived from them many biological properties with a positive impact on human health. Polyphenols which mainly include phenolic acids, flavanols, stilbenes (resveratrol) and anthocyanins are distributed in grapes mainly in the skins and seeds. In the last years, unconventional extraction methods, known as "green" technologies (ultrasound, microwave-assisted extraction, pulsed electric field) were applied to winemaking techniques in order to increase the extraction of bioactive compounds.

Aims: In this paper objective was to investigate extraction efficiency of polyphenols with antioxidant capacity from two varieties of grapes (white-Muscat Ottonel (MO) and red-Pinot Noir (PN)) by pulsed electric field (PEF).

Materials and Methods: Grapes were declustered, crushed and divided into three parts: one treated in PEF, one homogenized and then treated with PEF and one untreated (control). The bioactive compounds like total polyphenol and total flavonoid contents were determined by the spectrophotometric method. The antioxidant capacity of the samples was determined by two methods (FRAP and DPPH).

Results: Our results show that the application of PEF to the crushed grapes increases the content in total polyphenols by 2.15 and 3.17 times and total flavonoids by 2.78 and 5.84 times for MO and PN, respectively. Also, the antioxidant capacity was significantly increased when it was compared with the control sample. When the treatment with PEF was applied on homogenized grapes both bioactive compounds and antioxidant capacity were significantly increased compared to the samples treated with PEF for crushed grapes.

Conclusion: In the present research work, we demonstrated that the application of PEF to two different grape varieties significantly increased the level of total polyphenols and flavonoids and also the antioxidant capacity. The application of PEF to homogenized grapes was more efficient.

Acknowledgement: This work was performed through the Partnerships Program in priority areas - PN II, developed with the support of MEN - UEFISCDI, project No. 170/2014 "Electromagnetic methods to improve processes wine".

OPTIFEL PERSONALIZED NUTRITIONAL CALCULATOR

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Keywords: *calculator, elderly, nutrient requirement, personalized nutrition*

Introduction: The OPTIFEL Personalised Nutritional Calculator is the only available online tool which allows to determine on a personalised level the required nutrients for elderly people (65+). It has been developed mainly to support nursing homes providing best possible (personalised) nutrient enriched food to their patients.

Aims: A food calculator for elderly people was elaborated based on the functional requirement specifications and the existing recommendations for daily allowances across Europe, data which were synthesized and used to give aims in amounts per portion. The European FP7 OPTIFEL project “*Optimised Food Products for Elderly Populations*” aims to develop innovative products based on vegetables and fruits for elderly populations to increase length of independence.

Materials and Methods: A review on nutritional needs and existing solutions was carried out including the recent published advances. Data on physical, behavioural and taste specifications for elders and put them in description using the industries’ standard tests and methods were collate. An innovative interpretation and formulation was made combining all the different fields surveyed.

Results: A calculator to get personalised recipes for elderly people was developed based on information from personalised nutritional recommendation and personalised nutrient intake. The key factors for personalised nutritional requirements are: gender, weight, height, age, activity, place of living, diseases. The software tool has been programmed around well-established measures such as Basal Metabolic Rate (BMR) and Body Mass Index (BMI).

Conclusion: The OPTIFEL Personalised Nutritional Calculator is recommended to be used by nursing homes. With the OPTIFEL calculator nursing homes can determine whether a nutritional lack existed and by how much and advice on supplementation.

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Acknowledgement: The research has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n°FP7-311754 (OPTIFEL project)

DEVELOPMENT OF AN IMPERIAL STOUT BEER RECIPE WITH A DARK CHOCOLATE FLAVOR

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Keywords: *dark chocolate, microbrewery, strong craft beer*

Introduction: Craft brewers take the standard recipes for beer making and enhance them using new techniques and ingredients that normally are not found in beers. Thus a research was started to acquire knowledge on the process of obtaining new craft beer recipes (namely an imperial stout beer with a dark chocolate flavor) to possibly further use the results for technology transfer. Russian imperial stout, is a strong dark beer that was brewed in the 18th century in London, England for export to the court of Catherine II of Russia. It is characterized by very high alcohol content, usually over 9% ABV.

Aims: This research aimed to implement a high gravity beer fermentation technology in a local microbrewery in order to obtain and test out a new beer recipe using their equipment.

Materials and methods: Production trials were performed in a microbrewery from Braseria Tătar Cluj-Napoca with a mashing boiler capacity of 50 liters. The recipe consisted in using three types of malt: Pills, CaraMunich, Carafa, and three types of hops: Goldings, Fuggle, Challenger and a batch of Wyeast 1056 American Ale yeast starter. 200g of dark chocolate with 75% cocoa were added in the final stage of the boiling process, after the hops. The beer quality parameters were measured during the entire fermentation process using a Funke Gerber Beer Analyser, according international standards. The final product was subjected to psysico-chemical analysis. The influence of the fermentation parameters on beer quality were analysed for the purpose of process optimization.

Results: The two stage mashing process was achieved in 5 hours. Problems occurred due to high quantity of malt which further led to a decrease in yield. The beer wort was fermented at 16°C for 14 days, bottled without filtration or pasteurization and kept for fermentation at 5°C for another 14 days, resulting a beer with 12% ABV.

Conclusion: A strong Imperial Stout beer with a dark chocolate finish was obtained. The beer presented a rich, strong chocolate and malt flavor, a high content of alcohol, but a lower yield due to filtration problems arising due to high malt content in wort.

DEVELOPMENT OF NEW RECIPES FOR PROBIOTIC DRINKS WITH FUNCTIONAL GASTROINTESTINAL HEALTH IMPACT

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Keywords: *health impact, irritable bowel syndrome, probiotic drink*

Introduction: Fruit and vegetable residues most commonly found in Romania were previously selected and tested in different percentages in order to obtain the first prototype probiotic drinks with functional gastrointestinal health impact designed for mass consumption. Thus apples, sugar beets, grapes and carrots were considered to have enough nutrients and characteristics to create a favorable aspect and taste. Among them, grapes are the only ones available in high quantities during autumn and less available during the other seasons.

Aims: Seasonal fruits were researched in Romanian market in order to replace one of the ingredients of the probiotic drinks in case of temporary unavailability, while maintaining the primary characteristics of the prototype drink.

Materials and Methods: Fruits were analyzed physicochemical and tested as a component in the probiotic drink following the standard technological flow but at a lower scale, replacing the grape residues. Due to the fact that the prototype drink had to have more sugars and less fibers, vegetables were not considered.

Results: Seasonal fruits were identified as follows: cherries, oranges (in spring), sour cherries, apricots (in summer), pears, plums (in autumn), oranges, pineapple (in winter). Throughout the production process testing, all of the fruits selected for their sensory properties and availability have properly behaved and were successfully introduced in seasonal probiotic drink recipes.

Conclusion: Multiple fruits were identified in order to replace one of the ingredients of the new probiotic drink in case of unavailability. Due to the fact that not all the selected fruits are currently used for processing at an industrial level but rather for direct consumption, their juices could be valorized and sold on the local market as new products, while residues could be used for probiotic drinks.

Acknowledgement: This work is a result of the research founded through Project No. 154 [PN-II-PT-PCCA-2013-4-0743]

THE FOOD PRESERVATIVE POTENTIAL OF ESSENTIAL OILS: IS LEMON GRASS THE ANSWER?

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Keywords: essential oils, food preservative, lemon grass, orangina juices, thermal treatment, yeast

Introduction: In spite of the use of all available means of food protection, spoilage of foods is still a major problem in different parts of the world. Yeasts and filamentous fungi are widely distributed in nature and are responsible for the microbiological spoilage of an extensive range of food. Alternative sources of safe, effective and acceptable natural preservatives need to be explored, such as essential oils. Natural antimicrobials can be used alone or in combination with other novel preservation technologies to facilitate the replacement of traditional approaches in food preservation.

Aims: The objectives of this study were to determine the chemical composition of Lemon grass (*Cymbopogon citratus*) essential oil (LGEO) and to assess its antifungal effect *in vitro* and a real food system (mixed fruit juices) alone and in combination with thermal treatment.

Methods: The antifungal activity of Algerian LGEO was evaluated against several food spoiling yeasts and molds through disc diffusion and vapour diffusion methods.

Results: The chemical profile of EO, characterized through Gas Chromatography-Mass Spectrometry (GC-MS) analysis, revealed geranial (42.2%) and neral (31.5%) as major components.

LGEO exhibited promising antifungal effect against *Candida albicans*, *C. tropicalis* and *Aspergillus niger*, with different inhibition zone diameters (IZD) (35–90 mm). Significantly, higher anti-*Candida* activity was observed in the vapor phase. The yeasts *C. albicans* and *C. tropicalis* were inhibited completely by the LGEO vapors at 60 µL per disc. Moreover, the zone of inhibition increased with increasing oil volume.

Furthermore, the anti-yeast efficacy of LGEO oil alone and in combination with thermal treatment was evaluated in a real food system (Orangina juices). The samples treated with a combination of LGEO at 0.2% and 0.16% and thermal treatment enhanced the reduction viability. Present results established the superior performance of integrated (thermal-LGEO) treatment over the individual exposure (LGEO alone) for Orangina juice preservation.

Conclusion: Results confirmed the effectiveness of LGEO in providing an immediate and significant protection of Orangina juice to yeast proliferation.

THE INFLUENCE OF STORAGE IN CONTROLLATED ATMOSPHERE ON QUALITY INDICATORS OF THREE APPLE VARIETIES

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Keywords: *apple, controlled atmosphere, storage*

Introduction: Fresh fruit is one of the indispensable components of rational nutrition of human (Oltenacu et al., 2015). Texture is one of the most important quality criteria of apple fruits characterized by multiple attributes such as firmness, juiciness, crunchiness or mealiness (Delairea et al., 2015).

Aims: The purpose of this study, was to observe the correlation fruit quality of 3 apple varieties, in 2 rooms with different controlled atmosphere, during 8 months of monitoring. Also it was observed which varieties present better quality in this period.

Materials and Methods: For this purpose three varieties of winter apple with red peel like Topaz, Redix and Florina were analysed parameters: dry matter content, acidity, soluble-solids and firmness during eight months. These were stored in controlled atmosphere with different parameters. Room 1 has the parameters: T: 1°C, O₂: 1,5%, CO₂: 3%, H: 90% and Room 2 has the parameters: T: 5°C, O₂: 2%, CO₂: 2%, H: 90%.

Results: During the eight months of storage, it was observed that the same variety presented differences between storage rooms. Thus, all three varieties present better firmness in the Room 1 comparative with Room 2. But towards the end of the storage time in Room 1 was noticed that some apples have cracked and in Room 2 was observed dehydration for a few apples. In the end was registered notable differences between soluble-solids values and acidity of apples.

Conclusion: Apples in Topaz and Florina varieties have kept quality indicators better than apples of the variety Redix for the two storage conditions. Room 1 has parameters best suited to the requirements necessary for keeping the apple varieties.

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PHYSICO-CHEMICAL PROPERTIES OF COMPOSITE FLOUR FROM THE 650 WHEAT FLOUR TYPE AND DIFFERENT PULSES AND OILSEEDS FROM ROMANIA COUNTRY

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Keywords: *composite flour, oilseed flour, pulse flour, physical-chemical composition*

Introduction: Given the global population growth and therefore the increase for food requirements, more and more studies are needed for finding new sources which can ensure a healthy diet. The pulses and oilseeds may be used in different doses in the bakery products due to their high nutritional content. From a chemical point of view, pulses are characterized by a high level of proteins (18-40%), carbohydrates, from which starch is the main component. Oilseeds contain, instead of carbohydrates, fat (~20%) which can have beneficial effects in bread making.

Aims: The physical-chemical properties of composite flour (moisture, ash, acidity, protein content, fat content, alpha-amylase activity) from the 650 wheat flour type and peas flour, rapeseed flour, yellow and brown flaxseed flour, tomato seeds flour, pumpkin seeds, and yellow mustard seeds in different levels 5%, 10%, 15% and 20% were analyzed.

Materials and Methods: The physical-chemical analyses of the composite flours were analyzed as follows: moisture content by oven drying method (SR EN ISO 712:2010), protein content by Kjeldahl's method (SR EN ISO 20483:2014), fat content by Soxhlet method (SR ISO 7302:2002), ash by dry ashing (SR EN ISO 2171:2010), acidity according to SR 90:2007 and alpha-amylase activity by Falling Number method according to SR EN ISO 3093:2010.

Results: The moisture content, fat, protein, acidity, ash and amylase activity of the composites were as follows: 12.20÷13.79%, 1.62-10.48%, 12.57-16.47%, 2.04÷7.12, 0.73÷1.61% and 301÷558 s compared with wheat flour 13.9%, 1.7%, 12.2%, 2.1, 0.65%, 325 s respectively.

Conclusion: The lowest protein content was for the wheat flour with 5% brown flaxseed addition, for the lipid content for 20% pea flour addition, for ash content for 5% pea flour addition and for moisture content for 20% pumpkin flour addition. The highest alpha-amylase activity was for 20% rapeseed flour addition which improved the alpha amylase activity of the wheat flour and the lowest value for wheat flour with 20% brown flaxseed addition.

Acknowledgment: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0214.

ALTERNATIVE AND SUSTAINABLE FOOD SUPPLY SYSTEMS: COMMUNITY SUPPORTED AGRICULTURE (CSA) IN ROMANIA

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Keywords: *alternative food networks, CSA, community supported agriculture, food supply systems, local food*

Introduction: Community Supported Agriculture (CSA) partnerships are alternative short food supply chains, based on direct relations between consumers and small local producers. The flexible concept of CSA describes a connection between consumer and farmer, an alternative system of distribution based on community values and solidarity [1].

Aims: The aim of the present work was to present the purpose of CSA systems using the data provided by the Asociația pentru Susținerea Agriculturii Țărănești (ASAT) from Romania [2].

Materials and Methods: The research method for this study has been a multiple case study of CSA partnerships in Romania, carried out since 2008 to 2015. All the actors involved in the networks were included in our research, producers, consumers and their locations. ASAT solidarity partnerships have been developed in a pilot phase in Timisoara between 2008 and 2011. After the pilot phase of the model and its adaptation to the Romanian context, from 2013 other partnerships were developed in Arad, Bucharest, Cluj-Napoca, Oradea and Odorheiu-Secuiesc and Sibiu.

Results: The number of partnerships has grown from 1 in 2008 to 10 in 2015. More than 1000 consumers are involved and benefit from the support to develop ASAT partnerships and relations of solidarity and social justice.

Conclusion: In the present study, we demonstrated that CSA system can be an innovative solution for food supply systems for small groups, but future studies are necessary to demonstrate if this system is sustainable for a larger number of farmers-consumers. The educational and pedagogical role this development model plays within the society complements its economic importance. ASAT solidarity partnerships were developed as a tool for fighting poverty, supporting CRIES Association and ASAT small producers who are facing social and economic problems.

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STUDY REGARDING THE USE OF *SALVIA OFFICINALIS* ESSENTIAL OIL IN FOOD PRODUCTS WITH A HIGH FAT CONTENT (MAYONNAISE)

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Keywords: essential oil, mayonnaise, *Salvia officinalis*.

Introduction: Antioxidants prevent the reaction of free radicals with biomolecules thus protecting the nutritional values and physiological properties of foodstuffs. Nowadays there is an increasing trend among food technologists to replace the synthetic antioxidants with the natural ones (Rasmy et al., 2012). *Salvia officinalis* is one of the most widespread herbal species used in the area of human health and in the food-processing industry. Sage and its extracts are known to be a rich source of antioxidants (Jantova et al., 2014).

Aims: The aim of the present study was to assess the addition of *Salvia officinalis* essential oil and its impact on the physicochemical characteristics on homemade mayonnaise.

Materials and Methods: The sage leaves were collected in June 2015 from the green-house of Phytotechny Department of UASVM. The essential oil was extracted by hydro-distillation. Mayonnaise was prepared from fresh whole egg, oil, salt, mustard, white pepper, vinegar, lemon juice (blank sample). Three mayonnaise samples were prepared in the same way and sage essential oil was added in 2 µl/g, 4 µl/g, 8 µl/g. For comparison, BHT (synthetic antioxidant) was added only to the control sample. The samples were monitored for 4 months in order to highlight possible physicochemical changes, by determining the peroxide value, the free fatty acids content and pH.

Results: The initial pH value of the all samples was 4.69 and was relatively constant during storage. The peroxide values and the free fatty acids content for all samples increased during the storage period but the results obtained for the mayonnaise with sage essential oil were comparable with those for the control sample.

Conclusion: The study demonstrated that the mayonnaise samples in which the sage essential oil was added retained their integrity throughout the storage period. *Salvia officinalis* essential oil could be useful to control the development of rancidity and to maintain the quality and extend the shelf life of mayonnaise our other food products with high fat content.

Acknowledgments: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCSIS–UEFISCDI, project number PN-II-RU-TE-2014-4-0842.

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CHEMICAL CHARACTERIZATION OF RED BERRY JAMS: ANTHOCYANINS AND RADICAL-SCAVENGING ACTIVITY

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Keywords: *anthocyanins, antioxidant activity, berries, HPLC*

Introduction: Red berry are an important source of bioactive compounds (especially anthocyanins) which have positive health benefits. Moreover, red berries (chokeberry, blueberry, blackcurrant, elderberry, raspberry or cranberry) are a widely consumed fresh or in processed forms (jams, juices, syrups or jellies). Due to the fact that fresh berry consumption is not always possible, their selection to produce jam should be a good option using low temperature, friendly non-destructible methods.

Aims: The study offers an overview on anthocyanin composition of 5 commercial available berries jams and also their antioxidant activity.

Materials and Methods: Commercial available berries jams were purchased from local market having a medium price range (blueberry, blackcurrant, blackberry, cranberries and raspberries). The analyzed samples, 5g each were grounded using an ultraturax (Miccra D-9 KT Digitronic, Germany) then were homogenized and weighed, followed by addition of 10 mL of methanol containing HCl 0.3 % (v/v). The obtained mixture was shaken during 20 min on a magnetic stirrer in the darkness. The extraction process was repeated till the samples were colorless. The extracts were concentrated at 35°C under reduced pressure (Rotavapor R-124, Buchi, Switzerland) and filtered through 0.45 µm Millipore filter for HPLC and antioxidant assays.

Results: The obtained results showed that, anthocyanins are still available after thermal processing. The analysed samples were characterised by the presence of glycosylated and also acylated anthocyanins. From all analysed samples, blackcurrant jam was found to have the highest anthocyanins content while the presence of anthocyanins in raspberry jam was the lowest one. Moreover all samples have showed to exhibit antioxidant potential by ABTS assay.

Conclusion: As conclusion, our study clearly demonstrates that commercial available jams are a rich source of anthocyanins and also exhibit antioxidant potential.

Acknowledgments. This work was supported by UEFISCDI National Project PN-II-RUTE-2014-4-0944, 16/01.10.2015.

DEVELOPMENT AND ANALYSIS OF QUALITY PARAMETERS OF AN INNOVATIVE FUNCTIONAL JUICE

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Keywords: *antioxidant activity, bioactive compounds, nitrates, traceability, vitamins.*

Introduction: Nowadays, the functional products represent a sustainable trend in food industry due to the beneficial effects that they have on the human body as well as due to the increased interest of people for a healthy and balanced lifestyle.

Aims: Due to the increasing interest in vegetables health benefits, the aim of the present study was to develop and optimize a pumpkin and apple functional juice, respectively to accomplish the quality control in terms of its physicochemical and sensorial properties.

Materials and Methods: The raw materials, pumpkin (*Cucurbita* spp) and apples (Golden Delicious), were purchased from local supermarkets (Cluj-Napoca, Romania) and the reagents from Sigma Aldrich or Merck (Darmstadt, Germany). Two variants of juice were made in which the proportion of pumpkin-apple varied in a ratio of 1:1 and 1:2. Physicochemical determinations were made both on raw materials and finished products in order to achieve the traceability of some compounds of interest. Thus, the monitored parameters were: antioxidant activity (spectrophotometric method), content of nitrites and nitrates (according to Griess reaction), vitamin C and acidity (titrimetric method) and dry matter (refractometric method).

Results: The highest levels of vitamin C occurred in pumpkin (26.64 mg/100g) and implicitly in the juice obtained in the ratio of 1:1 (12.32 mg/100 ml) which also presented the highest antioxidant activity (10.98%). Instead, juices dry matter was higher in 1:2 prototype (10.1 °Brix) because in this case the apples contain less moisture (81.82%) than pumpkin (91.81%). The nitrates content was at very low level in all the analyzed sampled, with values between 24.7-41.2 mg/kg for apple and pumpkin, respectively between 28.41-30.94 mg/kg for 1:2 and 1:1 juices.

Conclusion: The preliminary studies performed on the new developed products revealed that both raw materials and obtained functional juices meet the quality requirements specified by the standard admissibility criteria. Consumers also were impressed by sensorial and nutritional properties of the new product, positively appreciating both variants of juice.

MATHEMATICAL MODEL TO CALCULATE THE ENERGY AND PROTEIN REQUIREMENT FOR SHEEP

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Keywords: *diet balancing, feeding norms, mathematical modelling.*

Introduction: Feeding norms assessment for animals is a dynamic process related both to the continuous process of improving animal capacity to ingest and use the forage, and to the exogenous factors other than the type of forage, the technology of forage processing and preserving, the exploitation technology in general. A major element concerns diet balancing in energy and nitrogen matter. Each forage will therefore be characterized by two potential values as digestible protein, which ensures diet balancing with non-protein matter if fermentable organic matter predominates in one of the forages. This manner of expressing the potential dietary protein level avoids the waste of energy, when the dietary nitrogen level is not high enough, and the waste of nitrogen, when dietary energy level is too low.

Aims: To put mathematical language, by simulations and optimizations these models are effective instruments of decision orienting bearing positive consequences both on the biologic and economic plans.

Materials and Methods: Experimental data and mathematical special programs.

Results: These novel elements outlined by the most recent investigations in the physiology of nutrition are presented by mathematical modelling of energy and protein metabolism with the purpose of optimizing diet formulations according to production requirements, providing thus the possibility to develop strategies for an efficient animal production under specific soil, climacteric and socio-economic conditions. Optimizing diet formulations according to production requirements and providing thus the possibility to develop strategies for an efficient animal production.

Conclusion: In the present research work, we improved the methods of feeding animals. As a conclusion, the model allows us to calculate the energy and protein requirement starting from easily determined input variables (weight gain, age in days). An argument would be absolutely necessary balance between the demands imposed by the mathematical methods on the models, and the changes the mathematic methods suffer in order to adapt to the type and goal of the models.

INORGANIC IONS AND METAL CONTENTS IN SELECTED MINERAL WATERS AVAILABLE ON POLISH AND ROMANIAN MARKETS

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Keywords: *anions, cations, ion chromatography, metals, mineral waters*

Introduction: Water has vital importance for the human organism as it participates in the transportation of nutrients into cells and tissues. It is delivered not only by consuming various beverages, such as coffee or tea, or eating different dishes, but also by drinking bottled water, commonly called “mineral” (Astel *et al.*, (2014).

Aims: The aims of the study were to characterize bottled water brands commercially available in Poland and Romania for major and trace components; check compliance with respect to national and international guidelines for the occurrence of harmful components in analyzed water; compare the accuracy of the mass concentration of soluble compounds mentioned on the labels of the various brands of bottled water available on both markets.

Materials and Methods: Several dozens of different brands of sparkling and still mineral bottled water from Poland and Romania were analyzed by ion chromatography and microwave plasma-atomic emission spectrometry methods. Analytes were: major inorganic ions (F^- , Cl^- , NO_3^- , PO_4^{3-} , SO_4^{2-} , Na^+ , K^+ , Mg^{2+} and Ca^{2+}) and trace metals (Li, Rb, Sr, Ba, Cr, Mn, Fe, Ni, Cu, Zn, Cd, Al, Pb).

Results: Declared by producers concentration of selected ions was noted from the labels. In many cases the mean level of determined analytes was different than the mean concentration of these elements declared by the manufacturer. In the vast majority tested mineral water available on the Polish and Romanian markets, are compliant with hygiene normative.

Conclusion: Mineral water makes an important source of minerals for the human organism. Its consumption has been systematically rising, even though not all the types have appropriate health properties. Therefore, the quality of drinking bottled water has to be controlled systematically.

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QUALITY EVALUATION OF BREAD SUPPLEMENTED WITH MILLET(*PANICUM MILIACEUM*L.) FLOUR

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Keywords: *bread quality, chemical composition, Panicum miliaceum L.*

Introduction: Millets represent a diverse group of plants from the species *Sorghum*, *Panicum*, *Setaria*, *Pennisetum*, *Paspalum*, or *Eleusine*. Of these plants, millet (*Panicum miliaceum* L.) is the only species, which is used on a larger scale for food consumption and offer a range of health benefits to the consumer (Regine *et al.*, 2013). Millet is rich in protein, fiber, mineral (iron, calcium, phosphorus) and vitamin content (Amir *et al.*, 2015).

Aims: This study was conducted to assess the acceptability of wheat bread produced by addition of millet flour in varying proportions (10%, 20% and 30%). Bread produced from 100% wheat flour served as the control.

Materials and Methods: The raw materials were purchased from specialized stores. The final breads were submitted to the physico-chemical and sensorial exams. The quality characteristics (volume, crumb porosity, elasticity, protein and moisture) were determined according to STAS 91-2007.

Results: Millet flour in combination with the wheat flour, improves the quality of the final breads. By comparison to the control bread, higher porosity and protein content, better texture and taste were identified. Up to now bakery products from millet are only scarcely found on the Northern market, although the consumption of (whole meal) millet offers several health benefits (increased content of protein or dietary fiber, blood cholesterol lowering and anti-carcinogenic properties, etc.). (Regine *et al.*, 2013). Bread produced from millet and wheat flour would be a valuable contribution for a healthy diet.

Conclusion: In the present research work, it was demonstrated that it can improve the quality of bread by adding millet flour in proportion of 30% at the same time improving the sensory properties.

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MINERALS CONTENTS OF SOME PULSES AND OILSEEDS

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Keywords: mineral elements, oilseeds, pulses

Introduction: The minerals elements content from the materials of vegetable origin are characteristic for each species type and varied function on pedoclimatic factors, culture technologies. Minerals represented the food constituents absolutely necessary for life contributing to a normal vital activity and a body development and can be classified in macroelements and microelements. There are of essential importance in the diet, even though they comprise only 4–6% of the human body. An adequate knowledge of the minerals elements content from food is vital to the health, well-being and safety of the consumer. Even nowadays, deficiencies of calcium, magnesium, copper, iron, zinc, can lead to abnormal development and at several diseases. The growing consumption of pulses and oilseeds on the basis of its nutritional properties and beneficial effects impose an evaluation of the mineral elements presence.

Aims: The macro and microelement from some pulses and oilseeds such as: peas, rapeseed, tomato seeds, yellow and brown flaxseed, pumpkin seeds and mustard seeds were analyzed.

Materials and methods: The mineral elements analysis was performed using an Agilent Technologies 7500 Series system coupled plasma-mass spectrometer. The spectrometric method (ICP-MS) allows the simultaneous determination of the mineral elements content after a prior acid mineralization of the sample. For each sample the following minerals were determined: *Na*, *Ca*, *Mg*, *Fe*, *Zn*, *Mn*, *Cu*, *Pb*, *Co*, *Cr*, *Ni*, *Se*, and *V* in duplicate.

Results: The higher amounts of *Ca*, *Na* were recorded for the yellow flaxseed and for the tomato seeds, while it is found in lower amounts in the pumpkin. *Mg* is present in higher amounts than *Ca* in all the oilseeds and pulses analyzed. *Fe* and *Mn* are presented in high amount in the tomato seed, while *Zn* is present in high amounts in tomato seed and in pumpkin seed. *Co* is present in the highest amounts in the pea seed. Significant amounts of *Cr* were found in the tomato seed, yellow flaxseed and mustard seed, while *Ni* was found in low amounts in pumpkin seed, brown flaxseed and mustard seeds. *Se* was found in the highest amounts in the mustard seed, pea, pumpkin and yellow flaxseed. *V* was presented in high amount in the tomato seed and in the mustard seed. *Cu* is present in low amounts in the brown flaxseed, rapeseed and mustard seeds.

Conclusion: *Na* is the element present in higher amount in all types of seeds. All the pulses and oilseeds samples presented with few exceptions higher values for the mineral elements analyzed. *Pb*, a metal with a toxic character was present only in low amounts in the mustard seed.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0214.

ANTIOXIDANT ACTIVITY OF SOME DRIED FRUITS FROM THE ROMANIAN MARKET

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Keywords: *antioxidant activity, dried fruits, polyphenol, vitamin C.*

Introduction: In recent years it has become evident that free radicals and reactive oxygen species affect DNA structure and cell membranes and thus induce various forms of cancer, appearance of aging and various diseases. Dried fruits provide many antioxidants and others health protective compounds (Miletić *et al.* 2014; Sharma *et al.* 2014).

Aims: This paper aims to analyze the antioxidant activity of some dried fruits from Romanian market (goji berries, chokeberries, cranberries, apricots) and relationship with their content in certain antioxidant compounds: polyphenols, ascorbic acid and carotenoids.

Materials and methods: Antioxidant activity of the dried fruits was determined by CUPRAC method and total polyphenols by Folin-Ciocalteu assay. Ascorbic acid content of the samples was carried out by the method with 2,6 diclorophenolindophenol and carotenoids were determined spectrophotometrically.

Results: Dried goji fruit had the highest concentration of vitamin C, about twice more than the dehydrated fruits of chokeberries. Goji berries showed a very high concentrations of carotenoids, about nine times higher than in chokeberries, 12 times higher than in apricot and 65 times higher than in cranberries. Regarding the content of polyphenols, the highest concentration was found in the chokeberries, followed by the apricots and goji. The best value of antioxidant activity was found for goji berries, followed by chokeberries.

Conclusion: Among all analyzed dried fruits, goji berries have the highest antioxidant activity which is in direct correlation with the concentration of carotenoids and vitamin C. In the case of chokeberries, high antioxidant activity is related primarily to the fact that they have the highest polyphenols content.

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HEAVY METAL UPTAKE FROM SOIL BY *LACTUCA SATIVA* L.

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Keywords: *cadmium, contamination, heavy metals, lead, lettuce*

Introduction: Heavy metals have a known toxic potential to all living organisms, each one being hazardous outside a certain range of concentrations (Jarup, 2003). Leafy vegetables (lettuce, parsley, dill, etc.) were recorded with higher contents of heavy metals than the normal ones when cultivated in contaminated locations.

Aims: The major objective of the present research was to establish the degree of contamination with heavy metals for lettuce and to explore the correlation between plant contamination and soil contamination.

Materials and Methods: Lettuce samples were subjected to microwave-assisted digestion, then lead, cadmium, copper and zinc were determined using a double beam spectrophotometer Shimadzu AA-6300 equipped with an ASC-6100F autosampler, a flame atomizer, a graphite furnace, a deuterium lamp for background correction and hollow cathode lamps for each of the studied elements. The determination of heavy metals were accomplished according to SR ISO 8288: 2001 and SR EN 14083: 2003, each with modifications for suitability to the analyzed matrix type.

Results: The recorded concentrations for heavy metals showed maximum values for the average concentrations of the four heavy metals originating from a site with historical pollution (Șeica Mare): 1.27 µg/ kg Pb, 0.09 µg/ kg Cd, 2.71 mg/ kg Cu and 6.39 mg/ kg Zn. For other two considered locations cadmium concentrations were under the detection limit, while for lead, copper and zinc there were no significant differences.

Conclusion: The obtained results revealed a moderate contamination of lettuce with heavy metals, the main contributors being soil pollution and traffic. The contamination with heavy metals of lettuce originating from Șeica Mare is a proof of lead, cadmium, copper and zinc persistence in soil.

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SYNCHRONOUS ALCOHOLIC FERMENTATION OF TWO DIFFERENT ORIGIN SUBSTRATES WITH APPLICATION IN BEVERAGE INDUSTRY

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Keywords: *beer, grape, synchronous alcoholic fermentation*

Introduction: Beer had since ancient times an important role in the world's civilization. Nowadays, is consumed for its sensory, but especially as a reason for social interaction. In addition, recent studies showed the benefits of beer moderate consumption on health. Beer is a low-alcohol beverage and also present many nutritional properties outlined by its nutritional content rich in vitamins, minerals and antioxidants that come from the raw material (malt and hop). Wishing to attract as many niches of consumers, brewers tend to produce every year new and innovative beers.

Aims: The purpose of this study was to develop the technology for an innovative special beer, which as of our knowledge, at the present moment, there is no such product on the market.

Materials and Methods: The synchronous alcoholic fermentation of two different origin substrates was monitored and their composition was assessed in order to obtain beverage with superior sensory properties. Technological process was developed in the Winery Pilot Station of the UASVM Cluj-Napoca. Special beer was obtained by alcoholic fermentation of hopped dark wort with grape must from the autochthonous Feteasca neagra and Feteasca regala grapes variety, respectively. Second fermentation process was followed by the maturation (3 weeks at 5°C) in order to harmonize sensory qualities. The entire process was monitored considering fermentation and final product physicochemical parameters.

Results: The optimized ratio of the two fermentation substrates was of 2.5:3 on primary raw materials – beer wort and grapes must. The process was monitored on optimizing the fermentation process. The best fermentation yield was obtained when lower fermentation extracts were used.

Conclusion: The result was an innovative beverage, which still maintained the beer's character, slightly bitter, but gave specific and subtle nuances of grapes. This study demonstrated that the simultaneous fermentation of the two substrates with different glucidic origin may proceed under controlled conditions and may be carried out so as to obtain the desired fermentation products.

FACTORS INFLUENCING THE CHARACTERISTICS OF FRUIT BRANDIES AFTER RAPID INDUCTION OF AGEING CHARACTER

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Keywords: *ageing, fruit brandy, toasting, Transylvania, wooden chips*

Introduction: Research on rapid induction of ageing character to double distilled traditional fruit brandies, from Transylvania region was conducted. Various types of wooden chips: oak, acacia, beech, mulberry tree and chestnut were used as an alternative to traditional ageing in wooden barrels. Traditional ageing process is expensive and require longer period. Thus, for reducing the prices and the ageing period, as an alternative to barrel ageing, is using of wooden chips.

Aims: The aim of this study was to highlight that during ageing process, the chemical composition of fruit brandies varies both depending on the type of the wood used and the transformations occurring during the heat treatment.

Materials and Methods: The evaluation of the brandies consisted in analyzing the alcohol concentration, total acidity, ester contents, total dry extract and the phenolic compounds after two months of ageing with wood chips.

Results: The results were compared with a control sample (unaged distillate), and found that during the ageing process volatile and non-volatile compounds were extracted, and these compounds were coming from the wood. The heat treatment influences the chemical composition of the wooden chips.

Conclusion: Phenolic compounds change their chemical structure during roasting, and due to the Maillard reaction, volatile and non-volatile compounds were formed, which changed the color of the aged brandies, into a more pleasant one. The chemical composition of finished products varied due to the composition of the wooden chips used and to the heat treatment applied. Studies included the optimisation process of roasting by different controlled temperatures for chestnut, acacia, mulberry, oak and beech wooden chips. Evaluation of volatile and non-volatile compounds formed was carried out by comparison with the samples of the distillate with heat untreated wooden chips. It was demonstrated the improvement of physicochemical characteristics and polyphenolic compounds content, by rapidly inducing of the ageing character.

NEW USES OF HAWTHORN FRUITS IN TONIC WINES TECHNOLOGY

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Keywords: *antioxidant capacity, polyphenol, tonic wines*

Introduction: Tonic wines are true natural elixirs, having the property to fortify the organism. To achieve a complex product and to supplement the antioxidant properties of the wine, were added the hawthorn fruits, which completed the product by maceration, so that the tonic wine got major active substances which have great medicinal value and are very effective in treating cardiovascular diseases.

Aims: The aim of the paper was to obtain a complex product, rich in biologically active principles, at a low cost.

Materials and Methods: To obtain the tonic wine, semi-dry red wine, hawthorn fruit harvested from the spontaneous flora, rosemary, lemon zest, and locust honey were used. The antioxidant capacity was determined from wine and tonic wines by assessing free radical scavenging effect over 1,1-diphenyl 1-2-picrylhydrazyl (DPPH) radical. Determination of total polyphenols using Folin-Ciocalteu method, determination of alcoholic concentration, determination of total acidity, determination of total dry extract and determination relative density.

Results: The content of polyphenols of tonic wine is about 6 times higher than in simple wine, the hawthorn representing a product rich in polyphenols (510.2 mgGAE/100g). Antioxidant capacity increases when hawthorn fruits are added, as they have an important contribution in terms of new product antioxidant properties. Hawthorn, locust honey and rosemary add extra minerals in the total dry extract. The relative density is increased due to the substances present in hawthorn; the concentration of alcohol due to the fermentation which triggers during maceration also increases, and the acidity of tonic wine is higher compared to the simple wine. Higher acidity also contributes to the palatability, giving the wine a pleasant refreshing taste.

Conclusion: A new recipe was created, more precisely, a complex product with high antioxidant capacity, rich in beneficial active substances – the tonic wine with hawthorn.

THE EFFECT OF PROCESSING ON THE ANTIOXIDANT COMPOUNDS OF CACTUS JAM

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Keywords: *antioxidant capacity, polyphenols, red pitaya*

Introduction: Current development trends of the food industry are represented by exploiting by-products with high aspect of compounds useful to the human body. Cactus fruit, called Red Pitaya, or dragon fruit is a species of Cactaceae family, now spreading throughout the world for its fruit, especially in Asian countries such as Vietnam, Taiwan, Malaysia, and the Philippines (Lim *et al.*, 2010). Cactus fruit brings a high supplement of biologically active compounds, such as fiber, potassium, antioxidants, polyphenol, flavonoids.

Aims: The main purpose of this study was to obtain a functional jam from cactus fruits (*Hylocereus undatus*), fortified with eggs shell calcium.

Materials and Methods: The cactus fruits and seeds, as well as the jam were biochemically assessed: determination of total polyphenols using Folin-Ciocalteu method, the antioxidant capacity was determined by assessing free radical scavenging effect over 1,1-diphenyl 1-2-picrylhydrazyl (DPPH) radical, determination of soluble solids – refractometry, moisture determination, acidity, pH and ash determinations.

Results: Following the analysis, the highest content of total polyphenols was recorded for cactus seeds (165,25 mg GAE/100g) followed by the cactus fruits (54.69 mg GAE/100g), and the finished product. The functional jam had a total polyphenols content of 56,98 mg GAE/100g. The antioxidant capacity was also higher in the cactus seeds - 56.408% DPPH/mg; the cactus fruit had an antioxidant capacity of 14.201% DPPH/mg, and the functional jam product had an antioxidant capacity of 11.535% DPPH/mg. The content of soluble solids, acidity, pH, moisture and mineral content were within the standard values for the jam type products.

Conclusion: The finished product obtained was rich in biologically active substances and minerals beneficial to human health.

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PROBING THE ABILITY OF BOVINE β -LACTOGLOBULIN TO BINDS ANTHOCYANINS FROM SOUR CHERRIES EXTRACT BY QUENCHING EXPERIMENTS

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Keywords: *anthocyanins, β -lactoglobulin, fluorescence, quenching*

Introduction: Sour cherries are an important source of anthocyanins which can be used as bioactive ingredients. However, these molecules are unstable and the stabilization for use in industrial purposes could be aided using microencapsulation technologies. β -Lactoglobulin (β -LG) has high affinity to small hydrophobic ligands and can be used for encapsulation.

Aims: The aim of our study was to investigate the interaction between anthocyanins from sour cherries (AE) extract and heat treated bovine β -LG based on quenching experiments.

Materials and Methods: The extraction of anthocyanins from freeze-dried sour cherries skin was performed according to Turturică et al. (2016).

Quenching experiments 100 μ L of thermally treated protein solution (25 to 100°C for 15 minutes) was suspended in 2.5 mL of 20 mM Tris buffer at pH 7.5 and titrated by successive addition of AE. The Stern-Volmer constants were calculated as reported by Dumitrașcu et al. (2016).

Results: The fluorescence of the protein was significantly quenched with increasing the ligand concentration, with a maximum reached at 80°C. The Stern Volmer constant varied from $0.46 \cdot 0.09 \times 10^{-15}$ L mol⁻¹ at 25°C to $0.59 \cdot 0.15 \times 10^{-15}$ at 80°C, suggesting Trp exposure at higher temperatures. The binding constant (K_b) values and the number of binding sites (n) at different temperatures were derived. The n values increase with increasing temperature from 0.60 ± 0.11 to 0.88 ± 0.03 , indicating the increase of β -LG affinity for AE with increasing the temperature.

Conclusion: The results are expected to deliver important details when designing new applications with functional ingredients.

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Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS-UEFISCDI, project number PN-II-RU-TE-2014-4-0115.

GOLD NANOPARTICLES ENCAPSULATED IN A POLYMERIC MATRIX OF SODIUM ALGINATE

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Keywords: FTIR, gold nanoparticles, microcapsules, Raman spectroscopy, UV-Vis

Introduction: Plasmonic nanoparticles can be used as building blocks for the design of multifunctional systems based on polymeric capsules. The use of functionalised particles in therapeutics and imaging and understanding their effect on the cell functions are among the current challenges in nanobiotechnology and nanomedicine.

Aims: The aim of the study was to manufacture and characterize polymeric microstructures by encapsulating plasmonic gold nanoparticles in biocompatible matrix of sodium alginate.

Materials and Methods: The gold nanoparticles were obtained by reduction of tetrachloroauric acid. Encapsulation in sodium alginate matrix was carried out using the Multinozzle Biotech Encapsulator. To characterize the microcapsules, UV-Vis, FTIR and Raman spectroscopy, optical and confocal microscopy experiments were performed. *In vitro* cytotoxicity tests on A549 were also performed.

Results: The disappearance of the UV-Vis plasmonic band of gold nanoparticles upon embedding in sodium alginate demonstrates successful encapsulation. Characteristic vibrational peaks of alginate present in the FTIR and Raman spectra show the presence of alginate shell. The capsules have spherical shape and 120 µm diameter. The presence of encapsulated gold nanoparticles is also shown by confocal microscopy. For these experiments the nanoparticles were labelled with a fluorophore, rhodamine 6G. *In vitro* tests show that the microcapsules are not cytotoxic upon 24 h of cells exposure to microcapsules concentrations ranging from 1 to 10 capsules per cell.

Conclusion: Spherically shaped, 120 µm microcapsules of sodium alginate loaded with gold nanoparticles were obtained, that could potentially be considered as release systems for biologically relevant molecules.

Acknowledgements: We thank the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, for funding through project number PN-II-RU-TE-2014-4-2211.

DEVELOPMENT OF GLUTEN FREE COOKIES FROM RICE AND COCONUT FLOUR BLENDS

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Keywords: *coconut flour, cookies, gluten-free*

Introduction: Coconut flour is obtained from coconut residue taken after the extraction of the coconut milk. Coconut flour is a good source of dietary fiber and can be added to bakery products. It's characterised by high functionality due to properties such as: prevention of chronic diseases, e.g. diabetes mellitus, cardiovascular diseases (CVD) and colon cancer (Trinidad *et al.*, 2004).

Aims: This study aims to assess the addition of rice and coconut flour blends on cookies formulation, composition and acceptability.

Materials and Methods: The ratios between coconut flour (CF): rice flour (RF) were 100:0, 50:50, 30:70; other ingredients used were maple syrup, butter, egg powder, ammonium bicarbonate, sodium bicarbonate. The raw materials were purchased from specialized stores. Moisture, ash, fat, protein, total carbohydrates of cookies were determined by AACC methods, while sensorial evaluation was carried out using a 9 points hedonic test.

Results: Measurements performed in this study revealed that blends of rice and coconut flour can be successfully incorporated into gluten free cookies, resulting in products with pleasant flavor, and taste. Blending coconut and rice flour at different proportions led to cookies with enhanced protein, ash and fat content. Total carbohydrates content varied slightly with the increased addition of coconut flour.

Conclusion: The obtained results indicate that blends of rice and coconut flour could be used for gluten free formulation, although they need to be optimized, especially when the coconut flour proportion is increased by more than 50%. Coconut flour possesses good nutritional properties which could be utilized for value addition of baked goods.

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ENTHALPY EU PROJECT: ENABLING THE DRYING PROCESS TO SAVE ENERGY AND WATER, REALISING PROCESS EFFICIENCY IN THE DAIRY CHAIN

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Keywords: *dairy, food quality and safety, novel food products, process system engineering, spray dryer modelling*

Introduction: Sustainability is a major topic in the food industry nowadays. Products have to be produced in an energy and water efficient way. The dairy industry is one of the most energy intensive sectors in food processing; mainly concentration and drying processes are responsible for high energy consumption. The way milk powder is produced has not changed radically over 50 years. While in the last decades innovative processing methodologies have been introduced, which can lead to breakthroughs in energy and water efficient processing.

Aims: The aim of ENTHALPY is to optimize and redesign the milk powder production chain; making efficient use of energy and water, and increasing the use of renewable resources.

Materials and Methods: Using a systematic approach, the “ENTHALPY” project focuses on innovations within the post-harvest chain representing the highest energy and water consumption. The technological core of the project is covering various aspects such as pre-treatment, atomiser, dryer modelling and inline monitoring, membrane technology as well as enzymatic cleaning technology.

Results: ENTHALPY will save energy and water in the dairy industry by introducing innovations in the processing plant such as: RF heating, solar thermal energy, mono-disperse atomising, dryer modelling, inline monitoring, cleaning with enzymes and membrane technology. With these technologies energy and water loops will be closed instead of being lost in the plant.

Conclusion: During the ENTHALPY project, several innovation technologies will be developed and implemented in order to save energy and water in the dairy industry. Quality and safety of the food products derived from the novel processes will be assured by establishing a comprehensive food quality and safety concept based on the principles of HACCP or IFS6.

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DEVELOPMENT AND CHARACTERIZATION OF A NEW CARROT-PINEAPPLE AND VANILLA POD JAM

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Keywords: *Ananas comosus*, *Daucus carota* L., bioactive compounds, jam, vanilla pod.

Introduction: There are currently many evidence demonstrating that fruits and vegetables play an important role for the human health and also for the prevention of many diseases. Thus, the development of food products that incorporate the nutritional and bioactive ingredients of this raw materials contributes to the improvement of the overall population health (Guiné et al., 2015).

Aims: Through this study we aimed to obtain a new assortment of jam (carrot-pineapple in 1:1 ratio and vanilla pod) in order to diversify the variety of products available on the market, as well as to satisfy the consumer demands relating to food quality and psychosensorial properties.

Materials and Methods: The raw materials, carrots, pineapple, sugar and vanilla pod were purchased from the local supermarkets (Cluj-Napoca, Romania). Physicochemical determinations were made mainly on fresh carrot and pineapple samples in order to establish the quality of raw materials and to quantify several biologically active compounds. The analysed parameters were: total phenolic content and antioxidant activity (spectrophotometric method), vitamin C and acidity (titrimetric method) and consumer acceptability (sensorial evaluation of the finished product).

Results: The highest levels of polyphenols occurred in pineapple sample (75.90 mg GAE/100g), which also presented the highest antioxidant activity (15.07%), closely followed by the carrot sample (63.50 mg GAE/100g and 13.52% RSA). The same order was also observed in the case of vitamin C, pineapple (51.04 mg%) showing a value almost four times higher than the carrot (14.08%). Consumers also were impressed by sensorial properties of pineapple-carrot jam, appreciating positively the new product.

Conclusion: The quality of raw materials used but also the high degree of sensory appreciation confirms the real potential of marketing the new product.

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NEW GOJI BASED LIQUEUR: PHYSICOCHEMICAL EVALUATION

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Keywords: *almond milk, antioxidant capacity, goji berry, liquor, Lycium barbarum*

Introduction: Power fruits for better health, *Lycium barbarum*, generally called goji berry, are well-known for their positive correlation between phenolic compounds and antioxidant activity. Particularly, *Lycium barbarum* is widely used as a functional food and provide a wide variety of dietary antioxidants such as vitamins, carotenoids, flavonoids and other phenolic compounds.

Aims: Due to the increasing interest to goji berries, the aim of the present study is to characterize a new goji-based liqueur as sustainable valorisation of these fruits. Step of maceration of fresh goji berry in ethyl alcohol (96%) get a new type of liquor with goji berry and almond milk without any heat treatment. This product contains a significant proportion of bioactive compounds with many health protective benefits (alleviating oxidative stress).

Materials and Methods: Total phenolics and flavonoids of goji berries were determined spectrophotometrically using a modified Folin-Ciocalteu method, while the antioxidant activity was determined with 1,1-diphenyl-2-picrylhydrazyl (DPPH) reagent. Also, several physicochemical analyses were conducted (alcoholic concentration, total acidity, total dry extract and relative density).

Results: Compared to goji berry samples (139,2132 mg GAE/100g), the total phenolic compounds in goji berry liqueur have just a little more reduced values, but the bioactive compounds were successfully transferred through the maceration process. The liqueur retains a considerable part of the goji antioxidant capacity values (more than half). Almond milk added to the berry liqueur brings extra minerals in the total dry extract. The technological scheme for obtaining a liqueur by maceration results in high contents of total phenolic compounds, while the product can be used as a food supplement.

Conclusion: Goji berry valorisation in an innovative and nutritious liqueur with high antioxidant capacity. Special product which besides the goji berry contains almond milk added.

EFFECT OF THYME ESSENTIAL OIL ON POLYPHENOLS AND ANTIOXIDANT CAPACITY IN HOT PEPPER SAUCE

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Keywords: *antioxidant activity, hot pepper, polyphenol, thyme essential oil, quality*

Introduction: Recent studies have shown that thymus species have strong antibacterial, antifungal, antiviral, antiphrastic, spasmolytic and antioxidant activities. *Thymus vulgaris* essential oil is a safe natural preservative for stored foods, and there is less risk of development of antimicrobial resistance because the mixtures of compounds of the plant oil represent different mechanisms of antimicrobial activities.

Aims: The main aim of this research was to investigate the polyphenols and antioxidant activity of the methanol extracts obtained by maceration from hot pepper sauce.

Materials and Methods: The hot pepper sauce was produced by in-house methods to which was added a progressive quantity of thyme essential oil 0, 50, and 150 μl/100 g product. Total phenolic contents were determined colorimetrically using Folin-Ciocalteu reagent with gallic acid as the standard, and antioxidant capacity was determined by DPPH (1,1-diphenyl-2-picrylhydrazyl) method.

Results: The existence of phenolic compounds in the aromatic hot pepper sauce was confirmed by the Folin-Ciocalteu method. In general, antioxidant activity is closely related to the amount of total polyphenols. In this case is confirmed, the antioxidant activity increased with increasing concentration of polyphenols. The antioxidant capacity was measured by the free radical scavenging method DPPH and was proven to be high at higher concentrations of thyme essential oil (80.18 %) and lower concentrations in the sample without essential oil (77.92%).

Conclusion: In the present research work, we demonstrated that thyme essential oil added into hot pepper sauce is successful according to polyphenols and antioxidant activity.

DEVELOPMENT OF AN NEW TYPE OF CANNED VEGETABLE ENRICHED WITH *CICER ARIETINUM*.

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Keywords: *canned vegetables, garbanzo beans, protein content, quality control*

Introduction: Consumers requirements regarding the quality and diversity of food products have undergone continuous changes in the last decades. Vegetable proteins have gained immense importance in modern food industry due to their nutritional and functional properties.

Aims: Due to the increasing interest in vegetables health benefits, the aim of the present study was to develop and optimize a canned vegetable enriched with garbanzo beans (chickpeas), respectively to accomplish the quality control in terms of its physicochemical parameters.

Materials and Methods: The raw materials were purchased from local supermarkets (Cluj-Napoca, Romania) and the reagents from Sigma Aldrich or Merck (Darmstadt, Germany). The quality of raw materials was investigated regarding the content of ash, fat, moisture, acidity, vitamin C (titrimetric method), total polyphenols and antioxidant capacity (spectrophotometric method) and protein content. Also, the canned product was investigated regarding the acidity, sodium chloride, protein and fat content.

Results: The obtained results revealed that peppers have the highest vitamin C content (65.12 mg%) followed by bell peppers (54.56 mg%) and onion (12.32 mg%). Regarding the content of polyphenols were obtained values between 61.82 mg GAE/100g fw and 101.01 mg GAE/100g fw, the richest sources proving to be bell peppers and peppers. In general, the antioxidant activity is closely related to the total polyphenols content. Of all raw materials, bell pepper has the highest antioxidant capacity with 15.67%, followed by red pepper with 14.95%, onion with 13.76% and chickpeas with 9.93%. Also, it has been observed a higher content of protein in vegetable stew sample enriched with chickpeas (4.2%) compared to control sample (1.83%).

Conclusion: The performed preliminary studies revealed that both raw materials and canned vegetable are in accordance with the quality parameters stipulated by the standards. Due to high nutritive value, the obtained product can be recommended for the people concerned about a healthy lifestyle and especially to those who adopt a vegetarian diet.

DEVELOPMENT AND CHARACTERIZATION OF A NEW “RAW-VEGAN” CHOCOLATE

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Keywords: *chocolate, raw-vegan, sensory.*

Introduction: Chocolate is a food product that provides a great flavor, and also has a high nutritional value, being part of a special category of sugar confectionery products. Generally, chocolate is made of cocoa beans, sugar, milk, nuts.

Aims: The purpose of this work was to obtain and characterize an assortment of “raw-vegan” chocolate, designed because of the growth trend of “*raw foodism*” in a society that is even more interested in the effects of food on the human health.

Materials and methods: The maximum temperature used within all processes was 40°C. Sensory properties were assessed by using the hedonic scale (9 points). Moisture, sucrose and ash content of fresh and dried sugar beet were assessed. Moisture was performed by oven method, ash by muffle furnace, while the sucrose content was determined by polarimetric method using a Bellingham Stanley ADP 410 Polarimeter.

Results: This assortment of chocolate involved the using of sugar beet, in a powder that constitutes an alternative “raw” but also healthy of sugar. Also the cocoa powder has been replaced with carob powder and cocoa butter with the “raw” alternative, obtained by cold pressing. The fresh sugar beet showed a sucrose content of 21.32%, while for the dried samples 77.19% sucrose was recorded. The moisture content of sugar beet samples decreased after drying from 75.65% to 5.002%, while the ash increased from 1.83% to 6.62%.

Conclusion: It has been obtained and characterized a “raw” confectionery product that might be consumed in solid form being ideal for chocolate lovers. “Raw” chocolate is a healthy variant due to the fact that it is processed without excessive heat (thus, richer in antioxidants), it does not contain refined sugar, additives and preservatives.

DEVELOPMENT OF FUNCTIONAL BEVERAGE FROM WHEAT GRASS JUICE

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Keywords: *antioxidant capacity, beverage, wheat grass, polyphenol, Triticum aestivum*

Introduction: Wheat grass is the young grass of the common wheat plant *Triticum aestivum* Linn., family Poaceae (Graminae). It is commonly known as the “green blood” due to its high chlorophyll content which accounts for 70% of its chemical. In the form of fresh juice, it has high concentrations of chlorophyll, active enzymes, vitamins and other nutrients.

Aims: Wheat grass helps blood flow, digestion, and general detoxification of the body due to the presence of biologically active compounds and minerals and due to its antioxidant potential. The aim of this work was the development and characterization of a functional beverage from green wheat juice by adding apple and limes.

Materials and Methods: Wheat grass was grown in the laboratory and the other ingredients (apples, limes, cinnamon and honey) necessary for obtaining the beverage were purchased from local supermarkets. The fresh beverage samples were compared with the pasteurized beverage (72 °C-12"), during a 14-day period; the samples were analyzed at an interval of 7 days. The determination of ascorbic acid was made by titration with a solution of potassium iodate (KIO₃). Overall antioxidant activity was evaluated by indirect spectrophotometric method, which utilized 2,2-diphenyl-1-picrylhydrazyl (DPPH) as generated system for free radical. Total flavonoid content and total polyphenols content were determined using the aluminum chloride spectrophotometric method and Folin Ciocalteu method, respectively.

Results: Vitamin C ranged between 4.64 mg/100 g and 6.4 mg/100g, the highest concentration being found in fresh beverage. The values for the phenolic contents ranged between 71.11 and 91.74 mg GAE/ 100g. The total flavonoid contents ranged from 15.20 to 28.54 mg QE/100 g. The maximum amount was always found in the fresh juice. The results for the antioxidant activity that were expressed as percentage of decrease in the absorbance value of each sample compared with the absorbance of DPPH reference solution, ranged between 13.27 and 13.98 % .

Conclusion: The beverage has a high content of bioactive compounds and after pasteurization and storage (14 days) the loss in the monitored bioactive compounds was not significant.

USE OF VEGETABLE PROTEIN IN OBTAINING ASSORTMENT "POGĂCELE WITH CRACKLINGS"

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Keywords: *rice flour, soy flour, vegetable protein*

Introduction: „Pogăcele with cracklings” are a traditional Transylvanian product, highly valued by consumers, they are usually served as appetizers or snacks. Due to the high content of lipids and proteins from the raw material (cracklings) their caloric intake is high, about 620 calories/100 g product. Considering current trends and concerns of consumers for a healthy lifestyle, it requires optimization of new recipes for this type of product.

Aims: The purpose of this study was to optimize the classical recipe of „Pogăcele with cracklings” by using derivatives of vegetable protein and wheat grass addition to a contribution of bioactive compounds.

Materials and Methods: There were obtained three experimental versions of pogăcele with cracklings: Variant 1 (blank sample-V1) which was used wheat flour in 100%, 30% cracklings; Variant 2 (V2) consists of: 30% soy meal, 70% wheat flour, 10% cracklings; Variant 3 (V3) composed of 30 % rice flour, 70% wheat flour, 10% cracklings. To the three manufacturing recipes other ingredients were added, such as: wheat grass, sour cream, butter, yeast and spices. Experimental variants were analyzed in terms of physicochemical (fat, protein, dry matter, acidity and ash) according to standards of AOAC (Association, 2000). For the sensory analysis the traditional 9-point hedonic test was used, to assess the average degree of liking or disliking of products.

Results: Two experimental variants obtained by substituting wheat flour with 30% of soy and rice flour were obtained. Some physicochemical analyses of products were determined, as dry matter (84-92.60 %), acidity (1.05-1.10 %), ash (1.5502.93 %), fat (26.73-31.58 %) and protein (9.60-19.40 %). Comparative with blank sample (V1) the others two samples have recorded a decrease of fat content and an increase of protein.

Conclusion: The addition of soy and rice flour in the traditional product improved its sensory and nutritional qualities. The results showed that the V3 achieved the highest degree of acceptability. Also, comparative with V1 this variant recorded a decrease of fats content and an increase of protein and ash.

IDENTIFICATION AND QUANTIFICATION OF ANTHOCYANINS FROM ROSE HIP (*ROSA CANINA L.*) BY HPLC-PDA-ESI-MS

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Keywords: *anthocyanins, HPLC, rose hip*

Introduction: *Rosa canina L.* (rose hip) commonly known as the dog-rose is a rich source of vitamin C and also an important provider of natural colorants for food industry. Rose hips are an important source of bioactive compounds such as, anthocyanin, flavonoids, phenolic acids with potential health benefits. Rose hip contains also many compounds with high antioxidant potential: ascorbate, β -carotene, glutathione, α -tocopherol.

Aims: The aim of the present study was to identify and quantify the anthocyanins in different varieties of rose hips from Transylvania country.

Materials and Methods: The compounds identification and peak assignments were done based on their retention times, UV-VIS spectra and also compared with standards and published data. High-performance liquid chromatography (HPLC) coupled with electrospray ionization mass spectrometric (ESI-MS) detection in positive ion mode has been used to identify anthocyanin from rose hip crude extract. The mobile phase used was 4.5% formic acid in bidistilled water (solvent A) and acetonitrile (solvent B). The gradient elution system started with 10% B for 9 min. The percent of B increased linearly to 12% at 17 min and continued up to 25% B at 30 min. Between 30 and 50 min the percentage of B was 90%. The flow rate was 0.8 ml/min and the analyses were performed at 35°C. Data's were collected at 520 nm. Anthocyanin quantification was done using cyanidin-3-glucoside as standard. HPLC profile of anthocyanin was recorded at 520 nm.

Results: Rose hip (*Rosa canina L.*) varieties were very few analyzed regarding their anthocyanin content. The analyzed crude extract was characterized by the presence of cyanidin-3-O-glucosid. The results obtained demonstrated that the quantity of cyanidin-3-O-glucosid depend on the region, altitude and type of rose hip variety.

Conclusion: This study represents a contribution to the chemical characterization of phenolic profile of rose hip.

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OAT BASED PRODUCT RICH ON UNSATURATED FATTY ACIDS AND FIBERS

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Keywords: *drying, fibers, oat, unfermented dough, unsaturated fatty acids*

Introduction: Oat (*Avena sativa*) it is known as a cereal which provide numerous health benefits (protects hearth, weight control, cholesterol reducing effect etc.), but currently, just 20% of oat crop is used in human nutrition. Olive, hemp and flax oils are rich in unsaturated fatty acids being also recommended for human consumption for nutritional reasons.

Aims: The aim of this work was to develop and optimize a technology for obtaining oat unfermented dough, in order to obtain unleavened bread rich in fibers and unsaturated fatty acids.

Materials and methods: Solid and fluid consistency dough were prepared, by taking different oil content (4,3% and 8,3%). Drying was performed at three levels of temperatures (150°C, 120°C, 90°C), uncovered and covered by aluminum foil or baking paper. The moisture loss dynamics was measured for each drying method and temperature. Textural profile was performed by using the Texture Analyzer CT3, equipped with the cylindrical probe TA41. Sensory properties were assessed by using Hedonic scale (9 points).

Results: The drying process showed that uncovered samples had a significant decrease of moisture in the first 30 min; in the last 30 min this decrease was constant. Samples covered with aluminum foil and baking paper had a linear moisture decrease. Drying at different temperatures involved different times for reaching the optimal moisture content of the final product as follows: 90 min at 150°C, 135 min at 120° and, 240 min at 90°C. For the lowest temperature used, the moisture content was >25%, which was not suitable from sensory and economic points of view.

Conclusions: Textural profile showed that samples containing higher percent of oil content had a lower hardness than those with reduced percent of oil, at 120°C and 150°C. The most appreciated unleavened oat bread was dried at 150°C and had a low content of oil (4,3%).

TEXTURE AND SENSORY PROFILES OF NEW DEVELOPED SUGAR-FREE SUNFLOWER KERNELS BARS

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Keywords: *sensory, sugar free bar, sunflower kernel, texture analysis.*

Introduction: Sunflower kernels are widely used in human diet, as dessert or snacks due to their nutritional and sensorial qualities. Nowadays, there is an increased interest for partially or totally replacing of sugars in confectionery, due to the large number of diabetic and obese people.

Aims: The aim of this work was to develop a new type of sugar-free bars from sunflower kernels and assessing their texture and sensory profiles.

Material and methods: Sugar bars were obtained following the traditional technology of Chikki variety bars, by studying different types of syrups based on sugar / glucose (conventional) or isomalt / maltitol (sugar-free version). For both types of bars, different concentrations of syrups were used (90%, 93%, >95,5%). The textural profile was obtained by using the Texture Analyzer Brookfield CT3 equipped with TA-SB knife and the TA-43 ball. Sensory properties were assessed by using the hedonic scale (9 points).

Results: Measurements of hardness taken with knife TA-SB showed that sugar bars with >95,5% concentration of sugar and glucose syrup have the highest hardness. The maximum value of adhesiveness was recorded in the case of samples with 93% concentration (sugar / glucose). Fracturability showed the lowest values when the syrups concentrations were lower. Measurements of these parameters obtained by using ball accessory showed a highest value of hardness in case of >95,5% conc. of isomalt / maltitol. Adhesiveness had maximum value at the >95,5% conc. of sugar / glucose, respectively isomalt / maltitol. The maximum fracturability was recorded for the sample of isomalt / maltitol >95,5% conc.

Conclusions: Sugar bars obtained by using lower concentrations syrups had reduced values of hardness. When high conc. syrups were used, the adhesiveness increases. The same phenomena appears in the case of fracturability (>95,5%). Overall, sensory showed that the most appreciated samples were the sunflower kernel bars based on isomalt / maltitol syrup.

PROTEIN FINGERPRINTING OF BLACKBERRIES AND BLACK GRAPES SKIN EXTRACTS

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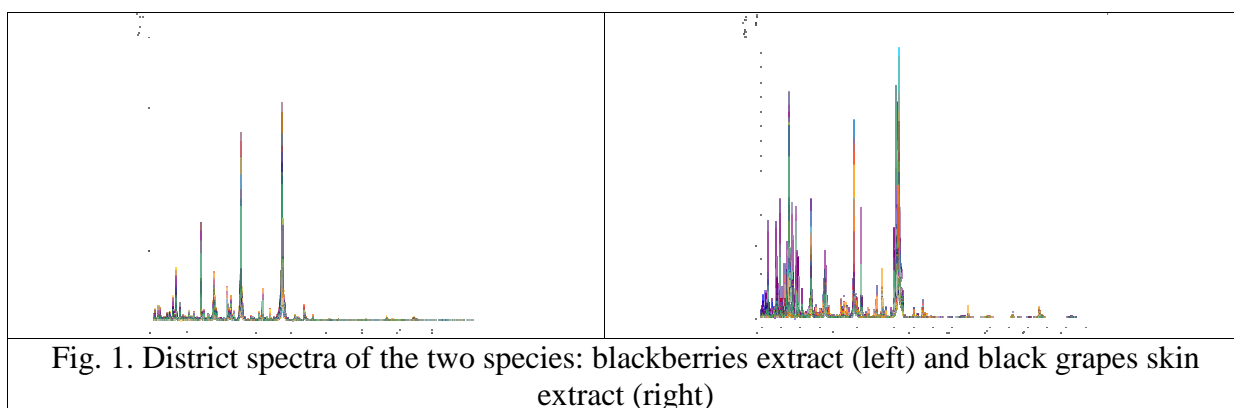
Keywords: MALDI-TOF mass spectrometry, protein, PCA, *Rubus fruticosus*, *Vitis vinifera*

Introduction: Proteins play an important role in the quality of natural wine and non-alcoholic natural beverages because they affect taste, clarity and stability of those products. Protein fingerprinting is the most powerful analytical technique for unknown protein identification.

Aims: Protein fingerprinting by MALDI-TOF mass spectrometry was performed on fresh extracts of *Rubus fruticosus* and *Vitis vinifera* to identify their spectral patterns.

Materials and Methods: For sampling were considered whole fruits of the local *Rubus fruticosus* sp. and the skins of black grapes – cultivar Othello (*Vitis vinifera* x (*Vitis labrusca* x *Vitis riparia*)). Proteins were extracted by ethanol treatment followed by extraction with formic acid and acetonitrile. Alpha-cyano-4-hydroxycinnamic acid from Bruker Daltonik GmbH (Bremen, Germany, #255344) was used as qualified matrix for peptide analysis. Measurements were done with a Bruker microflexTM LT/SH MALDI-TOF mass spectrometer. The MALDI Biotyper 3.0 software was used for analysis of spectra and PCA (principal component analysis).

Results: The resulted spectra (Fig. 1) showed very distinct spectral patterns – very different protein fingerprints.



Conclusion: MALDI-TOF mass spectrometry, followed by PCA, can become a rapid method for protein fingerprinting of berry extracts – as a measure of freshness (proteolysis naturally appears in time or due improper storage condition – excessive heat) and authenticity.

Acknowledgements: This work was financially supported by National project PN 16 36 04 02.

PERSONALISED NUTRITIONAL POWDER FOR ELDERLY DEVELOPED IN OPTIFEL EUROPEAN PROJECT

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Keywords: *elderly, enriched nutritional powder, fluid bed drying, personalised food*

Introduction: Elderly people are a target group with specific needs regarding food safety, nutrients, texture, taste and convenience. The European OPTIFEL project “*Optimised Food Products for Elderly Populations*” aims to develop innovative products based on vegetables and fruits for elderly populations to increase length of independence.

Aims: A personalized nutritional powder for elderly containing minerals and vitamins was developed by CENTIV for applications in OPTIFEL project by designing and processing of novel food products such as nutrient dense smoothie products.

Materials and Methods: The amount of the powder used for each person, in each product, was calculated using a food calculator, which was developed within the same FP7 European OPTIFEL project, named OPTIFEL Personalised Nutritional Calculator. The Mineral and Vitamin powder has been agglomerated in a Fluid Bed Dryer in order to obtain a higher solubility and homogenization of all the nutrients.

Results: Centiv developed in the FP7 European OPTIFEL project, at pilot scale, a Mineral and Vitamin powder in order to obtain a desired supplement with a neutral taste, free of color and which can be added in any drinks or food matrix for enrichment in a certain concentration. It will not influence the final taste and has great solubility.

Conclusion: Developing innovative food and services tailored to elderly populations is a new challenge for key players involved in food industry and catering. The category of population targeted by the OPTIFEL project is the elderly people cooking at home or making use of meal-on-wheels services for whom the project will develop food products adapted to their needs.

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Acknowledgement: The research has received funding from the European Union Seventh Framework Program (FP7/2007-2013) under grant agreement n° FP7-311754 (OPTIFEL project).

IMPROVEMENT OF BIOAVAILABILITY OF CAROTENOIDS AND CHLOROPHYLLS FROM ALFALFA BY INCORPORATION OF IT IN RAW VEGAN CHOCOLATE

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Keywords: *Alfalfa, bioavailability, carotenoids, chlorophylls, raw vegan chocolate.*

Introduction: On an almost saturated sweets market, the Alfalfa functional chocolate associates the concept of sweets with a healthy lifestyle offering a dynamic point of view. Alfalfa is known in the Arabic culture as the father of all plants. Alfalfa is considered a super-food because of the high content of active molecules (chlorophylls, carotenoids, vitamins, enzymes, phytoestrogens, and bioflavonoids). Due to the high chlorophyll content, the alfalfa acts like a detoxification agent while carotenoids gives it great anti-oxidation properties.

Aims: The aim of the present work was to investigate the possibility of incorporation of a carotenoid and chlorophyll rich source (alfalfa powder) in an innovative food matrix – raw vegan chocolate.

Materials and Methods: The determination of the content of chlorophylls and carotenoids in alfalfa, was done using methods as UV-VIS spectrometry, column chromatography and high performance liquid chromatography (HPLC). For obtaining the raw vegan chocolate with alfalfa, the alfalfa powder was utilized, together with cacao butter, cacao powder and stevia powder (*Rumex patientia*). Using a questioner, it was conducted a market study that followed aspects as taste, price and design.

Results: The results proved the presence of valuable compounds as chlorophylls and carotenoids and the utilized techniques helped us to quantify their presence (11.63 mg/100 g alfalfa powder chlorophyll. a, 4.95 mg/100 g alfalfa powder chlorophyll b and 300 mg/100 g alfalfa powder). The FTIR spectra showed that the main compounds from the alfalfa powder are carbohydrates. Outputs from the questionnaire showed promising results regarding the market acceptance.

Conclusion: In the present research work, we demonstrated that raw vegan chocolate represent an excellent food matrix for the incorporation of alfalfa powder, a rich source of α and β chlorophylls and β carotene.

INCIDENCE OF *ESCHERICHIA COLI*β - GLUCURONIDASE POSITIVE ON GOAT MILK

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Keywords: *Escherichia coli*, hygiene, milk

Introduction: Milk is an excellent growing environment for microorganisms. *Escherichia coli* is one of pathogens that can multiply in milk, if it has been produced in unsanitary conditions and it has not been immediately cooled (Barzoi and Apostu, 2002).

Aims: The aim of this study is to detect *E. coli* strains α - glucuronidase positive - in samples of collected goat milk, depending on the lactation period.

Materials and Methods: Milk samples were collected by hand milking from 50-60 goats that had been raised and maintained in traditional system. The determination of the CFU *E. coli* β-glucuronidase-positive was carried using TBX medium.

Results: The presence of pathogenic microorganisms in milk could take place through faecal contamination or direct excretion from the udder into the milk flow. No presence of *E. coli* strains was detected during springtime, when goats are milked three times a day; the same was observed during fall, when the milk production is lower and the milking is done once a day. The load of *E. coli* β-glucuronidase-positive was averaging 66.67 CFU/ml of goat milk, during the middle lactation period (July-August), in conditions of higher temperature. The presence of the species *E. coli* was also confirmed by microscopic examination.

Conclusion: Attention should be paid to hygiene and milk should be immediately cooled, during hot weather, as *E. coli* can be a source of food poisoning. The recorded average value of such germs in raw milk is below the level of acceptability.

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SECTION 4: HORTICULTURE AND FORESTRY

EFFECT OF DIFFERENT TYPES OF FERTILIZATION ON *VIGNA UNGUICULATA* SUBSP. *SESQUIPEDALIS* CROP

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Keywords: compost, landraces, plant growth, *Vigna unguiculata* ssp. *sesquipedalis*.

Introduction: The genus *Vigna* currently includes around 80 species. Cowpea (*Vigna unguiculata*(L.) Walp) is an important legume of the tropics, with its various uses: as grains in processed foods, as a vegetable (fresh leaves, peas, and pods), and as dry haulms and fodder. It is an inexpensive source of vegetable protein, and a hardy crop well adapted to relatively dry environments. In combination or association with cereals and other grain legumes, it contributes to the sustainability of cropping systems in marginal lands of semiarid areas, with its fixation of nitrogen, ground cover, and the soil improvement it provides from plant residues (Singh et al., 1997). Yardlong bean (*Vigna unguiculata* ssp. *sesquipedalis* (L.) Verdc.) is known as vegetable cowpea, asparagus bean, string bean, snake bean, snake pea, snap pea, bodi, bora and sitao. Its origin is possibly in the Middle West Africa or in Southern China. Yardlong bean is widely grown in Southeast Asia, South China and West Africa for immature pods which are used as a vegetable (Fana et al., 2004). It constitutes also a Messinian crop landrace in Greece.

Aims: The scope of the study was to evaluate various types of fertilization in terms of their effect on yardlong bean's growth and characteristics.

Materials and Methods: A yardlong bean crop was established in the experimental field of Costa Navarino located in Pylos town in Messenia, Peloponnese, Greece. The experiment was set up according to the randomized complete block design with three replicates and three treatments: compost, inorganic fertilizer and untreated (control). The field was sowed on 14th of April 2016.

Results: Our results demonstrated that compost could raise the plant growth and improve the characteristics of yardlong bean. The root characteristics were higher (at 5% significant level) at organic fertilized plots. Also the fresh pods yields were higher at organic fertilized plots.

Conclusion: In the present research work, we demonstrated the significant role of organic fertilization in yardlong bean's growth.

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THE STANDARD CHARACTERIZATION OF THE ROMANIAN ONION LANDRACE RED OF FĂGĂRAȘ

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Keywords: *landrace, onion, Red of Făgăraș, standard TG/46/7, traditional knowledge.*

Introduction. Făgăraș Country is the name of the old region where red onion was recognized for more than 60 years to be among the most important cultivated crop in the region. This landrace was first officially mentioned to be cultivated in 1750 based on the fiscally documentation of the region (Gyémánt et al., 2009). During 1952 the landrace *Red of Făgăraș* was included in the Official Catalogue for cultivars and hybrids for Romania. However, this landrace was erased in 2004 without applying *in situ* conservation measures according to the requirements of the Plant Treaty and ratified by our country in 2001. Food security depends on the appropriate management of all genetic resources including landraces that have to be conserved and sustainable used (Maxted et al., 2016) and efforts have to be done for the recognition of this landrace as a genetic resource to be maintained under conservation into the Official Catalogue.

Aims. The study focused on three localities recognized for cultivating the Red of Făgăraș in order to evaluate land cultivation and traditional knowledge erosion. Nine standard measurements and analysis have been applied according to the UPOV Standard TG/46/7 in agreement with the European Union framework for the conservation of plant varieties such as the following: Directive 2008/62/EC; Directive 2009/145/EC and Directive 2010/60/EU.

Materials and Methods. All onion bulbs have been collected after traditional harvesting during the autumns of 2013 and 2014, from householders, maintained at 4°C and 9 different measurements and analysis according to UPOV Standard TG/46/7 were realized.

Results. The Red of Făgăraș proved to be a medium variety in bulb size, medium to high in height and medium in dry matter content. The traditional knowledge is under erosion due to an aging population. After 1989 the declared cultivated area for this landrace dramatically declined to 76.27% in Mândra, 50% in Recea and 33.34% in Beclean, mainly due to the dismantling of local crops marketing during the last 26 years.

Conclusion. Even the Red of Făgăraș was collected from three different locations and during two consecutive years, it proved to present similar characteristics and may be further recognized as a conservation genetic resource in the future Official Catalogue. Traditional knowledge erosion and the loss of cultivated areas are among the major threats that may contribute to the disappearance of landraces that fuels food insecurity.

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THE INFLUENCE OF TERROIR ON PHENOLIC COMPOSITION OF RED GRAPES

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Keywords: *extractable anthocyanins, maturities seeds*

Introduction: Phenolic composition and quality of grapes are determined by the cultivation region with its abiotic and biotic conditions, the vintage, grape variety and training system of vines. This phenolic composition, along with the wine-making technology, is one of the main characteristics which influence the red wine stability and quality (Antoce, 2007).

Aims: The aim of this work was to evaluate and compare the phenolic potential of some red grapes varieties authorized for the production of wines with controlled denomination of origin, harvested in 2015 in four famous Romanian vineyards: Murfatlar, Dealu Mare, Dealul Bujorului and Iasi.

Materials and Methods: Nine varieties of wines were studied: five indigenous varieties (Feteasca neagra, Babeasca neagra, Mamaia, Arcas and Busuioaca de Bohotin) and four international varieties (Cabernet Sauvignon, Merlot, Pinot noir and Burgund). The method used to determine the phenolic compounds in grapes was the Glories method.

Results: The statistical analyses (ANOVA) of the parameters determined at harvest time show that, as regards the phenolic composition, significant differences exist even for the same variety harvested at full maturity, if it is grown in different regions. The differences between vineyards can also be seen by performing a Principal Component Analysis for all the grape varieties studied and the following parameters: total anthocyanins (Aph1), extractable anthocyanins (Aph3,2), the percentage of extractability of anthocyanins (EA%) tannins from the skins (skins T), tannins from seeds (seeds T), maturity of the seeds (MS) and polyphenols.

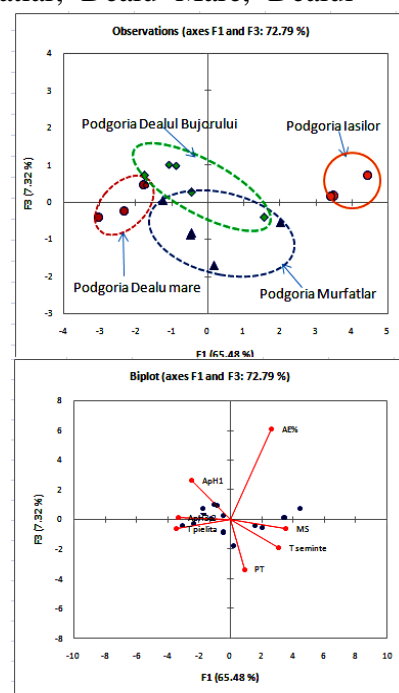


Fig 1. Principal Component Analysis of the grape phenolic potential-related parameters for the red varieties determined at harvest in 4 Romanian vineyards

Conclusion: The results also showed that in spite of the differences induced by each cultivation region, the studied varieties accumulate sufficient amounts of polyphenols, so that, by an appropriate winemaking technology, they can be extracted and generate typically coloured and structured red wines, with important bioactive compounds for human health.

THE BEHAVIOUR OF SOME GRAPE HYBRID ELITE VARIETIES OBTAINED AT SCDVV BLAJ, IN 2014-2015

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Keywords: *hybrid elite varieties, sugar/acidity, wine variety*

Introduction: At Research Station for Viticulture and Enology Blaj (S.C.D.V.V. Blaj) has tradition and continuity in improvement of vine varieties. Creating, through genetic improvement works, of varieties capable of providing higher quality grape production, appears as a real alternative to increase the profitability of grapevine culture.

Aims: The aim of this paper is the obtaining new grapes varieties for wine, with high quality, with good resistance to pests and diseases, and an increased tolerance to spring frosts.

Materials and Methods:

The elite variety 5-26, was obtained after the sexual crossbreeding of two elites, 8-33-44 (Iordana x Pink Traminer) x (51-19 Raisin de Saint Pierre x Perla de Csaba) and the elite 6-110 resulted from hybridization between others two elite varieties 9-35-10 (Pink Traminer x Iordana) and 51-19 (Raisin de Saint Pierre x Perla de Csaba). In order to establish the value of the hybrid elite varieties were performed observations and measurements to determine the ampelographic characteristics, the agro-biological characteristics, as well as to the quantity and quality of the grapes yield.

Results: The shoots of the elite variety 6-110 are with long internodes and the grapes are large, with semi-compact berries, spherical, translucent with a thin skin and pleasant taste especially at veraison. The grapes greatly resemble to Feteasca Regală-21Bl. (control), but enter in veraison much earlier and have higher sugar concentration. The sugars concentration recorded in grapes was higher at the elite variety 6-110 than of Fetească Regală-21Bl. The elite variety 5-26 exceeded the production of grapes of Pink Traminer-60Bl. (control), but exhibited a lower sugar concentration.

Conclusion: Both elites have potential to be used for development of cultivars for white wines of superior quality. The elite varieties 5-26, 6-110, are potential new varieties of grapes with a high yield and high quality, given by a high concentration of sugar in the must. As a result of the study, it was found that these elite varieties, numbers 5-26 and 6-110, have a good sugar/acidity balance, stood out and conditions for vine culture, these will be proposed for homologation.

ANALYSIS AND EVALUATION OF THE MAIN ECOCLIMATIC CONDITIONS FROM ROMANIA'S VINEYARDS

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Keywords: *climatic conditions, insolation, rainfall, temperature*

Introduction: Vine act as indicator in relation whit ecoclimatic changes and they are particularly sensitive to temperature changes. Temperature is a limiting factor and works by limiting the distribution area for all plants, in other words temperature is a limiting factor for vines, both in terms of growth and fructification and for its area of economic culture.

Aims: The main objective for this paper is to present the climatic conditions: temperature, insolation, rainfall and cloudiness for Romania's main wine centres in the vineyards: Dealu Bujorului, Murfatlar, Târnave, Iași, Ștefănești-Argeș.

Materials and Methods: The climatic data conditions (temperature, insolation, rainfall and cloudiness) were obtained from weather forecasting center, the Agro Expert system and also from the National Meteorological Administration. Based on these data, the thermic balance was calculated: ($\sum tg$ global thermal balance; $\sum ta$ activ thermal balance; $\sum tu$ useful thermal balance); the thermal coefficient (C_t); coefficient of insolation (C_i) and coefficient of precipitation (C_p).

Results: The climatic data analyzed for the five studies areas during 2010-2014 reveal that the highest annual average temperature was recorded in Murfatlar vineyard (14.1⁰C), followed by the vineyards: Dealu Bujorului (11.5⁰C), Târnave (10.9⁰C), Iași (10.4⁰C) and Ștefănești-Argeș (10.0⁰C). The length of the vegetation period is within the normal cultivation limits of vines, with 185 days in Dealu Bujorului vineyard, 198 days Murfatlar vineyard, 183 days in Târnave vineyard, 174 days Iași vineyard and 184 days Ștefănești-Argeș vineyard. In the experimental years 2010-2014, the thermal balance with the highest values was recorded in Murfatlar vineyard with 5288⁰C the global thermal balance ($\sum tg$), 4815⁰C the active thermal balance ($\sum ta$) and 2514⁰C the useful thermal balance ($\sum tu$). Insolation and precipitations are in normal parameters for viticulture.

Conclusion: Based on the results, we can conclude that the ecoclimatic conditions are excellent for viticulture and in this areas are obtained both white and red wines of superior quality.

PLANTS ROOT INTERFERENCE AREA, A BENEFIT TO THE MICROBIAL COMMUNITY

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Keywords: *microbial community, plants, plant root interference area*

Introduction: Part of byproducts synthesized by plants through photosynthesis reach the ground, where create selective microenvironments for micro-flora and associations of plant - microorganisms, which are a benefit for plant growth (Badri et al., 2009; Prashar et al., 2014).

Aims: Setting the interference effect of the root interference area of vines and herbaceous plants and of radicular exudates from vine rhizosphere on microbial community and estimating microbial population present on the vine leaves.

Material and Methods: The biological material was represented by leaves (Fa, Fb), and soil rhizosphere (Ra, Rb) of two varieties of vines (Tamaioasa Romanian white and black / TA, TN), and from the vine roots interference area with other herbaceous plants (Ma, Mb). The soil has never been chemically treated. The microbiological study of biological samples was performed by classical and molecular methods.

Results: Overall, bacteria had a significant presence in soil samples taken from the root interference zone (Ma, Mb). Actinomycetes quantitatively dominated the root interference area of herbaceous plant with variety TA. The range of actinomycetes species and leaves microflora was reduced.

Conclusion: In this study we have shown that significant growth of microorganisms occurs in the interference area of vine with other herbal plants as a result of the cumulative effect of radicular exudates.

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BUTTERFLY COMMUNITY CONSERVATION THROUGH ECOLOGICAL LANDSCAPE DESIGN IN URBAN AREAS

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Keywords: *blooming plants, host plants, landscape design, Lepidoptera, urbanization*

Introduction: Due to urbanization most of the ecosystems are strongly affected by human activities (Rosa et al. 2004). As a result, preservation of biodiversity becomes more and more important aiming to partially reestablish the lost habitats of different species (mammals, birds, amphibians, insects, etc.). Our research focuses on butterflies which constitute an extremely important group of ‘model’ organisms used for centuries to investigate different research areas including navigation, pest control, embryology, mimicry, evolution, genetics, population dynamics and biodiversity conservation.

Aims: This research was carried out to identify some *lepidopterans*, mostly diurnal butterflies (*Aglais urticae*, *Vanessa atalanta*, *Brintesia circe*, etc.) specific to Cluj area in order to through ecological landscape design call this ‘flying beauties’ back to city gardens contributing to biodiversity conservation. Thus, gardens cannot replace natural habitats, they can serve as stepping stones for butterflies as they travel between natural habitats interrupted by urban constructions.

Materials and Methods: As a preliminary to the experiment, an elaborate scientific literature review was made. Numerous field trips were organized to identify the most common and the rarest butterfly species in the surrounding areas of Cluj (Făget, Florești, Târnița, etc.). The plant selection for the new ecological garden design was made according to the needs of the identified butterflies depending on their developmental stage. In addition, some specific plants were also chosen for sheltering together with other abiotic elements that are indispensable for a butterfly garden (e.g. puddles, rocks). In order to make this ecological garden design more expressive we used the following softwares: Realtime Landscaping Architect, Corel Draw, Sketchup and Lumion.

Results: The results show that if we take into account the butterfly needs early in the planning stage of our garden, ensuring them a friendly habitat they will come and settle in our garden to entertain us in sunny days with their physical beauty and display. Moreover, the size of the garden and the number of flowering and host plant species used are directly proportional with the number of butterfly species that are attracted to the garden.

Conclusion: In this research, we demonstrated that landscape architects have a crucial role in butterfly community conservation, through their abilities to arrange plants in such manner to restore a part of the natural habitat where these small flying beauties can survive against unstoppable urbanization.

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INVENTORY OF VITICULTURAL YIELD AND QUALITY PARAMETERS IN RESPECT OF SOIL MANAGEMENT

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Keywords: *must, pH, sugar content, total acidity.*

Introduction: In each landscape window (Hoble *et al.*, 2016) were picked 5 vines per plot (4 plots x 5 vine = 20 vines/landscape window). Where the vineyard was located on a slope, these four plots were selected to represent the lower (1 plot), middle (2 plots) and upper part (1 plot) of the slope.

Aims: To assess the quantity and quality parameters of grapes in respect of management intensity.

Materials and Methods: For quantity parameters: There were counted grapes on a vine, then put in a 10 l bucket and weighted. Finally, were calculated the averages for: number of grapes/vine, weight of grape (g) and yield (kg/vine). For quality parameters: There were harvested small parts of grapes from grape vines on 5 vines/plot, from the sunny and shaded, bottom and top, in order to obtain a homogeneous sample of 0.500 kg/plot.

Results: For Sauvignon blanc was determined a yield of 4.6 kg/vine (low management intensity), and 6.3 kg/vine (high management intensity). For Fetească regală was obtained a yield of 5.6 kg/vine (low management intensity), and 4.1 kg/vine (high management intensity). The highest amount of sugar (g/l) was registered for Pinot gris (high management intensity), and the lowest amount of sugar was determined for Chardonnay (179 g/l) (high management intensity).

Conclusion: The lowest difference registered for pH of must (0.04) was for both Riesling Italian (low management intensity) and Fetească regală (high management intensity). The highest difference for pH of must (0.41) was observed for Muscat Ottonel - low management intensity.

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Acknowledgements. 2013-2014 BiodivERSA/FACCE-JPI joint call for research proposals, with the national funders UEFISCDI - Romania, FWF Der Wissenschaftsfonds - Austria, ANR - Agence Nationale de la Recherche - France, Bundes Ministerium für Bildung und Forschung - Germania and Ministerio de Economía y Competitividad - Spain. This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CCCDI - UEFISCDI, project number 6/2015.

THE ELABORATION OF A PRACTICAL PROTOCOL FOR THE MICROPROPAGATION OF SEVERAL APPLE ROOTSTOCK VARIETIES

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Keywords: *apple rootstocks, ex vitro rooting, floating perlite, wheat starch*

Introduction: Several apple genotypes have been successfully multiplied by micropropagation; the first studies regarding apple micropropagation were reported in the late 1960-ies (Dobránszky and Teixeira da Silva, 2010).

Aims: The aim of our research was to optimize the in vitro multiplication stage of some apple rootstock genotypes by the use of simple culture media with low cytokinin content and to test the direct ex vitro rooting ability of the shoots obtained in the in vitro multiplication stage, by the floating perlite method, which is a radically new, simple and effective technique, in order to elaborate simplified and optimized micropropagation protocols for these rootstocks.

Materials and Methods: For the experiments we used six apple rootstock genotypes: MM 106/4, MM 106/6, D 18, D 20, JTE-H and MR 09/4. For the multiplication stage, modified MS media were used, supplemented with 0.7 mg/l BAP and gelled with 50 g/l wheat starch. The explants consisted of 2 cm long shoot fragments containing 4-5 nodes. Five microcuttings were used per culture vessel. The multiplication cycle was 60 days. The in vitro cultures were incubated in the growth room at 16 hour photoperiod, 32.4 $\mu\text{mol m}^{-2}\text{s}^{-1}$ light intensity and 23 \pm 3°C temperature, 50 \pm 2% humidity. The regenerated shoots were rooted and acclimatized directly ex vitro, in one stage, by using the floating perlite method.

Results and Discussion: The investigations regarding the number of shoots/vessel and the length of the regenerated axillary shoots show that the various genotypes reacted differently in the multiplication stage. In some genotypes (D20) a high number of short shoots was regenerated, below the standard size of 2 cm. In genotype MR 09/4 there was the highest number of standard-sized shoots, followed by D18. In genotypes MM 106/4 and MM 106/6 a small number of shoots were regenerated, but these were long and vigorous; these rootstock varieties presented the highest percentages of standard-sized shoots. We consider that the rootstock variety JTE-H had optimal development in these conditions, having in view the relatively high number and high percentage of standard-sized shoots, as well as the height of the regenerated plantlets. Among the genotypes in our study, MR 09/4 had the highest multiplication rate (19.56) followed by D18 (15.36). The lowest multiplication rates were provided by MM 106/6 (5.36) and MM 106/4 (3.32). The use of direct ex vitro rooting and acclimatization in floating perlite provided rooting percentages above 90 %.

Conclusion: Our results show that BAP at 0.7 mg/l concentration is suitable for the micropropagation of all the apple rootstocks in our study and wheat starch is an effective gelling agent for all the genotypes we tested. Direct ex vitro rooting in floating perlite provided good results in most of these rootstocks, ensuring rooting percentages higher than 90 %.

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LYOPHILIZATION AS A CONSERVATION METHOD IN SWEET CORN

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Keywords: *lyophilisation, sweet corn, hybrids, preservation methods*

Introduction: Sweet corn is a maize variety that can be used for human consumption. It is an important source of vegetable proteins and it provides many benefits for health: rich in nutrients, including antioxidants and fibres. This vegetable is grown mainly for freshly boiled ears, thus its period of consumption is very short. For this reason, preserving sweet corn is a good solution to extend this period and could be made in different ways like freezing, drying, canning, pickling or salting. Most of these conservation methods need additives or freezers. Lyophilisation has the great advantage that the final product does not require any special storage conditions, or the addition of preservatives. It could also be an appropriate method for conservation of sweet corn grown in ecological conditions and in low-input systems (Ardelean *et al.* 2010).

Aims: The main objective of this paper was to evaluate the suitability of Romanian sweet corn hybrids, with different period of maturation, for the use of lyophilisation method.

Materials and Methods: The sweet corn hybrids (Prima – early, Deliciul Verii - semiearly and Dulcin - semilate) were provided by the Agricultural Research Station, Turda, Romania. The lyophilisation procedure was carried out at the Faculty of Chemistry of Babeş Bolyai University, Cluj-Napoca. The hybrids were cultivated in Salaj County, in a low-input system.

Results: According to literature review, the selected hybrids are appropriate for lyophilisation method. The duration of lyophilisation process is different for the three types of hybrids: the shortest period is registered for Dulcin and the longest for Prima. However, all these hybrids are sold very well on the market, for commercial purposes (Has, 2002).

Conclusion: Fresh kernels from all three hybrids under study keep their integrity after lyophilisation process. This freeze drying technique can be used as an alternative way of sweet corn conservation.

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Acknowledgements. The study was conducted under a project entitled “Cercetări privind eficiența biologică și economică a liofilizării porumbului zaharat” no. 15525/30.09.2014, financed by S.C. CasaBio cu sanatate S.R.L. Cluj-Napoca, Romania.

OBTAINING OF GRAFTED PLANTING MATERIAL AT SOME ROMANIAN TOMATOES

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Keywords: *grafted seedlings, Lycopersicon esculentum, Romania*

Introduction: The tomatoes have highest share in Romanian crops from protected spaces (greenhouses, solariums). The grafting is an agronomical technique that induces or improves some qualities of the tomato cultivars (resistance to soil diseases and pests, resistance to abiotic factors, quantity and quality of fruit production). In Romania, it has been developed because soil borne pathogens are a serious problem, that can be avoided by using resistant rootstocks (Doltu *et al.*, 2015).

Aims: The research was aimed the establishing of the technological stages for producing of scion and rootstock seedlings from *L. esculentum* species, to obtain compatible phenotype when is grafted.

Materials and Methods: The observations of this research were conducted on Department of Horticultural Cultures in Protected Spaces from Horting Institute Bucharest. The experience was carry out on a cultivar collection consisting from *L. esculentum* plants: scions (Siriana – F1 hybrid and Buzău 1600 – variety), creations from the germplasm bank of Research and Development Station for Vegetable Growing Buzău Romania (VDRS Buzău) and rootstock (Groundforce – F1 hybrid). Siriana is early hybrid with red fruit, spherical, slightly flattened and average weight of 140 g. It is cultivated in protected spaces and field. Buzău 1600 is semi-late variety with red fruit, spherical and weight of 180-200 g. It is cultivated in field. The obtaining of seedlings is according to the ecological requirements of the species.

Results: The plant diameters were correlated for a grafting by the annexation method, cutting at 45 degrees. The grafting was performed successfully.

Conclusion: The technological steps have achieved phenotypic compatibility of the symbiotes when was the grafting by annexation. The technology for producing of scion and rootstock seedlings at these Romanian tomatoes (Siriana and Buzău 1600) was established for the crops in protected spaces in south area of Romania.

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RESEARCH ABOUT IMPROVEMENT THE AROMATIQUE GRAPEVINE BY SELECTION CLONALE IN THE VINEYARD DEALU BUJORULUI

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Keywords: *clonal selection, grapevine, vineyard*

Introduction. The paper shows to orientation improvement program. Selection of vine varieties is avoiding the emergence of heterogeneous populations in terms of genotypic and phenotypic mixtures biotypes (ecotypes, agro -ecotypes), valuable or improper, affecting the quantity and quality of production. Varieties from clonal selection will determine the improve and expand of the current range, in terms of quantity and quality of production, because each clone, by cultural skills and quality that was selected (quantity, quality, mixed), contributes complementary to make production superior quality by adapting their culture at climatic conditions and specific vineyards and wine centre in order to obtain wines with denomination of origin.

Aims. Selection of genetic resources vineyards and taking in culture only those selections clonal with maximized productivity, adapted to the specific culture, tolerant main stress abiotic and biotic and quality traits corresponding market requirements, is recognized as a major factor in achieving performance economic.

Materials and Methods. The material used was the clonal elites 35-21 Muscat Ottonel, Șarbă 25-45, and the grapevines Muscat Ottonel and Șarbă. Agro biological and technological observations and measurements were performed in the experimental field and laboratory genetic-improvement in period 2013-2015. The statistical interpretation of the results was performed by DUNCAN test using SPSS version 20.

Results. Productivity index both absolutely and relatively had the highest values at elite 35-21 Muscat Ottonel (Ipa -249,1; lpr -146,10). Production at stump for wine grape varieties ranged from 6,45 kg to elite 35-21 Muscat Ottonel. The size of grapes, viewed by the average weight genotypes studied was higher in elite 25-45 Șarba (221g). Clonal elites versus the witness have a high potential for accumulation of sugars in the grape must, between 217 and 252 g / l. Total acidity of the grape is in the normal range, specific vineyard with values between 4.26 and 5.97 g / l H₂SO₄.

Conclusion. These clonal elites are characterized by higher production quality compared to varieties of the populations of origin.

NEW CREATION VINE FOR QUALITY WHITE WINE OBTAINED AT RDSVV BUJORU

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Keywords: *new grapevine, vineyard, wine*

Introduction: Improving crop varieties that are used both in terms of quantity as well as quality report can't be done only by exploiting the genetic factor. Through hybridization genotypic variability creates a new variety uniting hereditary characters belonging to two or more genetically different parental forms. That hybridization is currently used as a method of improvement in most programs is supported by vast number of varieties obtained by this method followed by selection.

Aims. Obtaining new varieties of vines with characters and superior qualities better acclimated, with superior quality properties, with planting staggered maturation and increased resistance to natural factors critics, has become a concern for breeders.

Materials and Methods: As a method of obtaining sexual variety Bujoru controlled intraspecific hybridization using varieties Băbească gray x Pearl of Csaba. For estimating agro biological and technological variety Bujoru were made observations and determinations on the fertility and productivity, crop quality and quantity and timing of the ripening period. Control variety was the mother of the parent's variety Băbească gray.

Results: Bujoru cultivar is a variety with medium to large effect of increasing fertility middle 54-60% fertile shoots, fertility coefficient values range between 1.08 to 1.31 and from 0.31 to 0.63 Cfr Cfa. Productivity variety is average: 263.5 absolute productivity index and relative index 174.5. It has good resistance to frost (- 18 ... -200C), middle drought, resistance to diseases and pests. Production capacity is superior variety Băbească gray. Grape maturation occurs is early. High yields of grapes are 17-20 t / ha. At full ripening grapes accumulate 180- 190 g / l sugar and to late maturing two grapes accumulate 250-278 g / l sugar. Total acidity ranges between 3.8 to 4.4 g / l H₂SO₄.

Conclusion: Variety Bujoru complete assortment current vineyard Dealu Bujorului and meets quality traits superior to parental varieties.

CHARACTERIZATION OF LOCAL ACCESSIONS OF SNAKE MELON (*CUCUMIS MELO* VAR. *FLEXUOSUS*)

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Keywords: *Cucumis melo*, descriptors, diversity, morphology

Introduction: Snake melon (*Cucumis melo* var. *flexuosus*) is a botanical variety of melon (*C. melo*) characterized by having elongated fruits (they can measure more than 1 m) that are used in the same way than cucumber (*C. sativus*). Snake melon cultivation was popular in the past in the Mediterranean region of València (Spain), but in the last decades it became neglected. Nowadays there is an increasing interest in the recovery of local vegetables, and Valencian snake melon varieties are potential candidates for enhancement.

Aims: Our work is aimed at the morphological characterization of local Valencian varieties of snake melon using standardized descriptors. The objective is to evaluate the diversity in these materials and to select potentially interesting materials for their recovery.

Materials and Methods: We used eight accessions of snake melon originating from the region of València from the collection of our Institute (COMAV) and two control accessions of regular melon types used for being consumed as a sweet fresh fruit. Ten plants per accession were grown in a commercial greenhouse and characterized using seven fruit descriptors (IPGRI, 2003).

Results: The snake melon varieties were clearly distinct from the controls. Apart from the different shape (elongated for snake melon and elliptic for the controls), the fruit weight was much lower in the snake melon, with average values below 600 g, than in the control accessions, with average values above 1400 g. A considerable diversity was found among the snake melon accessions, with four accessions considered of small size, with fruit weight between 300 and 400 g and four large-sized accessions, with fruit sizes between 500 and 600 g. Fruit length and breadth were also variable, ranging between 34.6 and 56.3 cm and between 3.7 and 6.1 cm, respectively. Some accessions had uniform pale green colour while others had narrow dark green stripes. Also, variation was found for blossom end shape. As a result of the characterization, two snake melon accessions were selected for potential recovery and further evaluation.

Conclusion: Accessions of local varieties of snake melon from the region of València (Spain) are variable and amenable to selection. These selected accessions may help in the recovery of this neglected crop, which can contribute to the development of the local horticultural sector.

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COMPARATIVE STUDIES OF OAK (*QUERCUS PETRAEA* L.) RESERVATIONS WITHIN CLUJ FORESTRY

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Keywords: *diameter, heights, genetically improved seeds, Quercus petraea, seed reserves*

Introduction: Lately, there is a sharp decline in global forest areas (about 7 million ha annually). In Romania it is necessary a sustained effort to extend the forest areas through artificial regeneration. In this context, a special production process of the genetically improved seed bases has an important role (Milescu, 2002).

Aims: The purpose of this study is to show the correlation between the heights and diameters of the *Quercus petraea* trees from seed reserves and their seed production.

Materials and Methods: They were chosen 80 trees situated in four *Quercus petraea* seed reserves of Cluj County. The trees selected were located at the distance of 30 meters from each other. The most representative trees from the seed reserves were selected. Also the selection was made after their taxonomic similarities. To characterize the trees, were made core diameter measurements and total height measurements.

Results: It has been found that the two measured variables (core diameter and trees height) are direct positive correlated, in the sense that increasing the value of a variable and thus leads to an increase in the other. The coefficient of variation of the trees diameter is bigger than the trees height, which indicates that the measuring shafts are found in the upper limit register without major differences in their heights as diameters.

Conclusion: Choosing trees with special qualities have great importance when it comes to transmitting genetic gain new generations. Comprehensive analysis of stationary and vegetation characteristics result in reproductive material with significant values as seeds quality and adaptability.

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EXPANSION OF *NEZARA VIRIDULA* (HEMIPTERA:PENTATOMIDAE) SPECIES IN ROMANIA FROM THE FIRST POINT OF EMERGENCE

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Keywords: *emergence, expansion, first point, Nezara viridula*

Introduction: *Nezara viridula* (Linnaeus) commonly referred to as the green stink bug or southern green stink bug is the last acquisition of Romania if we refer to the insect species. Importance species is date that is recognized polyphagous which has been recorded feeding on a huge range of monocotyledonous and dicotyledonous plants, especially showing a preference on legumes (Velasco and Walter, 1992).

Aims: Considering that this insect is relatively new entry into the country it is important to monitor its activity every year and new areas that installs. In this direction this paper highlights the green stink bug expanding from the first point signal (Timisoara Romania).

Materials and Methods: Monitoring species *Nezara viridula* is in fact main activity covered work. To achieve map spreading have taken into account the first emergence point of the species in Romania (Timisoara: Timis County). This species was discovered for the first time in our country 6 years ago (in 2010), in a culture of tomato (Grozea et al., 2012). The area subject to monitoring included six neighboring counties (Timis-TM, Arad-AR, Caras-Severin-CS, Bihor-BH, Satu Mare-SM and Hunedoara-HD). Period studied included 5 years (2010-2015) for TM and 3 years for other counties. The observations were made mainly in crops of tomatoes and green spaces, by 3 points for each county.

Results: Of the six counties monitored, only in four the pest was observed. In Timis, the insect populations were present in high levels (5-6 adults or 7-8 larvae/tomato plant or 10 -11 adults or 15-20 larvae/ornamental shrub). Low values were recorded in counties Arad, Bihor and Caras Severin. Most observation points have been marked by low levels, like as (0.5-1 adults or 1-3 larvae/tomato plant or 1 -3 adults or 3-4 larvae/ornamental shrub). In two monitored counties (Satu Mare and Hunedoara) no stink bug were observed.

Conclusion: Rapid expansion in 5 years after installation in Romania indicate that the green stink bug is a strong flier and is capable a long-distance natural dispersion.

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THE CURRENT STATUS OF GERMPLUM DATABASE: A TOOL FOR CHARACTERIZATION OF PLUM GENETIC RESOURCES IN ROMANIA

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Keywords: *characterization, database, genotypic, phenotypic, plum*

Introduction: In Romania, *Prunus* genetic resources are kept in collections of varieties, populations and biotypes, mainly located in research and development institutes or fruit growing stations. In the last years, some of the public holding institutions were reorganized and the number of plum accessions dramatically decreased. Also, there is a growing interest of private enterprises to establish their own *on farm* collections and fruit tree nurseries with native biological material for the purpose of multiplying valuable autochthonous varieties.

Aims: Creating the experimental model for the *Germplum* database based on phenotypic descriptors and SSR molecular markers analysis is an important and topical objective for the efficient characterization of genetic resources and also for establishing a public-private partnership for the effective management of plum germplasm resources in Romania.

Materials and methods: SSR analysis was performed on 87 plum accessions with five pairs of primers, using previously published protocols. Phenotypic descriptions were based on FAO/IPGRI descriptors. An open source relational database management system, MySQL-5.1, was used for designing the database, while the PHP tool was utilized for scripting language. The experimental model for the *Germplum* database is hosted on the web server ns.usamvcluj.ro.

Results: The database will have two levels of access, public and private. Currently, only the access to chosen descriptors, *e.g.* molecular data, is available, for registered users. The main features it offers is searching for molecular and phenotypic information on documented accessions, comparing phenotypic and/or molecular data among several accessions and exporting molecular data in compatible formats for different genetic analysis software.

Conclusions: The development of the *Germplum* database platform was completed and data will be added continuously after characterizing each new accession. The database will be available for public access, on-line, at the end of 2017.

STUDY ABOUT THE ESTABLISHMENT OF AN EDUCATIONAL CENTER IN A PEDAGOGICAL FOREST

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Keywords: *educational center, economical diagnosis, pedagogical forest,*

Introduction: This research forecasts a diagnosis on the assessment of a pedagogical forest role. The study was conducted in 2016 and implies the arrangement in Hoia forest, an area of research, stimulation and awareness for the whole society. The forest is used as a leisure area, which is given in administration of Forestry department of University of Agricultural Sciences and Veterinary Medicine Cluj–Napoca.

Aims: The aim of this study is to assess the ability of a recipient of this center, aimed at three levels: social, economic and environmental.

Material and Methods: In order to estimate the beneficiary capacity of the center is necessary to perform a general diagnostic concerning the functions of the education center. Enlarging economic value both the costs and the benefits it would entail the establishment of this center.

Results: Analyzing the future benefits of the pedagogical forest and lowering costs arising from the establishment and operation of the center, we can support the sustainability and profitability of the operation of this education center. The necessity to set up an endowment of approximately 45.500 euro is estimated, represented in property, equity capital, current assets and attracted resources.

Coclusions: The Pedagogical forest will be a source of research, knowledge and science development, means of education, culture and human civilization, factor diversity conservation landscape, ecological and biological. The field is developing, but the ideas behind this project are not promoted in our country and so we believe that this center will be a point of interest for all categories of people.

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INFLUENCE OF SOIL TYPE ON YIELD AND QUALITY OF DIFFERENT APPLE CULTIVARS

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Keywords: *apple cultivars, luvisc brown soil, pigments, soluble solids*

Introduction: Different pedological and agronomic measures are used in growing and fruit crops in general for increase quantitative and qualitative value of fruit (Murtic et al., 2012; Zoppolo et al., 2011). Soil type and properties, fertilizers have influence on development of root system and crop productivity and aromatic and texture features of fruits (Sanchez et al., 2007).

Aims: The objective of this study was to determine influence of different soil type on apple yield and quality. To investigate the variation in fruit quality, apples were harvested at commercial maturity on two different soil types.

Materials and Methods: The investigations were conducted in experimental apple orchards located in Focsani region on two different soil types: luvisc brown typical and luvisc brown pseudogleizate. Fruits of Jonathan and Golden Delicious cultivars were tested for color, soluble solids content, total acidity, ascorbic acid, anthocyanins content and chlorophylls content with specific analytical methods.

Results: At harvest yield, dry matter, soluble solids content, ascorbic acid and acidity were affected by soil type. In this study, no significant soil effect was found on colour, anthocyanins and chlorophyll fruit content.

Conclusions: The results obtained in this study suggest that luvisc brown pseudogleizate soil leading to increased yields and enhanced fruit quality.

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STUDIES ON AGROBIOLOGICAL OIV Descriptors OF TABLE GRAPE VARIETIES GROWN IN TARNAVE VINEYARD

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Keywords: *agrobiological attributes, OIV descriptors, table grape varieties*

Introduction: The description of *Vitis* varieties through morphological characteristics has been the subject of many studies for a long time. The vine characteristics are useful to standardization and description of grapevine varieties.

Aims: The objective of the research carried out to highlight the descriptors: ampelographic, agro biological and technological, of some table grape varieties, cultivated at SCDVV Blaj and their behavior in this vineyard area.

Materials and Methods: The table grape varieties studied are: Codreanca, Istrița, Somesan, Transilvania, Cetățuia, Splendid, Victoria and Timpuriu de Pietroasa, and the observations on the shoots, leaves and grapes have been made in viticultural center Blaj, Tarnave vineyard. The agrobiologic and ampelographic descriptors, to describing each variety, are presented in accordance with the methodology created by the International Organization of Vine and Wine.

Results:

The characteristics listed in the table serve the purpose of a standardized and objective description, of grapevine varieties. It is a common basis for an international cooperation for description and evaluation of grapevines. The data obtained through the specified methodology for young and adult leaves, shoot, inflorescence, are presented in the table 1. This table of characteristics comprises not only distinguishing characteristics of the grape varieties, but also characteristics that indicate the technological aptitudes of grape cultivars.

Table 1 Ampelographic OIV descriptors of some table grapes varieties, from SCDVV Blaj

Variety Cod OIV	Descriptors				
	OIV 001 Young shoot: aperture of tip	OIV 017 Shoot: length of tendrils	OIV 051 Young leaf: color of upper side of blade	OIV 065 Mature leaf: size of blade	OIV 076 Mature leaf: shape of teeth
Codreanca	5 (fully open)	7 (long)	1 (green)	5 (medium)	3 (both sides convex)
Somesan	5 (fully open)	7 (long)	1 (green)	5 (medium)	2 (both sides straight)
Transilvania	5 (fully open)	5 (medium)	1 (green)	7 (large)	2 (both sides straight)
Cetățuia	5 (fully open)	5 (medium)	1 (green)	5 (medium)	2 (both sides straight)
Splendid	5 (fully open)	7 (long)	1 (green)	5 (medium)	2 (both sides straight)
Victoria	5 (fully open)	3 (short)	1 (green)	5 (medium)	2 (both sides straight)

Conclusion: The OIV Descriptors for grape varieties aims at identical descriptor definition and recording, to one comparability of data and promote an increased utilization of descriptor data. The results of this study will contribute to knowledge of the specific features of table varieties grown in the vineyard Tarnave, characterization, highlighting technological attributes and behavior depending on climatic conditions.

THE INFLUENCE OF CULTIVATION METHOD ON CROP PRODUCTION OF BITTER GOURD (*MOMORDICA CHARANTIA* L.)

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Keywords: bitter melon, cultivation technology, early production

Introduction: *Momordica charantia* L. has been used in Asian traditional medicines for a long time (Kumar *et al.*, 2010), but in our country is less known. Some products of fruit extracts are present in the pharmaceutical industry in Romania. Encapsulated products are valued for regulating triglyceride or cholesterol. In Asia (China, Japan and India), the fruits are used for diet of diabetic people and for curing people in natural medicine (Kumar *et al.*, 2010; Fohs *et al.*, 2014).

Aims: The aim of this paper was to find the best way of cultivation to obtain high yield and quality fruits. This study can help to promote this crop in our country, especially for pharmaceutical industry.

Materials and Methods: Biological material is represented by 'Enaja' new cultivar of *Momordica charantia* L. This was used to establish the early production of bitter gourd. The experiments were carried out in 2015 in a greenhouse belonging to UASMV Cluj – Napoca. As an experimental factor different cultivation way was used (one branch, two branches and main stem). The harvest of early production was in 24.08.2015. Obtained results were statistically interpreted using Duncan test.

Results: The higher early production (0.72 kg/plant, respectively 0.93 kg/sm) was registered if the cultivation way was on two branches. The lowest crop production (0.53 kg/plant, respectively 0.69 kg/mp) was in case of cultivation on the main stem. The cultivation method on two branches generate differences of 0.19 kg/plant and 0.24 kg/mp. The differences between cultivation ways were significantly and statistically assured.

Conclusion: In the current paper, the best cultivation method for *Momordica charantia* L. was on two branches. This cultivation method generates the higher early production.

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CHARACTERIZATION MOMORDICA CHARANTIA USSING FT-IR SPECTROSCOPY

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Keywords: *Momordica charantia*, FT-IR

Introduction: *Momordica charantia* (bitter melon) belongs to the family of Cucurbitaceae, a climbing vine which is commonly seen growing on walls and shrubs in the tropics. The fruit has claimed to contain charantin, steroidal saponin, momordicosides, carbohydrate, mineral matters, ascorbic acid, alkaloids, glucoside (Oragwa L, 2013).

Vibrational spectral techniques, FT- IR, offer several advantages in the context of current research and using this technique we can identify molecular components in the samples studied.

Aims: In this paper, because earlier claim shows that the plant used as stomachic, carminative, tonic, antipyretic, antidiabetic, in rheumatoid arthritis and gout, the present investigation was carried to characterize a principal components of plant using FT-IR technique.

Materials and Methods: For FT-IR measurements were performed in the absorbance with a spectrophotometer FT-IR-4100 Jasco, using the KBr pellet technique. The spectra were obtained in the wavenumber range 265 cm⁻¹. Spectral resolution was set at 4 cm⁻¹ and all spectra were acquired over 256 scans. The sample was obtained from 0, 003 g of dried plants and ground.

Results: The bands attributable to the *Momordica Charantia* have been analyzed and discussed. In the “fingerprint” regione the intense and broad absorption band characteristic of C-C, C-O and C-H is present.

Conclusion: Using vibrational spectroscopy, it was proven that we can identify key molecular components in the samples studied and their molecular structure. This study has contributed to the characterization and identification of compounds in *M. charantia* seeds.

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INSIGHTS INTO THE MECHANISMS OF RESPONSE TO SALT STRESS IN OLEANDER (*NERIUM OLEANDER* L.)

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Keywords: *climate change; Nerium oleander; soil salinisation.*

Introduction: Soil salinity is one of the most important causes of reduction of crop yields worldwide, an increasing problem due to climate change. Genetic improvement of salt tolerance of our major crops has become an urgent need for the future of agriculture, especially in arid and semiarid regions, and therefore for global food security. Elucidating the most efficient mechanisms of tolerance in different plant species will contribute to this goal.

Aims: This work reports an initial characterization of the responses to salt stress in the Mediterranean shrub *Nerium oleander*, a xerophyte (drought-tolerant plant) widely used as ornamental, which has also been described as resistant to moderate salinity levels.

Materials and Methods: One-year-old *N. oleander* plants were treated for one month with 400 and 800 mM NaCl in half-strength Hoagland nutritive solution, while control plants were grown in parallel in the absence of salt. After harvesting, several growth parameters were measured, and the contents of common osmolytes [proline (Pro), glycine betaine (GB) and total soluble sugars (TSS)] and some non-enzymatic antioxidants (total phenolic compounds, total flavonoids), as well as those of malondialdehyde (MDA, an oxidative stress marker), were determined using spectrophotometric assays.

Results: Salt inhibited growth of *N. oleander* in a concentration-dependent manner, as shown by a strong decrease of stem length and fresh weight. The levels of Pro, GB and TSS increased in stressed plants as compared to the controls, but only slightly. Yet absolute TSS contents were much higher than those of the other osmolytes, both in salt-treated and in control plants. MDA levels also showed a salt-induced increase, but changes in antioxidant phenolics were very small or not significant.

Conclusions: TSS are the main contributors to osmotic adjustment in oleander, and their presence at high levels in non-stressed plants may represent a constitutive mechanism of response to salt stress. The synthesis of antioxidant phenolics is not activated in response to salt-induced oxidative stress.

PHENOLOGICAL GROWTH STAGES OF CHERRY (*PRUNUS AVIUM* L.) AND PEACH (*PRUNUS PERSICA* L.) ACCORDING TO THE BBCH SCALE

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Keywords: BBCH scale, phenology, stone fruits

Introduction: Phenology is a useful tool to better understand plant life cycles, and it has been studied in numerous herbaceous plants, such as rice, maize, sunflower, beans, and peas among others (Meier, 1997). Bleiholder et al. developed a two-digit decimal coding system for angiosperms, Biologische Bundesantalt, Bundessortenamt und Chemische Industrie (the BBCH-scale) in 1989. The BBCH code has been used to define the most important phenological growth stages from vegetative bud dormancy to fruit harvest (Alcaraz et al., 2013).

Aims: The purpose of this study is to present and detail descriptions of the stages of growth of stone fruits, *Prunus avium* and *Prunus persica*, according to the BBCH code.

Materials and Methods: Phenological data were collected from 4 years old trees of *P. avium* and *P. persica*. Three different healthy cultivars of each species have randomly been selected. The development stage of each organ was recorded during two growing seasons (2014-2016). Photographs of each stage were taken to illustrate the phenological growth stages.

Results: The phenological growth stages of stone fruits *P. avium* and *P. persica* are described according to the BBCH scale, under the environmental conditions of Cluj-Napoca city. Eight main growth stages are described for bud, leaf, shoot development (vegetative growth), inflorescence emergence, flowering, fruit development and fruit maturity (reproductive development). Secondary growth stages related to ordinal or percentage values of growth were also determinate.

Conclusion: The BBCH scales provide descriptions of vegetative and reproductive stages of *P. avium* and *P. persica* in specific environment conditions. An accurate understanding of these stages is important for the correct timing of orchard management, as well as for disease and pest management, irrigation, flower thinning, fertilizer effectiveness etc.

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RESPONSES TO WATER AND SALT STRESS IN THE ENDANGERED SPECIES *LIGULARIA SIBIRICA* (L.) CASS.

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Keywords: antioxidants; drought; *Ligularia sibirica*; osmolytes; salinity

Introduction: Climate change and anthropogenic activities are increasing the severity of environmental stress factors, affecting plant distribution and survival in different habitats. *Ligularia sibirica* (L.) Cass. is a postglacial relict strongly affected by these changes, to the extent that it is considered as a critically endangered species in Europe. Apart from biodiversity issues, *L. sibirica* has some economic importance, as an ornamental and medicinal plant.

Aims: We have analyzed several physiological and biochemical responses of *L. sibirica* to controlled water and salt stress treatments, to gain some insight into possible mechanisms of tolerance in this species.

Materials and Methods: Two-month old *L. sibirica* seedlings, obtained by seed germination, were subjected to stress treatment in the greenhouse. Water stress was applied by completely withholding watering of the plants, while the controls were watered with Hoagland nutritive solution. For the salt-stress treatment, this solution was modified by adding NaCl to a final concentration of 200 mM. After one month, plant material was harvested and several growth parameters were measured. Contents of osmolytes [proline (Pro) and total soluble sugars (TSS)], malondialdehyde (MDA, an oxidative stress biomarker) and non-enzymatic antioxidants (total phenolic compounds and flavonoids) were determined using spectrophotometric assays.

Results: Both, drought and salt stress had a negative effect on the growth of *L. sibirica* plants; under the conditions tested, growth inhibition was stronger in the case of salt stress. Treated plants showed an increase in Pro and TSS levels, especially under salt stress. MDA contents almost doubled, and antioxidant phenolics increased significantly in salt-stressed, but not in water-stressed plants.

Conclusions: Pro accumulation can be used as a salt and drought stress biomarker in *L. sibirica* and, together with TSS, likely contributes to osmotic adjustment under stress. Increase of antioxidant phenolics contents appears to partly compensate the salt-induced generation of oxidative stress.

IN-SITU BIOREMEDIATION OF CONTAMINATED SOILS FROM RODNA MINING AREAS FROM BISTRITA-NĂSĂUD COUNTY

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Keywords: *bioremediation, heavy metals, soil, trees*

Introduction: Soil ecosystems, which are contaminated with heavy metals, are the results of the metallurgical industry era. Tailings deposits with high concentration of heavy metals can cause significant damage to the environment and human health as a result of mobility and solubility (Garbisu and Alkorta, 2003). Bioremediation is a general concept that includes all those processes that take place in order to reconstitute the environmental conditions to its initial form.

Aims: The main objective of this research is to reduce heavy metal contamination level of the soil in mining areas of Rodna by establishing tree plantations as a suitable vegetation cover for bioremediation. In order to remove heavy metal contaminants or mitigate their harmful effects from the polluted sites, the use of plants constitutes a highly promising and less expensive technology for soil remediation.

Materials and Methods: The pedological conditions of a site are of especial importance for tree species selection and establishment. Therefore, soil samplings were taken from two different horizons from two different sites: two from Anieș and Valea Glodului where the pit lakes were situated; and another two from Făget and Blazna, pile tips. Soil samples for analysis were collected in accordance with the standard SR ISO 11464/1998-Soil quality samples pre-treatment for physical-chemical tests. Heavy metal determination was made in conformity with the standard SR ISO 11047/1999-Soil quality. Chrome, copper, lead, magnesium, nickel and zinc from soil extracts were identified through atomic absorption spectrometry. The pH of the soil was analyzed according to SR ISO 10390/1999-Soil quality.

Results: The soil study that has been carried out indicates that tailing deposits are not homogenous in the context of soil composition and permeability. The distribution of the nutrients varies considerably at the rooting system level; the acidity of the soil has medium values and the water-holding capacity of the soil is low.

Conclusion: Establishing and managing tree plantations in Rodna mining areas, does seem an appropriate and successful technology, being an alternative for soil remediation for future practitioners.

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EFFECT OF LIMITED DRIP IRRIGATION REGIME ON YIELD AND YIELD COMPONENTS OF SESAME UNDER MEDITERRANEAN CONDITIONS

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Keywords: *deficit irrigation, Sesamum indicum*, water stress, yield, yield components

Introduction: Sesame (*Sesamum indicum* L.) is one of the most important oilseed crops in the world and it is widely used in food, nutraceutical, pharmaceutical and other industries in many countries because of its high oil, antioxidant and protein contents (Uçan *et al.*, 2007). The sesame crop is usually grown under rain-fed conditions, where because of low and irregular precipitation is regularly subjected to mild to severe water deficit stress. Although sesame has good drought tolerance compared with many other crops, it is particularly susceptible to drought damage during the seedling, flowering and seed filling stages and can lead to yield loss (Uçan and Killi, 2010).

Aims: The aim of this study was to determine the response of sesame landraces to different irrigation applications during 2015 growing season.

Materials and Methods: The experiment was set up as a split plot design with three replicates, four main plots (irrigation treatments, designated as 100%, 75% 50% and 0 of the daily crop evapotranspiration) and two sub-plots (sesame landraces, Limnos and Evros). Different characteristics such as plant height, number of seeds per capsule, dry weight and number of capsules per plant, seed yield, 1000-seed weight and % capsules without seeds, were recorded.

Results: The results indicated that all traits except 1000-seeds weight were significantly affected by irrigation regimes. Plant height, shattering losses, dry weight and number of capsules per plant decreased with increasing water shortage. Seed yield and number of seeds per capsule were less affected by irrigation level, showed higher values in the 50% of the daily crop evapotranspiration treatment. Limnos produced higher seed yield and number of seeds per capsule under all irrigation regimes. Evros showed higher plant height and shattering losses than Limnos. **Conclusion:** The results of this study suggest that sesame landraces can use water efficiently, are locally adapted and associated with traditional farming systems.

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EFFECT OF ORGANIC FERTILIZATION AND AMF INOCULATION ON YIELD AND FLORAL QUALITY PARAMETERS OF COMMON MARIGOLD

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Keywords: *Calendula officinalis*, fertilization, flavonoids, arbuscular mycorrhiza, polyphenols

Introduction: Common marigold (*Calendula officinalis* L.) is a well-known annual aromatic and pharmaceutical plant as regards the wide range of its potential pharmaceutical and cosmetic usages since extensive investigation has confirmed the abundance of different active phytochemical compounds responsible for the properties of the plant (Muley *et al.*, 2009). On the other hand only a narrow scientific knowledge has been gathered related to the optimum cultural practices, the efficacy of the organic cultivation and the correlation of the production methods with the quality characteristics of this species (Rouphaela *et al.*, 2010).

Aims: The aim of this study was to evaluate the effects of organic and conventional fertilization combined with the arbuscular mycorrhizal fungi inoculation on yield and floral qualitative characteristics of common marigold during 2015 growing season.

Materials and Methods: The experiment was set up as a split plot design with three replicates, three main plots (fertilization treatments, inorganic, organic and untreated) and two sub-plots (addition/not addition of commercial mycorrhiza of genus *Glomus* spp.). Floral fresh and dry weight, total phenolic and flavonoid content of the dried flowers were recorded.

Results: The results indicate no statistically significant differences at the fresh/dry floral yield, total phenolic and flavonoid content of the dried flowers under the different treatments of fertilization. The results also demonstrate a tendency of increase of the fresh or dry weight of the flowers when the commercial mycorrhiza is applied but it is not statistically significant.

Conclusion: In the present research work, we demonstrated that the organic fertilization of the *C. officinalis* is not inferior to the inorganic fertilization of the specific species for the characteristics of fresh/dry flower mass, total flavonoid and polyphenolic content. tional farming systems.

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HYDROTHERMAL LIQUEFACTION OF INVASIVE PLANT SPECIES BIOMASS

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Keywords: biomass valorisation, energy recovery, hydrothermal liquefaction

Introduction: In present, climate changes and invasive species are two of the most important threats to biodiversity and the provision of the ecosystem services. The presence of invasive species cause damage worldwide with impact on agriculture, forestry, aquaculture, power generation and recreation (Stanley and Muir, 2010).

Aims: The work is related to the issue of integrating invasive plants treatment into sustainable transformation pathways. The paper presents a comprehensive technological approach for hydrothermal liquefaction (HTL) applied on wetland biomass. To ensure the achievement of new bio products through the development of bio-based industries, critical data need to be provided when HTL process is involved (Audo et al. 2015, b).

Materials and Methods: The most important step in HTL is the establishment of process basic parameters, which are mainly indicated by the solvent specific phase diagram and biomass characteristics (biopolymers composition, moisture and ash contents).

Thus, *Ludwigia sp.* and *Typha sp.* are processed in different HTL conditions in order to optimise the conversion to bio oil. The following variants were used: biomass/water, biomass/water-ethanol, and biomass/water-butanol.

Results: By the experimental work carried out in a 1L pressure reactor it was found that water in association with ethanol ensure more than 70% of plant conversion and the most suitable temperature seems to be 300 °C. Also, the solid fraction is a carbonaceous material with a higher heating value of 4000 – 4100 kcal/kg and its ash content exceeds 30%. Also, water in association with butanol showed better results than those obtained in water use variant.

Conclusion: In the present research work, we demonstrated that invasive plants biomass can be used for the achievement of new bio products applying hydrothermal liquefaction (HTL) process.

SCREENING FOR STRESS BIOMARKERS IN SIX ROMANIAN POPULATIONS OF EUROPEAN LARCH (*LARIX DECIDUA* MILL.)

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Keywords: drought; *Larix decidua*; salt stress; stress biomarkers

Introduction: *Larix decidua*, the European larch, has a discontinuous distribution in Central and Eastern Europe and a broad vertical span from 200 to 2.500 m altitude. It is a fast growing species, very tolerant to low temperatures and winds. As the only deciduous conifer species in Europe, it is often used as an ornamental tree due to its changes in foliage colours in autumn. Larch, as many other trees from alpine habitats, could be directly affected by global warming and land-use changes, as well as by low-quality, saline irrigation water when grown as ornamental (Harfouche *et al.*, 2014; Loranger *et al.*, 2016). Therefore, the study of its responses to abiotic stress factors, as drought and salt stress is of great practical interest.

Aims: To perform an initial screening of abiotic stress markers in *L. decidua*, analysing some biochemical responses to drought and salt stress in different populations.

Materials and Methods: Two-month-old seedlings from six Romanian larch populations were subjected to one-month drought (no watering) and salt (150 mM NaCl) stress treatments in the greenhouse. After harvesting, relative water content (WC%), and malondialdehyde (MDA, an oxidative stress biomarker) and total carotenoid (Caro) levels were determined in the plant material.

Results: Both treatments caused a slight decrease in WC%, and increases in MDA contents, as compared to the controls, with small quantitative differences between populations. In general, for each population, salt stress had stronger effects than water stress on these parameters. Caro contents decreased only slightly in the water stressed plants; for some populations, differences with the controls were non-significant. On the other hand, salt-treated plants recorded stronger and significant reductions in all six populations.

Conclusions: These findings point to the homogeneity of the response to drought or salt stress among the different populations of Romanian larch – regarding the analysed variables – and indicate that the reduction in Caro contents can be used as a reliable abiotic stress marker in this species.

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EXPERIMENTATION OF GRAPEVINE CULTIVATION IN ORGANIC SYSTEM, ON FIVE DIFFERENT ROMANIAN VINEYARDS

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Keywords: *adaptability, organic system, pest control, weeds.*

Introduction: Organic viticulture is an alternative mode of production based on rational exploitation of nature. Within this research were evaluated for suitability of grapevine varieties recommended for five of the most important Romanian wine regions for cultivation in organic system.

Aims: To facilitate the introduction of organic system in these vineyards.

Materials and Methods: In growing centres Murfatlar, Dealu Mare, Târnave, Bujoru and Copou-Iasi, in 2013-2014 were set up five experimental plots with grape varieties for wine representative for each area, here are applied organic growing technology in parallel with the conventional (control). White varieties studied are: Chardonnay (Murfatlar and Valea Calugareasca), Sauvignon blanc and Muscat Ottonel (Tarnave), Feteasca regala (Tarnave, Bujoru and Copou-Iasi). Red varieties are Cabernet Sauvignon (Murfatlar and Valea Calugareasca) and Merlot (Bujoru). Trellis system is half-high with stalk of 60-70 cm height, except on Tarnave, where culture system is with short stalk. In each vineyards was applied a pest control scheme, in accordance with Reg. EC 834/2007 and Reg. EC 889/2008. The climatic factors spectrum of weed and pests, vine development phenophases and quality and quantity of harvest were observed.

Results: From the analysis on climatic years 2013-2014 and show that their annual average was an increase compared with the average of the thermal years 1991-2010. The water regime was kept constant, registering values close to the annual average, both during the growing season and at wine year. Weeds spectrum: in all vineyard are: *Agropyrum repens*, *Cynodon dactylon*, *Convolvulus arvensis*, *Capsela bursa pastoris*, *Taraxacum officinale*, *Polygonum aviculare*, *Stellaria media* and *Amaranthus retroflexus*.

Phytopathological status: degree of attack at downy mildew (*Plasmopara viticola*) oidium (*Uncinula necator*) and gray mold (*Botrytis cinerea*), was moderate to high in Tarnave, degree of attack being between 0,5 and 20 to version organic and 0,5 to 13 at conventional version. Concerning the harvest, the quantity in conventional variant was high with 2-25% than organic. Grape sugar content was close to both versions.

Conclusion: The study demonstrates that it is possible to adopt and implement environmentally progressive culture system of grape-vine vineyards in selected areas.

INFLUENCE OF HUMIDITY STRESS ON AUBERGINE CROP

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Keyword: *aubergine, production, humidity, soil*

Introduction: In order to meet the consumption requirements, according to the crops destination and way of preparing the fruits, the eggplant breeding process aims at obtaining some cultivars properly adapted to the climate and soil conditions from different culture areas (Tudor *et al.*, 2004). In this context, the selection of genotypes which are tolerant to the thermal and hydric stress represents a major objective of the eggplant breeding activity (Saleh and Saud, 1995).

Aims: The reduced soil humidity level has detrimental irreversible effects on the aubergine crop, by massive abortion of flowers and qualitative fruit spoilage. To establish the soil humidity threshold favorable to this crop a series of experiments have been carried out, of which some results are being presented here on the interaction soil-water-plant-climate, under conditions of optimal supplying and at various water stress levels.

Materials and Methods: The biological material represented by the two varieties of eggplants (Luiza and Eleonora varieties) was studied in bifactorial experiences, with the factors variety and humidity regime, put in subdivided plots. The production data were statistically processed by way of variance analysis, while the level of significance of the production differences was established by means of the difference limit (Ciulca, 2002).

Results: From the results of production determined by the interaction of humidity factor of production, results distinct differences (60% moisture ceiling of I.U.) and significant (90% moisture ceiling of I.U.). Concerning the manifestation of the biological potential of the variety, was found significant differences in favor of Luiza variety.

Conclusion: Aubergine crop prefers balanced soil humidity regime, not lower than 60 % of the range of available moisture content, being however not higher than the normal field capacity of soil.

Under certain environment conditions the soil humidity level favours relevance of soil productive potential. Lucia variety was more resistant to hydric stress than Eleonora.

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PECULIARITIES OF THE SEED GERMINATION AND GROWTH OF THE GREEN PEAS PLANTLETS UNDER CONDITIONS THERMIC STRESS

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Keywords: *frost green peas, seedling, thermic stress*

Introduction: The physiological indices used to estimate the biological quality and potential of the seeds comprise, besides the germinating energy and ability, that allow to evaluate the level and uniformity of the seeds vitality, the ability of the plantlets to grow during germination, as well as their response to the effect of the unfavourable factors, such as the stress caused by temperatures below 0°C (frost) (Burzo, 1993; 2015).

Aims: Study of the physiological indices used to estimate the biological quality and potential of the seeds.

Materials and Methods: The study of the plantlets growth under normal and unfavourable temperature conditions was carried out on several categories of biological material, consisting of material and parental forms, the resulted hybrids, cultivars, promising lines, etc. Considering how useful it is to know the values of some specific indices for the estimation of the resistance to frost, the authors studied the peculiarities of the green peas plantlets growth under favourable and unfavourable conditions, by simulating the negative thermic stress (frost) by means of reducing the temperature up to -10°C. To this purpose the momentary and total permeability, the value of the relative harming index, the percent survival of the plantlets and the dry matter content were studied (Guy *et al.*, 1998)

Results: The results obtained demonstrated the repressing effect of the hypothermic stress conditions on the plantlets 9 - 27 days old (Some of the indices under study, such as the relative harming index and the percent survival, can be used to characterize the genetic material and to select it for further breeding).

Conclusion: The permeability of tissues, the momentary and total, has grown strongly after stress caused by frost. The degree of damage of the tissues depends on age when stress plantlets (between 9 and 27 days).

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THE GROWTH OF DIFFERENT APPLE CULTIVARS IN THE FIRST YEARS AFTER PLANTING

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Keywords: *genotypes, heritability, pome trees, vigour, young orchard*

Introduction: The vigour of the apple trees is a highly topical element of productivity in new established orchards (Mitre *et al.*, 2009). The worldwide trend in fruit growing is to increase the intensity of crops, an objective that is achieved through the establishment of intensive plantations, with a large number of trees per hectare (Mitre *et al.*, 2011). By associating a properly combination of variety and rootstock, with a modern technology, new plantations with high density can be established, with obvious advantages (maintaining trees of low growth, easy harvesting of the fruit and pruning, reducing the cost, high production at area unit, etc.).

Aims: To estimate the growth vigour of the apple trees, as a complex trait, with a heredity rather difficult to estimate due to the influence of the rootstock on the variety, and different interactions among genotype and ecotype.

Materials and Methods: Thirty apple cultivars planted in a new orchard at the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca were studied after two years from planting. The trees were grafted on M9 rootstock and the planting distances used were 3.5×0.9 m (3,200 trees/ha), while the training system was 'Slender Spindle'.

Results: A high vigour, evaluated by the trees' height and trunk diameter, was registered at Yellow Transparent, Bramley Seedling, Florina, Belle de Boskoop, Granny Smith, Gala Shinga, Rubine Rosso, Fiesta, Melrose and Gloster. On the contrary, the lowest vigour of growth was recorded at Lena, Evereste, Pinova, Laxton Superb, Discovery, Gala Mitchigala, Pinova, Yonagold Rubin Star, Gala Must, Fuji Kiku and Rozela cultivars. The coefficient of heritability had high values for all traits that define vigour (height, diameter, shoots length), therefore, the manifestation of elements of the trees was strongly influenced by the genotype and in a relatively small level by the environmental factors. The only deviation from a strong genetic heredity was recorded for the number of branches, which was significantly influenced by the environment.

Conclusions: An effective way of promoting new intensive plantations is to use varieties with low vigour. In order to create new cultivars and also for the adequate use of cultivars in new orchards, it is useful to know the vigour of genotypes; such data could be useful to intensify apple crop or in apple breeding for obtaining new cultivars.

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PEAR LEAVES PARTICULARITIES USED TO DISCRIMINATE DIFFERENT GENOTYPES AND POSSIBLE LINK WITH THE CHLOROPHYLL CONTENT

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Keywords: *genotypes, heritability, leave traits, variability*

Introduction: Among fruit trees, the authenticity is a valuable element that is easier preserved due the vegetative propagation. However, knowing the main traits of each pear genotype is useful for properly establishing the cultivar destination, as well as establishing the technology for the growing trees in orchards. These will assure expression of the maximum biologic potential, both as quantity and quality, respectively the practical value of the cultivars. In addition, the cultivars' features offer the possibility for its identification and protect the right of breeders and owner companies; even more, a solid knowledge in this regard would favour the properly use of different cultivars as genitors for pear breeding (Sestras, 2004; Militaru *et al.*, 2010).

Aims: The research was initiated in order to identify the variability and diversity of leave traits and the content of chlorophylls on different pear cultivars.

Materials and Methods: Twenty pear cultivars planted in a new orchard at the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca were studied regarding leaves traits (lamina - leaf blade peculiarities) and content of the total chlorophylls. The measurement of the leaves and chlorophyll analyses were made on representative leaves, collected at their maturity, in July, on several trees per genotype and from different position in the crown.

Results: The coefficients of variation (CV%) for length and width of leaf lamina had extremely low values (up to 5%) both within each cultivar but also among different cultivars. Per ensemble of the 20 cultivars, CV% for chlorophylls content was about ten (9.7%), with a large difference between the extreme values (1.1% at Hayatama and respectively 21.9% at Doyenne du Comice). Large dimensions of the leaves were recorded at Japanese cultivars, eg. Kumoi, Hayatama, Hosui, Shinseiki ('Nashi' type) followed by 'European type' Saint Remy and Kieffer Seedling. The content of total chlorophyll varied between 192.5 and 475.2 $\mu\text{mol}/\text{m}^2$. Compared to the average for all varieties (308.8 $\mu\text{mol}/\text{m}^2$), three cvs. were recorded with significant inferior values (Alexander Lucas, Kleiper and Novembra), and three, all Japanese, with superior differences (Kumo, Shinseiki, Tama) showing a possible connexion with leave' size.

Conclusions: The traits of the leaves differ significantly among the 20 pear cultivars studied. The leaf blade peculiarities could be use to discriminate pear genotypes and further studies could reveal if the chlorophyll content is correlated with yielding capacity or other traits.

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RESPONSES TO WATER STRESS AND RECOVERY FROM STRESS IN SIX HAZELNUT (*CORYLUS AVELLANA* L.) CULTIVARS

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Keywords: *Corylus avellana*; drought; stress recovery; water stress.

Introduction: Drought can be devastating for plants, and is probably the most important cause of reduction of crop yields worldwide, a problem that will worsen in the next decades due to climate change. This justifies the interest in elucidating the mechanisms of response to water stress in different crops; however, the possibility of finding appropriate conditions to recover water-stressed plants, by watering them before the drought treatment becomes lethal, has attracted less attention.

Aims: This study represents an initial attempt to define some biochemical markers that could be associated to the activation/inactivation of specific responses to water stress, in different *Corylus avellana* cultivars.

Materials and Methods: Responses to drought were analyzed in six cultivars of *C. avellana*. A drought treatment (by completely stopping watering) was applied to three-year-old trees, during ten days; then the trees were watered again. Leaf material was collected at the end of the stress treatment and after 24 hours of recovery, and used to determine some common osmolytes [proline (Pro) and total soluble sugars (TSS)], as well as malondialdehyde (MDA, an oxidative stress biomarker), by spectrophotometric methods.

Results: After the drought treatment, Pro contents increased ca. 2 to 3-fold in all hazelnut cultivars, to decrease again to control levels after 24 h recovery, although quantitative differences among cultivars were observed. No significant differences in TSS levels were detected between cultivars or treatments. In general, MDA increased with stress and decreased after re-watering the trees, but the differences were relatively small and significant only in some cultivars.

Conclusions: Pro can be considered as a reliable marker of water stress in hazelnut. The differences observed between cultivars in stress-induced Pro accumulation and in the degree of oxidative stress, indicated that some cultivars are more tolerant than others and could be selected for cultivation in drought affected areas.

THE EFFECT OF USING GRAFTED SEEDLINGS ON YIELD AND QUALITY OF TOMATOES GROWN IN GREENHOUSE

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Keywords: grafted, non-grafted, tomatoes

Introduction: Tomatoes (*Solanum lycopersicum* L.) are one of the most consumed species worldwide. Fruits are rich in vitamins and minerals, which constitute a good support for human health (Dinu *et al.*, 2015). In Romania, tomatoes are grown in greenhouse, adopting continuous monoculture, which leads to degradation of performance, both quantitatively and qualitatively. Studies have shown that after four years of continuous culture, the productive efficiency dropped to 48%, making it necessary to adopt soil disinfection practices or other technical methods (Bogoescu *et al.*, 2011). Currently, appeared modern technological sequences in tomatoes culture with influence on increasing tomato production and quality. Using performant hybrids, grafting methods which reduce the number of chemical treatments and other technological sequences represent a viable alternative for sustainable agriculture. Grafting vegetable species is considered worldwide an innovative technology. Khah *et al.* (2006) showed that tomato grafting on compatible rootstocks, has positive effects on culture, on increasing production efficiency, determining thereby higher profits for farmers.

Materials and Methods: The experience was established at the Teaching Resort of the University of Craiova, Romania (44°19'N and 23°48'E) in 2013-2014. The experimental model included the following variants: V₁ non-grafted tomato (control), V₂ - grafted tomatoes with a stem and V₃ - tomatoes grafted with two stems. The biological material used was represented by the hybrid Loreley. Planting was carried out in equidistant rows spaced at 100 cm and between plants at 30 cm for variants 1 and 2 and at 60 cm between plants in the row for variant 3. The density for variants 1 and 2 was 37 000 plants/ha, and for variant 3, approximately 18,500 plants/ha. At harvest was determined average weight of the fruits, the production, by weighing/m² and the biochemical composition of tomato fruit (D.S.S, vitamin C, carotene, B-carotene, polyphenols and anti-oxidant activity).

Results: Regarding the studied variants, average fruit weight/plant increased in variants with grafted plants compared to the control. It was found a good productive capacity at variants with grafted plants with one stem and 2 stems. The control variant recorded an earliness of production with 7 days compared to grafted variants. Nutritional quality of fruits was variable depending on the variants studied.

Conclusion: The productive yield/m² increased the most in variants 2 and 3. Growing tomatoes by grafting resulted in a delay in harvest period by one week, compared to non-grafted tomatoes. Concerning fruit quality, it was highlighted an increase in acidity, in vitamin C content and antioxidant activity at grafted variants.

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GRAFTING OF ROMANIAN MELONS AND WATERMELONS FOR CULTURE FROM SOUTH AREA OF ROMANIA

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Keywords: cucurbits, grafted seedlings, Romanian scions

Introduction: The vegetable grafting is useful in Romania; it is more difficult in watermelons and melons and it is continuously developing. Bogoescu *et al.*, 2015 highlights a better resistance of the rootstock to *Meloidogyne incognita* and *Fusarium oxysporum* attack, compared to the ungrafted cultivar.

Aims: The research was aimed the establishing of the technological stages for seedling producing of scions (Romanian melons and watermelons) and rootstocks (F₁ hybrids of *Lagenaria siceraria* and *Cucurbita maxima* x *C. moschata*) for obtaining of grafted plant seedlings.

Materials and Methods: The experience was realized out on a collection consisting from two Romanian scions, melon (Fondant variety) and watermelon (Dochița variety) obtained at Research and Development Station for Vegetable Growing Buzău and two rootstocks, bottle gourd - *L. siceraria* (Emphasis F₁) and interspecific hybrid squash - *C. maxima* x *C. moschata* (Cobalt F₁). Fondant is early variety with yellow fruit, spherical and weight of 1,5-3 kg. It is cultivated in protected spaces and field. Dochița is semi-early variety with striped green fruit, spherical and average weight of 5,5 kg. It is cultivated in field. The obtaining of scion and rootstock plants was made according to the ecological requirements of the species. The grafting was made by annexation.

Results: Technological stages for producing grafted seedlings of Romanian melon and watermelon were established.

Conclusion: The grafting was performed successfully for cucurbit symbiotes (scions and rootstocks). These technological stages for grafting by annexation of Romanian melons and watermelons are recommended for cultures in the south area of Romania.

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RESEARCH REGARDING THE SIMULTANEOUS CONTROL OF THE PATHOGENS ON TOMATOES CROPS UNDER HIGH PLASTIC TUNNELS

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Keywords: *pathogens control, plastic tunnels, tomatoes*

Introduction: In Romania the most important pathogens are: *Alternaria porri* f. sp. *solani* (early blight), *Botrytis cinerea* (grey mould), *Fulvia fulva* (leaf mold), *Phytophthora infestans* (late blight) and *Erysiphe* sp. (powdery mildew).

Aims: During period of vegetation, the attack of mentioned pathogens are frequently overlapping. The aim of this research is to identify fungicide combinations for simultaneously control of pathogens attack.

Material and method: The research took place during 2015, under high plastic tunnels with multiple possibility of ventilation, using tomato hybrid Prekos F1.

For controlling *Alternaria porri* f. sp. *solani*, *Botrytis cinerea* and *Fulvia fulva* were used 7 variants: 1. chlorotalonil 500g/l 0.2% + iprodion 500 g/l 0.1%; 2. chlorotalonil 500g/l 0.2% + fenhexamid 500 g/l 0.08%; 3. chlorotalonil 500g/l 0.2% + methyl thiophanat 500g/l 0.14%; 4. methyram 80% 0.2% + iprodion 500 g/l 0.1%; 5. methyram 80% 0.2% + fenhexamid 500 g/l 0.08%; 6. methyram 80% 0.2% + methyl thiophanat 500g/l 0.14%; 7. Untreated check. For controlling *Phytophthora infestans*, *Erysiphe* sp. and *Fulvia fulva* pathogens were used 5 variants: 1. (dimethomorph 9% + mancozeb 60%) 0.2% + difenoconazol 250 g/l 0.05%; 2. (dimethomorph 9% + mancozeb 60%) 0.2% + methyl thiophanat 500 g/l 0.14%; 3. (fenamidon 75g/l + propamocarb clorhidrat 375 g/l) 0.2% + difenoconazol 250 g/l 0.05%; 4. (fenamidon 75g/l + propamocarb clorhidrat 375 g/l) 0.2% + methyl thiophanat 500 g/l 0.14% and 5. Untreated check. Were made 6 applications during vegetable period. There were made observations regarding the frequency (%) and severity (%) of pathogen attack and were calculated the attack degree (%) and efficacy (%).

Results: The best efficacy for controlling *Alternaria porri* f.sp. *solani*, *Botrytis cinerea* and *Fulvia fulva* were obtained with the variants: 1. chlorotalonil 500g/l 0.2% + iprodion 500 g/l 0.1% (92.7%); 3. chlorotalonil 500g/l 0.2% + methyl thiophanat 500g/l 0.14% (90.3%) and 6.methyram 80% 0.2% + methyl thiophanat 500g/l 0.14% (90%). For controlling *Phytophthora infestans*, *Erysiphe* sp. and *Fulvia fulva* the best results were obtained from: 3. (fenamidon 75g/l + propamocarb clorhidrat 375 g/l) 0.2% + difenoconazol 250 g/l 0.05% and 1. (dimethomorph 9% + mancozeb 60%) 0.2% + difenoconazol 250 g/l 0.05%, with 94.5% and respectively 94.0% efficacy.

Conclusion: There were identified several product combinations which provide a good control of main pathogens on tomatoes under protected crops.

ACTIVE INGREDIENTS COMBINATIONS FOR PATHOGENS CONTROL ON CUCUMBER CROPS UNDER HIGH PLASTIC TUNNELS

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Keywords: cucumber, pathogens control, plastic tunnels

Introduction: *Pseudoperonospora cubensis* and *Sphaerotheca fuliginea* are the most important pathogens on cucumber crops under high plastic tunnels.

Aims: The aim of this research is to identify active ingredients combinations for simultaneously control of these pathogens.

Material and method: The research took place during 2015, under high plastic tunnels with multiple possibility of ventilation, using cucumber hybrid Mirabelle F1.

For controlling *Pseudoperonospora cubensis* and *Sphaerotheca fuliginea* were used 7 variants: 1. (dimethomorph 9 % + mancozeb 60 %) 0.2% + myclobutanil 240 g/l 0.02%; 2. (dimethomorph 9 % + mancozeb 60 %) 0.2% + penconazol 100 g/l 0.025%; 3. fosetyl aluminium 80% 0.2% + myclobutanil 240 g/l 0.02%; 4. fosetyl de aluminium 80% 0.2% + penconazol 100 g/l 0.025%; 5. (iprovalicarb 8,4 % + cupper oxychloride 40 %) 0.2% + myclobutanil 240 g/l 0.02%; 6. (iprovalicarb 8,4 % + cupper oxychloride 40 %) 0.2% + penconazol 100 g/l 0.025% and 7. Untreated check.

Were made 3 applications during vegetable period.

There were made observations regarding the frequency (%) and severity (%) of pathogen attack and were calculated the attack degree (%) and efficacy (%).

Results: The best efficacy for controlling *Pseudoperonospora cubensis* and *Sphaerotheca fuliginea* was obtained on both variant 4. fosetyl aluminium 80% 0.2% + penconazol 100 g/l 0.025% (84.8%. 100%) and variant 3. fosetyl aluminium 80% 0.2% + myclobutanil 240 g/l 0.02% (83.7%, 100%).

Conclusion: It were identified several product combinations which provide a good control of main pathogens on cucumbers under protected crops.

ASPECTS REGARDING THE MANAGEMENT OF POPLAR STANDS IN CODRII SĂTMARULUI FOREST DISTRICT

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Keywords: *poplar, site conditions, stand management*

Introduction: Codrii Sătmăruului Forest District is managing poplar stands of different ages, from the seedling stage to old forest stage, in management unit II Someș, owned by administrative units.

Aims: The scope of this study was to identify biotic and abiotic factors that concur to the destructuring phenomenon of these stands, starting with the first development stages. Moreover, site conditions and silvotechnical activities specific to these types of stands were taken into consideration.

Materials and Methods: For reaching the proposed aims, samples were taken from the field, both from affected trees (wood, shoots, leaves) and from the soil.

Results: From observations made in the field in compartments 13, 26, 29, Management Unit II Someș and lab analysis, the presence of xylophagous pests was invariably found, both in strongly affected trees and in average affected trees. Where the stand was excessively loosened (consistency under 0.4), the presence of an undergrowth of indigo bush, elder, red dogwood and walnut was observed.

Conclusion: Both studies in the field and lab analysis showed that stands from the observed area are in a precarious state of vegetation, and their good management requires the emergency extraction of affected trees and ecological reconstruction of this area, by using adequate forestation formulas for site conditions of each particular situation.

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3. ***Norme tehnice privind compoziții, scheme și tehnologii de regenerare a pădurilor și de împădurire a terenurilor degradate

STUDIES ON THE BIODIVERSITY DIAGNOSIS OF VINEYARD FARMS AT THE AGRO-ECOLOGICAL INFRASTRUCTURE LEVEL (AEI)

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Keywords: *agro-ecological infrastructure, biodiversity, diagnosis.*

Introduction: In Romania, vine farms currently occupy approximately 180,000 ha and therefore an important part of biodiversity, functional or planned, is present. Given the intrinsic value of biodiversity, considered an essential factor in maintaining and enhancing the vineyard ecosystem sustainability, for the conservation and improvement of biodiversity in recent times, the emphasis is on stable elements of the landscape AEI (agro-ecological infrastructure).

Aims: The aim of this paper is identification and assessment of biodiversity in agro-ecological infrastructure (AEI), based on the status in situ, with the purpose of proposing an action plan to maintain or improve the ecosystem biodiversity of the vineyard.

Materials and Methods: Six vineyard representative locations were selected in Romania: vineyards Tarnave, Dealul Mare, Dealul Bujoru, Murfatlar, Iași-Copou and Ștefănești Argeș. Identification, localization of semi-natural elements (or AEI) and numbering of management units was carried out on aerial photographs at a scale of 1/2500.

The diagnosis was based on the identification and assessment of biodiversity AEI using qualitative and quantitative indicators.

Results: For the surveyed vineyards, the AEI percentage, based on actual area occupied, ranges between 7% and 35%.

The following had been drafted, based on the results: a map of the vineyard, a map of conservation issues, a map of the conservation status of AEI and a map of biodiversity management measures.

Conclusion: Strengthening agro-ecological infrastructure (AEI) in and around vineyards favours the overall abundance and diversity of beneficial species.

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MOBILE APPLICATION DEVELOPMENT FOR OPTIMAL AND RAPID DIAGNOSIS OF VINE DISEASES

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Keywords: *diagnostics, machine learning, vine disease.*

Introduction: In a perennial culture such as the vine, late and inaccurate identification of the damage caused by diseases and pests can cause significant crop losses or even the loss of the entire production. To support the growers in Romania, in 2010 we posted online on **Error! Hyperlink reference not valid.** a guide for diagnosis of vine diseases and pests. Between 2010 and 2014, thousands of growers have accessed the online version of the guide requesting information, often too late to act effectively. Thus finding a new solution, easily accessible to growers that would offer a faster diagnosis, was necessary.

Aims: Create a database of labeled images and write a web application for optimal and rapid diagnosis of the most important diseases of vine using the latest methods of processing and automatic detection of pathogens in images.

Materials and Methods: The software product was tested in 2015 on www.vitis.ro with a database of 1,200 labeled images of vine leafs showing symptoms caused by the most prevalent pathogens: *Plasmopara viticola*, *Uncinula necator*, *Guignardia bidwelli*, *Colomerus vitis*, *Calepitrimerus vitis*. Most of the images were made in experimental fields at SCDVV Blaj by specialists in phytosanitary protection of vines and were processed by computer scientists.

Results: The software identifies pathogens of vine from images also taking into account the geographical location and weather conditions, when available, with a high detection rate. More work needs to be done in order to obtain a large quantity of expert labeled vine leaf images to increase the detection accuracy in the field where we encounter different conditions and where the leaf background and light varies greatly and leads to a low detection rate.

We note that for *Calepitrimerus vitis* and for *Uncinula necator* the number of available images was below 50, thus leading to an overall lower accuracy. We were unable to find enough plants infected with the two pathogens during the period the pictures were taken.

Conclusion: The obtained results enable a quick and efficient resolution of problems of the vine and serve as a database for creating an intelligent module based on machine learning algorithms.

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PRELIMINARY RESULTS ON BEHAVIOR OF TRANSGENIC AND CONVENTIONAL PLUM TO NATURAL PPV INFECTION IN A NEW FIELD TRIAL

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Keywords: *natural infection, PPV, plum*

Introduction: Few transgenic clones of *Prunus domestica* L carrying the CP gene of *Plum pox virus* (PPV) were developed to obtain PPV resistant plums (Scorza *et al.*, 2004). One transgenic line, C5, subsequently named 'HoneySweet' (Scorza *et al.*, 2007) was found to be highly resistant to graft- and aphid-mediated inoculation by PPV in greenhouse and field tests (Ravelonandro *et al.*, 1997, 2000; Malinowski *et al.*, 2006, Polak *et al.*, 2008., Zagrai *et al.*, 2008).

Aim: The goal of the study is to continue to monitor the durability and stability of resistance to *Plum pox virus* in 'HoneySweet' transgenic plum.

Materials and methods. The work on resistance to PPV of 'HoneySweet' transgenic plum is continued in Romania at Fruit Research & Development Station Bistrita, with a new field trial started in 2013. The plot is surrounded by a large apple orchard so that a buffer zone of minimum 500 m to be secured. The experimental plot is arranged in 12 blocks of 4 trees (two trees of 'Honey Sweet', one tree of Stanley and one tree of Reine Claude d'Althan). *Prunus cerasifera* and *Prunus spinosa* were interspersed for coexistence studies (data not show). Source of PPV inoculum was provided, too. Limited treatments with insecticides were made within the experimental plot in order to stimulate the virus spread by aphids. PPV monitoring was made by visual observation (three times per year) and by DAS-ELISA (Double Antibody Sandwich – Enzyme Linked Immunosorbent Assay) testing.

Results: No PPV symptoms were observed on both 24 transgenic and 12 + 12 conventional plums from the experimental plot on 2014 and 2015. DAS-ELISA has confirmed the PPV free status in all those trees. PPV infected trees were found in *Prunus cerasifera* and *Prunus spinosa* since 2014, probable due to previous infection. Also, in the spring of 2015 no PPV was observed on the trees belonging to 'HoneySweet' and Reine Claude d'Althan. Typical PPV symptoms were observed on one tree belonging to Stanley and DAS-ELISA confirmed the virus infection.

Conclusion: PPV infection was recorded within experimental plot on Stanley cv., three years after planting, 'HoneySweet' and Reine Claude d'Althan still remained PPV free.

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INFLUENCE OF TEMPERATURE ON MYCELIAL GROWTH OF SOME *PLEUROTUS ERYNGII* AND *LENTINULA EDODES* STRAINS *IN VITRO*

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Keywords: *Lentinula edodes*, mycelium, *Pleurotus eryngii*

Introduction: *Pleurotus eryngii* (King oyster) and *Lentinula edodes* (shiitake) are two of the most important and popular cultivated mushrooms worldwide. These speciality mushrooms are considered as a delicacy with high nutritional and functional value and are also accepted as nutraceutical foods. They are of considerable interest because of their organoleptic merit, medicinal properties and economic significance (Chang and Miles, 2008; Chen et al., 2013). Successful cultivation of these mushrooms requires a spawn with high productive potential, able to quickly colonize the culture substrate. Factors such as composition and pH of the nutrient medium, temperature and CO₂ concentration play an essential role in growth of the mycelium and preparing of the next mushrooms production. (Philippoussis, 2009). This paper examines the influence of temperature on mycelial growth of some *P. eryngii* and *L. edodes* strains of different origins.

Aims: The aim of the investigation was to determine the optimal temperature for *in vitro* cultivation of each of the eight strains under study.

Materials and methods: Different strains, *P. eryngii*-4 and *L. edodes*-4, were inoculated and grown on PDA media in tubes/Petri dishes, in four replicates. Mycelium extension rates were evaluated at 18°, 24°, and 30°C. The results were statistically processed and interpreted on the basis of calculated limit differences: DL5% DL1%, DL0.1%.

Results: The growth rate increased progressively along with the rise of incubation temperature from 18°C to 30°C. The fastest strains, with statistic assurance, were Pery-G of *P. eryngii*, at 30°C, and Led-S, LeM-51 of *L. edodes*, respectively. The *L. edodes* strains grew slower than those of *P. eryngii* under the given conditions.

Conclusion: Growth speed of *L. edodes* and *P. eryngii* strains cultivated *in vitro* is determined by genotype and is strongly influenced by temperature. The growth rate increased progressively along with the rise of incubation temperature from 18°C to 30°C.

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EFFECT OF NUTRITIVE MEDIA AND PH ON *IN VITRO* MYCELIAL GROWTH OF SOME *PLEUROTUS ERYNGII* STRAINS

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Keywords: *Pleurotus eryngii*, nutritive media, pH, mycelium

Introduction: *Pleurotus eryngii* (*P. eryngii* var. *eryngii*) originated from Mediterranean Sea shores, but it is also found in Asia, where this mushroom is traditionally cultivated. It grows in close association with umbelifers and produces highly priced edible mushrooms. Many countries have undertaken to grow it commercially: China, Japan, South Korea, Australia, South Africa, USA. *P. eryngii* is known in Europe under names like cardoncello/cardarello (Italy), King oyster, French horn mushroom. Besides its major nutritive qualities, *P. eryngii* is a mushroom of biomedical importance, containing a number of bioactive components which activate the immune system for a multitude of defensive functions (Valverde & col., 2015).

P. eryngii represents a new species for Romanian growers.

Production of spawn necessary for spawning and knowing its behavior during the growing phase (incubation) represents a first step towards the introduction of this species in culture. In order to evaluate the best growing conditions for *P. eryngii* mycelium we have tested 3 nutrient media at 3 different pHs.

Aims: The aim of the investigation was to determine the best nutritive medium and the optimal pH value for the *in vitro* cultivation of each of the four strains under test.

Materials and methods: First, four different strains of *P. eryngii* were inoculated and grown on PDA, MEA and WEA media in tubes/Petri dishes, in four replicates at 24 °C, pH 6.5, in the dark. In the next experiment, we checked the mycelial growth in the same medium but at 3 different pHs. Mycelium extension rates were evaluated after 7 and 10 days. The results were statistically processed and interpreted on the basis of calculated limit differences: DL5%, DL1%, DL0.1%.

Results: All 4 experimental strains showed higher growth rates in MEA medium, followed by PDA and WEA media. The initial pH range of 6.0-6.5 proved to be the best for the tested strains.

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REACTION OF *SEDUM SPURIUM PURPURTEPPICH* EXPOSED TO THERMAL AND HYDRIC STRESS

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Keywords: *dehydration, stalks, temperature, water loss*

Introduction: *Sedum* species are appreciated for their ability to grow in harshest parts of the gardens, they are easily facing dryness of summer, while most other plants less resistant to these conditions wither and die (Tan and Sia, 2005).

Aims: The analysis tried to find out what is the behaviour of this cultivar on extreme ecological conditions (high temperature and completely devoid of water) in order to be used in green roofs designs.

Material and Methods: The experience was developed in the didactical field of the Floriculture department of UASVM Cluj-Napoca. There were used sterile stalks of *Sedum spurium* cv. *Purpurteppich*, grown in outdoor ecological conditions. The biological material was exposed to height temperature (30-55°C) and lack of water for 10 days.

Results: Analyzing the results regarding the modifications of the weight of stalks exposed to height temperature and lack of water, can be noticed that in the first days, the weight of the sterile stalks is suddenly decreasing, while, in the next days, the loss of water is lower than in the first days, reaching to only 0-2 grams/day. Also, by reporting the losses of water (partial and cumulative) to fresh mass of plants of previous determination show some growth. This can be explained by the variability of environmental factors from day to day.

The amounts of water lost due to exposure of stalks to hydric and thermal stress are statistically significant form one day to another.

Conclusion: The first and most affected are the leaves in the reverse order of their emergence. The leaves at the base of the stems are the oldest and they are the first affected. They totally lose turgor, wither and they finally dry out. But stems, buds and leaves of apical part of the plant proved to be very strong.

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SECTION 5: ECONOMICS AND RURAL DEVELOPMENT

PRODUCTION OF APPLES AS POSSIBILITY FOR FAMILY FARMS DEVELOPMENT

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Keywords: *apple, development, economic effects, production, family farm.*

Introduction: Most apple producers in Serbia are family farms characterized as small holdings with small economic power. As most of registered farms, analyzed family farm is still in the process of specialization of production.

Aims: The paper analyzes the conditions and results of plantation establishment and production of apples on the family farm located in Rasina District in Central Serbia. The aim is to determine the cost effectiveness of invested funds for apple orchard establishment on the analyzed family farm.

Materials and Methods: Sources that were used in the preparation of the paper were written materials related to the production of apples and instruments of economic analysis, organization and business economics. As a primary source of information accounting calculations were used, technological table of apple orchard establishment, internal records and the pilot version of the business plan of apple producers at the family farm. For more accurate view and better monitoring of data domestic and foreign literature, internet web sites, available statistical data on the production of apples and publications related to apples production has been used. Methods used for the paper preparation were: calculation of plantation establishment, cash inflows and outflows for the period planned for orchard exploitation, and indicators of economic efficiency.

Results: Total cost of planting of apple orchard on the family farm amounts to € 16,080 for one hectare. All economic indicators show positive results. In the assessment of static model of economic efficiency indicators of investment were used: efficiency, profitability and productivity, which also have positive results. The production is efficient, since the ratio is greater than zero. Planned production is profitable, because profits participate with 71% in total production value. Calculating productivity, it was found that production of one tonne of apples required 822 hours of workers' labour.

Conclusion: This study was aimed to determine economic effects of establishing the apple orchards on the family farm in Brus. Establishing apple orchard is certainly high-budget investment, but it can be concluded that the economic effects of raising apple orchards on the farm in Brus was economically justified and cost-effective, based on the analyzed result.

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ECONOMIC IMPORTANCE OF TOURISM, CASE STUDY: NORTH-WEST DEVELOPMENT REGION

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Keywords: *economic impact, tourism, region*

Introduction: Research conducted on the economic role of tourism revealed the major impact it has on the economies and cultures in different countries. It acts on multiple levels: economic, political, social, cultural and may determine major favourable changes in the economy of different regions. This branch of economy is able to ensure prosperity to less-favoured areas, by developing areas devoid of high economic-value resources, but exhibiting natural and human tourist resources. Therefore, tourism is considered a lever in diminishing inter-regional disparities.

Aims: The purpose of this paper is to emphasize the importance of tourism in the North-West Development Region and identify methods for the regional development of this sector. The paper aims to analyze the contribution of tourism in the gross domestic product, as well as for employment rates in the North-West Region.

Materials and Methods: The study material is represented by the North-West Development Region. Statistical data about the main indicators of tourist circulation in the North West Region were obtained from official governmental sources. The bibliographical study was used to present the current situation of the touristic activity in the region and in order to interpret the results. The analytical research envisions the emphasis of direct and indirect effects that tourism exerts on the economy.

Results: The study provides an analysis of the evolution of tourism in the North-West Region, following the dynamics of tourist circulation in the 2000-2015 period for every county in the region, thus emphasizing the manner in which these components act on certain economic factors such as the increase in the GDP and employment.

Conclusion: Tourism in the North-West Development Region generates significant employment and contributes to the increase in the general GDP. The main issue that tourism faces in this region resides in an unevenly-developed tourist offer in the region, thus leading to significant disparities between counties.

THE IMPACT OF ANTI-SMOKING LAW IN ZAZA CAFÉ AND LOUNGE IN THE CITY OF CLUJ-NAPOCA

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Keywords: *Consumer opinion, legislation, smoking, impact*

Introduction: Following the European Union member states tendency in adopting legislative measures against the pollution generated by consuming tobacco products, Romania adopted in 2016 its own legislation, the No 15/2016 law, also known like “Anti-smoking” law. The law prohibits the smoking in public closed spaces including bars and it was perceived as excessive by a great part of population.

Aims: The aim of this work is to assess the impact of the law in one of the well-known bars in the city of Cluj-Napoca, concerning the general opinion, the future client’s behaviour regarding the number of visits, the alcoholic and non-alcoholic beverage consumption and to determine which the most vulnerable client categories are.

Materials and Methods: An omnibus questionnaire was administered to a representative sample of clients intending to describe their behaviour related to Zaza Café. The results were extracted using the corresponding statistical tests using the computing program of SPSS and Excel. An Internet opinion poll programme of “Isondaje” was used.

Results: The number of Zaza clients are equally splitted between masculine and feminine sex, the first one having a visit frequency higher than the second one. Also the total consumption of the man is higher compared to women consumption especially based upon the alcoholic drinks. The main attractive factors in visiting the bar are: the alcoholic and non-alcoholic beverage variety, the quality of music, the special events and the general atmosphere.

Conclusion: Following the present research work, we demonstrated that the impact of anti-smoking law will decrease the total income-consumption in the Zaza Café by 4-10 % mainly by the reduction of the number of smokers, which are also the main consumers of alcoholic drinks.

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SECTION 6-7: ANIMAL SCIENCE AND BIOTECHNOLOGIES

DETERMINATION OF METABOLIC RATE IN FISHES. A REVIEW

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Keywords: aerobic scope, fish metabolism, metabolic rate, oxygen consumption, respirometry

Introduction: Fish metabolism is defined as all biochemical processes in order to ensure growth and development of the organism, as well as the energy necessary for maintenance of vital processes. The determination of metabolic rate is linked directly with oxygen consumption (MO_2) and can be measured through respirometric experiments conducted in the laboratory, where environmental factors can be controlled. Whole-animal metabolic rate (MR) and aerobic scope (AS) are influenced by a variety of factors, endogenous (e.g. body mass) and exogenous (e.g. temperature, dissolved oxygen concentration). There is a minimum MR called basal (BMR) or standard MR (SMR) when activity of the organism is very limited, such as small fin movements to maintain position in a respirometer and a maximum metabolic rate (MMR) where the fish is subjected to different actions (e.g. swimming against higher water velocities) and the oxygen consumption reaches the upper limit. Aerobic scope represents the difference between minimum and maximum oxygen consumption rate (MO_{2min} and MO_{2max} respectively) (Clark, Sandblom and Jutfelt, 2013).

Aims: The aim of this paper is to review the terminology and methods associated with fish metabolism.

Conclusion: In conclusion, determination of fish metabolic rate is important for fishery management (estimation of carrying capacity in a rearing unit, shipping live fish, holding fish etc), for the developing bioenergetics model. Also, understanding the metabolic rate of a species has a great importance because it gives us information on how an organism consumes and utilizes energy, in addition it offers an insight into its biology from the level of its cells to its ecology.

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BEHAVIOUR AND PERFORMANCE OF JUVENILE RUSSIAN STURGEON *ACIPENSER GUELLENSTAEDTI* AT DIFFERENT WATER VELOCITIES

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Keywords: *Acipenser gueldenstaedti*, swim tunnel, oxygen consumption.

Introduction: Swimming ability among fishes can vary with differences in anatomy (e.g. position of fins and type of tail), physiology and behavior (Peake & Farrell, 2006). While there is a relatively large amount of information about various salmonid species, only few studies provided details about oxygen consumption and swimming behaviour at sturgeons. Generally sturgeon's behaviour in swim tunnels has been characterized as relatively docile with few violent movements or bouts of restlessness.

Aims: The aim of this paper was to investigate the swimming performance and the behaviour at *Acipenser gueldenstaedti* juvenile, for two distinct classes of weight.

Materials and Methods: Laboratory experiments evaluated fish swimming performance over a set of controlled replicable levels of activity. This was accomplished using a 156 L swim tunnel (Loligo Systems, Denmark) that provided recirculating water flowing through a holding compartment (dimensions: 70 cm length, 25 cm width, and 24 cm height) where fish were placed. Swimming velocity was increased by 10 cm/s steps until the fish was exhausted. A fish was considered exhausted when it rested at the back grid of the swimming chamber for >10 s. In this experiment we used five juveniles of Russian sturgeon (*Acipenser gueldenstaedti*) with a mean body mass of 375 ± 0.85 g and 480 ± 1 g. Prior to the start the trial fishes were fasted for 12h. After the experiment ended, we calculated the oxygen consumption, standard and active metabolism rate, optimum swimming speed velocity, critical swimming speed and tail beat frequency.

Results: As expected from the experimental design there was a significant difference between groups. Smaller fish were more active than larger fish, also oxygen consumption increases as fish get larger. At low and intermediate speeds, juveniles of Russian sturgeon keep their position in the swim tunnels by pressing their bodies and pectoral fins against the bottom.

Conclusion: As a conclusion the body size affects the swimming performance of sturgeons, also resting oxygen consumption rate decreased with fish mass.

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RESULTS OBTAINED BY INVESTIGATING SAFFRON USING FT-IR SPECTROSCOPY

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Keywords: SAFFRON, FT-IR

Introduction: Saffron is one of the highly prized spices known since antiquity for its color, flavor and medicinal properties. It contains several plant-derived chemical compounds that are known to have antioxidant properties.

Vibrational spectral techniques, FT-IR, offer several advantages in the context of current research and using these techniques we can identify molecular components in the samples studied.

Aims: Because the saffron has very important medical properties, it is necessary to conduct experimental studies that we analyzed several molecular structures using vibrational spectroscopic techniques.

Materials and Methods: For FT-IR measurements were performed in the absorbance with a spectrophotometer FT-IR-4100 Jasco, using the KBr pellet technique. The spectra were obtained in the wavenumber range 265 cm⁻¹. Spectral resolution was set at 4 cm⁻¹ and all spectra were acquired over 256 scans. The sample was obtained from 0.003 g of commercial saffron.

Results: The bands attributable to the saffron have been analyzed and discussed in comparison to those from the FT-micro-Raman measurement of the literature (1). The major changes were observed in the spectral ranges where the carbonyl group exhibits characteristic vibrational modes.

Conclusion: Using vibrational spectroscopy, it was proven that we can identify key molecular components in the samples studied and their molecular structure.

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DNA BARCODING - NEW METHOD FOR SPECIES IDENTIFICATION

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Keywords: DNA barcoding, mtCO I gene, specie identification.

Introduction: "DNA barcoding" was proposed as a useful tool to identify the animal species. certain short sequences of DNA is used to identify all species based on, a standard part of the genome. This method is gaining an increasingly practical applicability being used in phylogenetic studies but also to identify biological specimens of foods.

In this paper we describe the identification of three species (mammals): *Ursus arctos*, *Bison bonasus* and *Canis familiaris*. The two primer pairs were chosen in order to cover a larger number of species from bio fauna and manufactured products.

Aims: The goal was to identify three species (mammals), from collected raw material, using two systems of molecular markers and to select the best marker systems that can be applied for developing the DNA barcoding method. The two primer pairs were chosen in order to cover a larger number of species that could be identified in bio fauna but also in other manufactured products.

Materials and Methods: The biological material was collected from three mammals species : and *Canis familiaris* DNA was isolated from collected samples and control using commercial kit. The amplification was performed by PCR using two primer pairs. The resulted amp icons were sequenced and compared with reference DNA barcoding sequences.

Results: From the studied species the sequence of interest, mtCO I was multiplied by PCR method with both of primers pairs. The sequence obtained after sequencing and bioinformatics analysis revealed that in the case of *Ursus arctos*, *Bison bonasus* the primers can be used in species identification. In the case of *Canis familiaris* , it is difficult to obtain a reference sequence from the data base because of high intraspecific genetic diversity.

Conclusion: In the present research work, we obtained sequences DNA barcoding specie identification for three species, considering that the biological material was collected from our country. Also we realized a comparing study between two individuals belonging to the same specie (*Canis familiaris*).

HONEYBEE AS BIOINDICATOR OF HEAVY METALS IN URBAN AREAS AND WILDLIFE RESERVES OF TWO ITALIAN REGIONS

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Keywords: *Apis mellifera*, biomonitoring, pollution, contamination, ICP-AES.

Introduction: During the last 40 years, bees have increasingly been employed to monitor environmental pollution by heavy metals in territorial and urban surveys, pesticides in rural areas and also radionuclide presence in the environment. As bio indicator, the bee holds several important morphological, ecological and behavioral requisites, and man's beekeeping assures a potentially unlimited supply. Changes in the quality of bee honey are also caused by the contamination with micro-polluting agents, toxic to consumers.

Aims: Our investigation was carried out to monitor the heavy metals pollution using bee honey as bioindicator in two different environments: the Regional Park of Matese as a protected natural area in NE Campania (South Italy) vs urbanized areas of the Molise Region (Center Italy).

Materials and Methods: Eight apiaries owned by eight volunteer beekeepers were selected to participate to this survey: four apiaries were located in different districts of Regional Park and four in urban or industrial landscapes in Molise. All samples were collected from four hives in each apiary at intervals of one month during the laying period (April to October, 2015). The honey samples were taken from several honeycombs with a plastic cutter and no smoke was used when the hives came open. ICP-AES was used for heavy metal detection thus the resulting average sample of honey was subjected to statistical analysis. All beehives were monitored continuously for the entire survey period, also from the sanitary point of view.

Results: Sixteen elements were analyzed of which Cd and Hg were always lower than 0,001 ppm in all the apiaries, while Al, Fe, Ba, Cr, Mn, Mo, Ni, Pb, Cu, Sn, Ti, V, Zn and As resulted lower in the hives of Regional Park of Matese respect to apiaries than urban and industrial district of Molise. It is established that the average values of the detected chemical elements in the tested samples of bee honey are within the acceptable limits in our country and abroad for foodstuffs of animal origin for which not encounter any problem both from a qualitative point of view or commercial.

Conclusion: This study confirms the efficacy of honey bees in detecting environmental contaminants, such as heavy metals. Most importantly is that honey bees, unlike other environmental monitoring methods, capture and assimilate the bioavailable fraction of the pollutants so the bee families and the honey yielded by them are suitable biological indicators for the pureness of the environment and can be included in the monitoring systems ecological and help in the recovery of wild growing plants and the regulation of the biological equilibrium.

**A NEW SIGNALING FOR RATAN GOBY,
PONTICOLA RATANNORDMANN, 1840 (GOBIIDAE: PERCIFORMES)
IN THE ROMANIAN COASTAL WATERS OF BLACK SEA**

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Keywords: *Ponticola ratan*, Black Sea, new signaling, migration

Introduction: The Gobiidae family comprises a large number of acantomorph fishes (over 1120 species), being described so far 170 genera (Thacker and Roje, 2011). Bănărescu (1964) describes 27 species belonging to this family within and Romania's territorial waters. Few researchers subsequently studied these fish (Otel, 2007) because of no economic importance. Being generally small size fish, they are benthic marine and brackish water dwellers, but also found in some freshwater environments, returning to the attention of biologists, because their migrations of recent decades appear to be atypical, as are their reasons for migration.

Aims: In the context of climate change and human impact on the natural environment, we intend to establish the causes of the migration routes changes and the migration seasons of fish, in this case the Rattan Goby, in the Black Sea coastal waters.

Materials and Methods: The Rattan Goby specimen was captured accidentally, after a fishing session for Horse Mackerel (*Trachurus mediterraneus ponticus*). Whereas the species of gobies in the Black Sea are highly similar, *Ponticola ratan* species identification was made on the basis of specific morphological characters and features of the scales.

Results: The ratan goby is a species common in the northwestern region of the Black Sea and Azov Sea coastal waters, often encountered on the Ukrainian coast. In Romania, this species was first reported in 1960 near Mangalia, subsequently being mentioned four specimens at Sulina and one specimen near Gura Portiței. Due to the specimen we have caught near Sfântu Gheorghe Village (Tulcea County), it is the 7th report of this species in the Romanian Black Sea coastal waters. Its presence seems to be related to the climate changes that led in 2015, to the early migrations of Horse Mackerel schools. There is a common pattern and relationship between the Horse Mackerel migrations and the Rattan Goby migrations.

Conclusion: The Rattan Goby presence in the Romanian Black Sea coastal waters, seems to be due to specific climatic changes that occurred in 2015.

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BIOACTIVE COMPOUNDS AND ANTIOXIDANT CAPACITY FROM FIVE TYPES OF SEEDLINGS

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Keywords: *antioxidant capacity, bioactive compounds, seedlings*

Introduction: After germination process, the green seedlings accumulate important quantities of bioactive compounds such as enzymes, vitamins, minerals, chlorophylls and nutrients. Arugula seedlings have low calories, contain high amounts of iron and potassium, and represent a rich source of fiber and vitamins and wheat seedlings which contain numerous vitamins and minerals, thiamine, with co-factor enzymatic role (Nunes *et al.*, 2013).

Aims: The current study makes a comparison between different bioactive compounds and their antioxidant capacity, after the seedling germination and growth of five seeds (arugula, lentil, wheat, beans and mustard) both on soil in a pot (natural system) or directly on cotton wool soaked in water (artificial system).

Materials and Methods: In this study the following bioactive compounds were analysed: the content of lipase and of vitamin C using the titrimetric method, the content of chlorophyll *a* and *b*, with the spectrophotometric method. Also, the carotenoids content was analyzed using the chromatographic method and the antioxidant capacity with spectrophotometric method.

Results: The data of the present study showed that the highest amount of zeaxanthin, β - carotene and chlorophyll *a* was found in cultivars of wheat grown in natural system, the highest quantity of vitamin C was obtained in cultivars of lentil and wheat in natural system, while the highest antioxidant activity was found in cultivars of wheat, lentils and beans, though in this case with no statistical differences between the systems. The lipase activity is statistically different between types of seedlings, but statistical differences of lipase activity for the same seedlings in different systems exists only lentil and arugula seedlings.

Conclusion: The results show statistical differences between the values of bioactive compounds in the five types of seedlings but also in the values obtained for the same seedlings in different systems. The best cultivars having high nutritional quality for human consumption are wheat seedlings followed by lentil ones.

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Acknowledgements. This work was supported by the grants of the Romanian national Authority for Scientific Research CNCS-UEFISCDI, project number PN-II-ID-PCE-2011-3-0721.

ALTERNATIVE SOURCES OF REPLACING FISH MEAL

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Keywords: *fish meal, fish oil, protein sources.*

Introduction: With a production around 90 million tonnes in 2012, aquaculture remains the fastest growing food production sector, and is set to play a key role in meeting the rising demand for fishery products (FAO, 2014). The continuous development of aquaculture, led to limited availability of fish oil (FO) and fish meal (FM) resources. Generally, in a fish farm, feeds account up to 70% of the variable production cost, mostly due to the high price of the FM and FO. Due to the uncertain availability of fish meal and to the fact that FM doubled the price in recent years, many fish nutritionists have concentrated their efforts to find alternative protein sources to substitute fish meal in the diet of fish (Bokka Pavan Kumar, et al 2014). However, these alternative sources must be able to supply adequate non-essential and essential amino acids required for the growth of the fish. Furthermore, most plant protein sources contain antinutritional factors which can affect growth, nutrient utilization and fish welfare in general (Francis et al., 2001).

Lately, there are many preoccupations in this field and different ingredients were studied in the search for an alternative protein source for fish feed, such as: defatted soybean meal, rapeseed/canola meal, cottonseed meal, *Leucaena* leaf, Spirulina, and so on, or some animal alternative sources, like earthworm or other animal byproducts.

Aims: The aim of this study was to review some alternative protein sources used in aquaculture sector.

Conclusion: Many attempts were made by fish nutritionists in order to reduce the cost in the aquaculture industry by replacing FM from fish feed. However, a reduced use of FM and FO still remains a challenge for fast growing and sustainable aquaculture production and further researchers are needed in this field.

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ASSESSING THE CHEMICAL STATUS OF WATER FROM WELLS WHICH SUPPLY FARMS LOCATED ON ROMANIA'S TERRITORY. PART II

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Keywords: cow, drinking water, NO₂, NO₃,

Introduction. Cause of impurification with nitrates of wells are dependent by: nature of the soil or anthropic influence through using fertilizers based on nitrogen or improper location and cleaning of wells (Iacob Oanași col, 2012). Nitrites indicate older source of contamination of the aquifer (C.ElMahdy, 2013)

Aims: assessment of chemical status of 63 water wells located on the territory of Romania by point of view of chemical parameters: NO₂, NO₃

Materials and Methods:determination of nitrites(SRISO 6777/96),nitrates (SRISO 7890/1-98), report nitrates and nitrites in accordance with the L.458/2002, was performed at 63 wells that belongs to the decentralized system from the territory of 5 counties by Romania: Alba (AB- 7 wells), Buzău (BZ-6 wells), Cluj (CJ-33 wells), Mureș (MS-1 wells), Sălaj (SJ-6 wells).

Results: From the total number of samples analyzed (63-100%): in 48 (76.19%) from samples were obtained values below 0.5 mg/dm³NO₂ attesting good chemical states of water, distributed as follows:61.90% (39) from samples with values under 0.3 mg/dm³, 14.29% (9) samples with limits between 0.3-0.5 mg/dm³ and on 23.81% (15) aquifer is polluted with higher concentrations which exceeding the maximum admissible concentration(0.55-0.91 mg/dm³) for this parameter. Although average per county not indicate nonconformities in the chemical states of water in relation withNO₃ parameter, there is a sinuous curve of individual values: 9-73 mg/dm³AB; 35-71 mg/dm³BZ; 4-66 mg/dm³CJ; 9-63 mg/dm³MS; 12-49 mg/dm³SJ, as such poor chemical state from point of view of this parameter was recorded at one well from AB, 3 samples (50%) BZ, 9% (3) from sampleshave recorded exceeding at this parameter în CJ county, 1 samples (9%) in MS and in SJ countyall samples analyzed were enrolled in the permissible limits (12-49 mg/dm³).At the level of eight wells by 63 wells are

foundnonconformities in the report of $\frac{NO_3}{50} + \frac{NO_2}{3} \leq 1$, the values exceeding the threshold: 1.65 AB; 1.14,1.27, 1.45 BZ; 1.19, 1.28, 1.52 CJ, 1.30 MS.

Conclusion.Water consumption with the obtained values at the two parameters not reveal real danger of intoxication for livestock if are taken into account in optimizing the feed rations

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QUALITY ANALYSIS OF RAW COW MILK FROM THE COJOCNA FARM, USAMV CLUJ NAPOCA IN CORRELATION WITH THE FEEDING TECHNIQUE AND MAMMARY GLAND HEALTH STATUS

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Keywords: *Milk, Romanian spotted breed, Quality*

Introduction: The quantitative and qualitative milk monitoring is an absolutely crucial factor in the work of improving the productive performance of dairy cows in Romania (Onaciu et al, 2014).

Aims: The purpose of this study was to highlight the nutrition influence on milk quality, the status of mammary gland health and establish quality, conformity of raw milk and its adequacy for processing.

Materials and Methods: The biological material was represented by a 107 cows of Romanian spotted breed, which have been analyzed based on 576 milk samples, obtained from the eight controls. The evaluation of the main indicators of production both quantitatively and qualitatively of dairy cows milk was performed in 2015 at the didactics USAMV farm from Cojocna.

Results: Following the official control of milk production, it was found that the milk production was on average 14.76 kg/day with a quite high values of coefficient of variability, between 31.05% and 40.47%, depending on the controls, which indicating a strong heterogeneity of this trait. The chemical characteristics of 576 samples showed considerable variations from one control to another. The amount of total fat and protein was found to be on average of 3.92% and 3.37% respectively. Regarding the content of urea and somatic cells, in all tested milk samples, the lowest value was found in the fifth control, with an average of 8.04 ± 0.6 mg/dl and 69.20 ± 23.3 cell/ml $\times 10^3$, while the highest was in the first control 19.37 ± 0.7 mg/dl for urea, and 263.17 ± 31.7 cell/ml $\times 10^3$ for the somatic cells.

Conclusion: The research showed that the breeding of Romanian spotted breed cattle must be oriented to improve profitability by increasing animal productivity both quantitatively and especially qualitatively.

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RESEARCH ON PRODUCTIVE PERFORMANCE AND QUALITY OF MILK OBTAINED FROM SIMMNETAL COWS GROWN IN AGRICULTURAL CONDITIONS OF RUPEA, BRASOV COUNTY

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Keywords: *Farm, Milk, Performance, Simmental*

Introduction: Simmental breed is the second important breed in Europe, following the group of Holstein Friesian cattle and holsteinized populations (P. Perišić et al., 2009), which is increased in pure breed or cross-breeding both with dairy breeds and with beef breeds.

Aims: The study focussed on the Romanian spotted breed-Simmental type was aimed to evaluating the productive potential and some reproductive indices realized under the Sona farm conditions from Brasov.

Materials and Methods: Cattle herd of Romanian spotted breed-Simmental type was analyzed in terms of productive performances and some reproductive indices in the period 2013-2015. In the Sona farm, the cows are maintained in tied system with manure removal using scraper system and milking is done with portable milking machine. The main indicators taken into consideration to analyze the whole herd were the following: milk yield, milk quality, age of first calving, mammary repose and calving interval. The data were processed on each year and compared between them and the results have been tabled and interpreted.

Results: Analyzing the main indicators of reproduction and production from the herd exploited in the Sona farm, is found: length of total lactation was in average of 347 days, calving interval of 401 days and mammary repose was on average of 54 days. As regards the real production, this was increasing from 5439 kg of milk in 2013 to 7400 kg in 2015, with an average for the entire period of 6324.33 kg with 4.23% fat and 3.42% protein. Also the fat and protein content have increased over this period, from 4.13 % for fat and 3.25 % for protein in 2013, to 4.34 % and 3.56 respectively in 2015. These data converted to mature equivalent show an average production obtained in this period of 5683.33 kg of milk with a fat percentage of 4.02 and 3.25 for protein.

Conclusion: The research conducted under the conditions of the Sana farm from Brasov county has done much to show the productive potential and popularity of the Romanian spotted breed-Simmental type in Transylvania region.

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INCIDENCE STUDY OF CONTAGIOUS ECTHYMA IN SHEEP AND CURATIVE TREATMENT METHODS

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Keywords: contagious ecthyma, lambs, lesions, therapeutic treatment

Introduction: Contagious ecthyma is a contagious specific skin-disease of small ruminants, caused by a parapox virus of family poxviridae (Savory *et al.*, 2000 quoted by Khadim Hussain Dar *et al.*, 2015).

Aims: The purpose of this paper work was research the incidence of contagious ecthyma in lambs, the possibilities for anatomic and clinical diagnostic and looking for applicable curative therapeutic measures.

Materials and Methods: The biological material submitted for research is represented by 450 nursing lambs of the following breeds: Sardinian, Manech and Lacaune with ages between 1,5-3 months, raised in an intensive system at a farm in Sălaj county. The investigations regarding the incidence of contagious ecthyma in lambs were done in winter and spring of the year 2016. The therapeutic protocol which was established and applied to the group of affected lambs was aiming to heal lesions localized in diverse parts of the body (perioral, oral and ocular). The drugs were used by sprinkling repeatedly at intervals of 2-3 days and were composed of a mixture of methylene blue (20 ml), vitamin A, D3 E (100 ml) and betadine (10 ml).

Results: Resulting data highlights different values of the incidence of the lesions of contagious ecthyma for lambs depending on the body part. Thus, perioral lesions were dominant 59,92% (151 lambs), followed by the oral lesions 36,11% (91 lambs) and ocular ones 3,97% (10 lambs). After applying the treatment the healing process was observed after 2 days and complete healing after 6 days in more than 90.0 % of the animals treated.

Conclusion: Applying this type of treatment composed of a mixture of methylene blue, vitamin A, D3 E and betadine for 6 days to heal ecthyma in small ruminants is an effective alternative from an economic point of view.

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ASPECTS OF COPROPARASITOLOGIC POLLUTION DEGREE IN SOME DONKEY DIGESTIVE HELMINTHOSIS

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Keywords: donkey, infestation, parasites,

Introduction: First accurate descriptions of helminthosis were documented at the end of nineteenth century (Mehlis, 1831 quoted by Lichtenfels, 1975) and the data regarding to illnesses induced by these parasites represents a real problem for parazitologists and donkey owners.

Aims: The purpose of this work was to evaluate the incidence of digestive parasitosis (parascariidosis, strongilosis, oxiuriasis) and the level of intensity of parasitism in donkeys, in young ones and adults as well.

Materials and Methods: The analysed samples were represented by a group of 72 animals (40 adults and 32 foals) raised in Cluj and Alba counties (Microferma Șapca Verde, Bologa, Răscruți și Câmpeni). From these animals 31 skin samples were harvested and 72 coprology probes were collected in plastic bags and then analysed in the animal pathology laboratory belonging to the Animal Science and Biotechnologies Faculty.

Results: Incidence of parascariidosis in donkeys was found in 12.5% of the adults with a maximum occurrence in Bologa (30%). Incidence was at the level of 34.5% in foals, with a maximum of 57% in Câmpeni. Average spread of *Strongylus spp* was 82,5% in adults, and 59,5% in foals. For *Oxyuris equi* there is a reduced incidence at 15% in adults and 18% in foals.

Conclusion: Respiratory and digestive disturbances induced by these helminthosis in foals and adult donkeys can lead to high levels of morbidity. Therefore, it is necessary that the level of infestation to be controlled by prophylaxis and appropriate treatments.

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GROWTH DYNAMIC AND PHYSIOLOGICAL STATUS OF CALVES FOR MEAT PRODUCTION

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Keywords: *calves, meat production, growth dynamic, hematology*

Introduction: Cattle farming for meat production is a specific Romanian livestock activity. This sector experienced a significant development in the recent years, on the one hand due to demand in the market for beef and the other hand due to lower milk price. Thereby, many of the Romanian farms producing milk, entered into conversion. In general, cattle breeders are purchasing calves for meat from the local population, which subsequently submitted to intensive fattening. Passing through several successive stages of fattening structures based on specific feed, calves are sold in Western Europe. The maintenance condition and welfare of calves for meat production can be determined on the basis of increased growth and also by hematological indices (Roland et al., 2014).

Aims: Our research aimed to determine the dynamic fattening growth of calves and to determine the physiological status based on growth stages by means of hematological analyses.

Materials and Methods: Growth indices were determined (TG - total gain, ADG - average daily gain) on successive measurements and weighings. Physiological status was determined by hematologic analyses (WBC, RBC, HGB, HCT, MCV, MCH, MCHC, leukocytes formula).

Results: The duration of the experiment was 33 days and 10 calves were taken into the study. Mean initial body weight was 53.5 ± 0.513 kg and mean final body weight was $91.7 \pm$ average of 0.445 kg, resulting in a total gain (TG) of 38.2 kg and an average daily gain (ADG) of 1.158 kg / day. In general, hematological values obtained showed a gradual improvement in the physiological status of calves. Starting from higher values of leukocytes ($WBC_{initial} = 10.61 \pm 0.329 \times 10^9 / L$), their level fell slightly towards the end of the experiment ($WBC_{final} = 8.92 \pm 0.204 \times 10^9 / L$). The WBC higher values may give information on possible infections or parasitic diseases in the digestive tract. The calves are purchased from local breeders, and showed great variability for $WBC_{initial}$ ($V = 31.04\%$) that at the end of the experiment to fall ($WBC_{final} - V = 22.86\%$). Regarding other hematological indices, there were relatively constant values: $RBC_{initial} = 9.44 \pm 0.151 \times 10^{12} / L$ vs. $RBC_{final} = 9.35 \pm 0.114 \times 10^{12} / L$; $HGB_{initial} = 0.234 \pm 9.92$ g / dl vs. $HGB_{final} = 0.155 \pm 9.24$ g / dl; $HCT_{initial} = 30.5 \pm 0.604\%$ vs. $HCT_{final} = 30.15 \pm 0.389\%$.

Conclusion: The results indicate optimal values for dynamic growth. The hematological indices also reflect good maintenance, growth and feeding status in the farm and they were further improving during the experiment.

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USING GEOSYNTHETIC MATERIALS IN FISH FARMS: PRACTICAL CONSIDERATIONS

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Keywords: *geosynthetic materials, advantages, disadvantages, constructive solutions*

Introduction. The past 50 years have seen the use of synthetic products in civil works gradually increasing to become commonplace. The development in the 1950s and 1960s of synthetic materials resistant to biological or environmental degradation opened the way for various applications in environmental and civil engineering and constructions. Geomembranes have rapidly become accepted as standard components of geosynthetic lining systems in landfills, ponds, canals, dams, reservoirs, heap leach pads, wastewater treatment plants, fish farms, and agricultural facilities.

Aims. The aim of the article is to present the main kinds of geosynthetic materials, their functions and roles in fish farms, highlighting the advantages and disadvantages they have compared to conventional materials.

Materials and Methods. Bibliographical data from the reference literature, regarding the practical way in which geosynthetic materials are used in fish farms building, are used.

Results. Compared to classical materials, geosynthetic materials exhibit advantages, among which: they can replace large bulks and masses of conventional materials; important saving of material and energy is achieved; the construction works impact upon environment is significantly reduced. Besides these benefits, geosynthetic materials also present several disadvantages: they are thin; they fulfil only the role for which they were designed, required or tested. In order to improve and optimise the classical solutions of protecting and consolidating the benches and embankments of fish farms it is recommended to incorporate geosynthetic materials in the structures. In works longitudinally to the river flow, aiming at protecting the river bench against corrosive water currents, a filtering sand layer at the lower face of the concrete slabs is provided and this can be made optimal with geomembranes.

Conclusion. From an economic point of view, for ponds and canals, the cost of sealing with geomembranes is often smaller than that for a classical solution. In dry, even arid regions, the diminishing of the water loss in retaining or irrigation works with the help of geomembranes can evidently show its importance, all along the work service life.

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TESTING THE EFFICIENCY OF CARBON NANOTUBES FOR REMOVAL OF ANTIBIOTICS FROM AQUEOUS SOLUTIONS

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Keywords: Adsorption, antibiotics, carbon nanotubes, magnetite, removal

Introduction: Protection of water sources from contamination remains one of the most important challenges with which are facing the society. Nowadays, nanotechnology offers the ability to purify waters in order to effectively remove different pollutants and germs. More specifically, nanoparticles, Nano powders and Nano membranes are used for the detection and removal of the chemical and biological substances, including metals, cyanide, organic matter, algae, viruses, bacteria and, not least, the antibiotics.

Aims: Testing the efficiency of different types of carbon nanotubes for removal of the antibiotics from aqueous solutions.

Materials and Methods: The selected antibiotics for the present study were: ampicillin, ceftazidime, cefepime, imipenem, piperacillin, tazobactam, tetracycline, erythromycin, ciprofloxacin, norfloxacin, vancomycin, gentamicin, sulfamethoxazole/trimethoprim. For removal of the antibiotics from aqueous solutions were tested multiwall carbon nanotubes, functionalized with carboxyl group and with magnetite. The obtained functionalized carbon nanotubes were characterized by different technique as follows: SEM, TEM and FTIR. For the evaluation of the antibiotics retention degree from the aqueous solutions, quantitative assessment was performed by high performance liquid chromatography coupled with diode array, fluorescence, and mass spectrometer detectors.

Results: The best results were obtained by testing the suspensions of carbon nanotubes functionalized with magnetite (retention degrees up to 97%). The antibiotics which were less adsorbed or had not been retained at all on the carbon nanotubes surface were sulfamethoxazole (5.48%), and trimethoprim.

Conclusion: The present study demonstrates that functionalized carbon nanotubes can be used to efficiently remove of the antibiotics from aqueous solutions.

Acknowledgements: This work was funded through the EEA 2009-2014 Financial Mechanism under the RO04 - Reduction of hazardous substances scheme, grant number 3499/20.05.2015.

CATALYTIC ACTIVITY EVALUATION OF MnO₂ NANOPARTICLES OBTAINED WITH PLANT EXTRACTS

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Keywords: *Biosynthetic, catalysis, manganese oxide, nanoparticles, synthesis*

Introduction: Lately, more often for the synthesis of nanoparticles are used plant extracts to eliminate the hazardous wastes. These act as reducing and stabilizing agents, and have the advantage of being low cost and eco-friendly. Due to their excellent physicochemical properties MnO₂ can be applied in various areas including the catalysis.

Aims: In this investigation, MnO₂ nanoparticles were prepared using a son chemical method by KMnO₄ reduction in the presence of plant extracts, at room temperature. The obtained nanoparticles were evaluated for their catalytic activity.

Materials and Methods: The MnO₂ nanoparticles were prepared by two methods: chemically and biosynthetic using plant extracts (rosemary, oregano and tarragon). The nanoparticles were obtained by sonication at room temperature, until was formed a brown precipitate. The precipitate was washed with doubly distilled water for several times followed by ethanol washing three times and dried in an air oven. All MnO₂ synthesized nanoparticles were characterized and were tested for their catalytic activity.

Results: During the ultrasonic irradiation, KMnO₄ is reduced to MnO₂ by PEG and compounds found in plant extracts. The MnO₂ nanoparticles obtained by biosynthetic and chemically methods were characterized by SEM, EDX, FTIR, XPS, XRPD and BET surface area were determined. The XPS measurements prove that Mn(IV) was formed in biosynthesis procedure together with Mn(III), the ratio between Mn(IV) and Mn(III) being the same for all extracts used. From the FTIR spectra of the MnO₂ with extracts it was observed an increase in intensities and a slight shift of frequencies of the characteristic vibration bands of extracts.

Conclusion: In the present research work, the chemically synthesized MnO₂ nanoparticles were compared with those biosynthesized and were evaluated for their catalytic activity. The MnO₂ synthesized nanoparticles will be tested for biofuels obtaining.

Acknowledgments: This work was supported by the Romanian Ministry of Education and Research within the Nucleu Programme (Project PN16-30-02-05).

ANTIBACTERIAL ACTIVITY OF POLLEN EXTRACTS ON PATHOGENIC MICROFLORA FROM MILK

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Keywords: *antibacterial activity, strains, pollen extracts*

Introduction: Bee-pollen was used for thousands of years as functional food and medicinal plant product. Various beneficial effects were attributed to it and its consumption was increased years. The positive effects of a functional food can be either maintaining a state of wellbeing and health or reducing the risk of pathologic consequences. (Belhadj H. et al, 2012)

Aims: The aim of our study is to assess the antibacterial activity of some pollen extracts over bacteria in milk as an alternative to current antibiotic treatments.

Materials and Methods: The tests have been made on 16 pollen samples of the following families: Rosaceae, Salicaceae, Fabaceae, Tiliaceae, Asteraceae, Brassicaceae and twopolifloral pollen assortments, harvested in Transylvania, Romania.

The antibacterial susceptibility has been evaluated over 10 strains isolated from pathogenic milk from cows with clinical mastitis, belonging to *Staphylococcus* genera, using difuzimetric method.

Among the tested bacteria, the *Onobrychis viciifoliapollen* has the highest sensitivity 11.86 ± 1.79 mm and the low antibacterial activity is for *Brassica sp.* pollen 8.65 ± 2.65 mm.

Conclusion: The use of antibiotic substances over a long period of time resulted in larger doses of residues in milk, representing a potential biohazard. The conclusion from this study is that the use of ethanol extracts of pollen is a real alternative in the treatment of cow with various diseases.

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ANTIMICROBIAL PROPERTIES OF *PLEUROTUS ERYNGII* AND *LENTINUS EDODES* HYDRO-ALCOHOLIC EXTRACTS

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Keywords: Antimicrobial activity, hydro-alcoholic extracts, pathogenic microorganisms, *Pleurotus eryngii*, *Lentinus edodes*

Introduction: The multiple drug resistance in the human pathogenic microorganisms has developed due to intensive use of synthetic antibiotics that are frequent used in the treatment of various infectious diseases. Natural products with antimicrobial activities have been exploited in the last years. Several mushrooms have demonstrated efficient antibacterial activity as well as antifungal activity against resistant human pathogens. Besides superior nutritional values mushrooms posed significant medicinal properties. The medicinal bioactive compounds present in mushroom includes: polysaccharides, proteins, peptides, polyphenols, and lipids.

Aims: In this work, hydro-alcoholic extracts of two mushrooms species, *Pleurotus eryngii* and *Lentinus edodes*, were investigated for their antimicrobial activities against pathogenic microorganisms with medicinal importance.

Materials and Methods: Four isolates of *Pleurotus eryngii*: Peg, Pe1, Pe2 and *P. eryngii* 2600, and four isolates of *Lentinus edodes*: Lem 51, Lem 52, Leb and Les were tested for their antimicrobial properties. 70% ethylic alcohol mushroom extracts were prepared from biomass developed in submerged culture. Antimicrobial activities of the extracts against *Candida albicans*, *Candida parapsilopsis*, *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* var *spizizinii*, *Enterococcus faecalis* and *Pseudomonas aeruginosa* were screened by the agar disk diffusion method. After incubation period, occurrence of inhibition halos around each disk was observed and the zone of inhibition was measured.

Results: Results revealed that the 70% ethylic alcohol extracts have significant inhibitory activities against *Bacillus subtilis* var. *Spizizinii*, *Escherichia coli* and *Staphylococcus aureus*.

Conclusion: The present investigation can be concluded that the ethanol extracts of 6 isolated edible mushrooms showed biopharmaceutical potentiality.

Acknowledgements: This work was made with the support of the MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT – ROMANIA, through the Rural Development Programme- ADER 2014-2020.

STUDY ON THE MILK QUALITY IN THREE FARMS FROM SĂLAJ COUNTY

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Keywords: *milk, milk, fat, protein, lactose, NCS*

Introduction: Milk quality is influenced by many factors including rank lactation. This study aims the evolution of the main quality parameters of milk as the fat, protein, lactose, dry matter and the number of somatic cells for the first five lactations in Baltata romaneasca during twelve official controls, starting in June 2015 until the month of April 2016.

Materials and Methods: The biological material studied was represented by herds of dairy cows in three farms from Sălaj County (Crasna villages, Marin and Bodia). Analyzing qualitative parameters of milk obtained from the herd in lactation 1 during the 12 controls, there was a percent of 3.50% fat, 3.05% protein, 4.49% lactose and 8.48% dry substance in farm from Crasna. These parameters fluctuate over the five lactations, the highest values being ranked in lactation five. Herd from Marin farm presented a fat content of 4.44% in lactation 2, while the lowest percentage of fat was recorded in lactation 3 (3.66%). Regarding the protein, the highest percentage was obtained in lactation 2 (3.70%) and the lowest in lactation 1 (3.39%).

Conclusion: Lactation rank affects milk quality, so in lactation 1 there were recorded the lowest values of quality parameters of milk.

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PRINCIPAL COMPONENTS ANALYSIS UTILITY IN THE LIVESTOCK FIELD

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Keywords: correlation matrix, factor analysis, main components

Introduction: Principal Components Analysis method first appeared in various psychological studies that attempted to assess variables such as intelligence, more exactly how one can evaluate characteristics such as power of assimilation, understanding, responsiveness, and one found that many of them are determined by a hidden variable i.e. intelligence (Helmy *et.al*, 2009).

Aims: The objective of this paper is to provide information about the Factor Analysis method which is method widely spread and used in various domains. This paper shows the usefulness of this method in the livestock sector.

Materials and Methods: Four physiological characteristics were considered in our analysis: height (cm) weight (kg), the trunk circumference (cm) and weight of the calves at calving (kg) for ten breeds of cattle.

Results: The Principal Components Analysis method consists in the presence of a set of variables X_1, X_2, \dots, X_m , and one aims to determine a new set of variables F_1, F_2, \dots, F_n , also called factors or components, where $F_i = v_{i1}X_1 + v_{i2}X_2 + \dots + v_{im}X_m$, provided that $n < m$. Reversal is also required, that is the possibility to retrieve the variables X using components, i.e. $X_i = b_{i1}F_1 + b_{i2}F_2 + \dots + b_{in}F_n$. Thus one may notice that via components one attempts to reduce the number of variables, without losing the original variables variance. First one calculates descriptive statistics (mean and standard deviation). Then one proceeds with the matrix of correlation coefficients, to see if calculated indicators are independent. To apply factor analysis it is necessary that large enough correlation exist between variables in order for the size reduction be meaningful.

Conclusion: This paper is conceived to provide a theoretical section for the factor analysis method and a practical application thereof in the livestock sector, by reducing data size, by using four variables i.e. weight, height, circumference of the trunk and weight of the calves at calving for ten cattle breeds

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INFLUENCE OF YEA-SACC 1026 PROBIOTIC ON MEAT QUALITY IN CHICKEN BROILERS

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Keywords: *meat chickens broilers, YEA-SACC 1026 probiotic, meat quality.*

Introduction: The use of probiotics, as fodder supplement for chickens, could stimulate meat quality that is a very important criterion especially for human consumption markets.

Aims: The study had in view the effects of YEA-SACC 1026 probiotic product on meat quality in chicken broilers.

Materials and Methods: The researches were conducted on 75 meat chickens of Ross-308 hybrid grouped on three lots of 25 capita/lot during an experimental period of 42 days. The daily rations complied with the requirements of breeding phases for chicken broilers. In the mixed fodder of Lot 1 (E), for 42 days, was added YEA-SACC 1026 probiotic in proportion of 0.1% in all breeding phases (phase I =1-14 days, phase II =14-35 days and phase III =35-42 days). In the Lot 2 (E) during 42 days was added in mixed fodder the YEA-SACC 1026 probiotic in proportion of 0.25% in all breeding phases (phase I =1-14 days, phase II =14-35 days and phase III =35-42 days). In the experiment end, it was effected control slaughtering of 5 chicken broilers per each lot, to establish the meat quality by trenching and meat chemical composition (protein content, fat content, mineral content and dry matter content).

Results: The use of probiotics leads to carcass weight increasing with 4.85% in Lot 1 (E) (YEA-SACC 1026 probiotic in proportion of 0.1%) and with 4.75% in Lot 2(E) (YEA-SACC 1026 probiotic in proportion of 0.25%) given to Control Lot. In the chicken broilers of experimental lots, the weight of superior quality meat in carcass (quality I =breast and quality II = thigh and leg) was greater with 1.53% for the chicken broilers of Lot 1 (E) (YEA-SACC 1026 probiotic in proportion of 0.1%), respectively with 2.08% for the chicken broilers of Lot 2 (E) (YEA-SACC 1026 probiotic in proportion of 0.25%) given to Control Lot.

Conclusion: After YEA-SACC 1026 probiotic administration, as fodder supplement, in the Lot 1 (E) and Lot 2 (E) was improved the chicken broiler meat quality by increasing of protein content and reducing the fat one. The obtained results confirm the favourable effects of probiotics on chicken broiler meat production and its quality.

RESEARCHES CONCERNING THE INFLUENCE OF WEANING SYSTEM ON *SUINA* YOUNG STOCK

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Keywords: *Suina*, proliferation, weaning system

Introduction: Starting from the fact that in *Suina* species the meat production is linked to proliferation (Zeneci, 2004), and not least on weaning system as technical element of sows' use in reproduction process, the numerous observations and researches in this domain put into evidence the fact that the passage of biological material from piglet stage to those of young one and subsequent fattening pig involves application of some technologies specific for each categories concerning on feeding, maintenance and care.

Aims: This paper aims to bring more information about the evolution of dynamic growth of weaned piglets in different systems until the body mass of 25 kg

Materials and Methods: Investigations were carried out in 2015 in the bio base of *Suina* Breeding Department (Faculty of Animal Science and Biotechnologies, UASVM Cluj-Napoca), working on piglets from 3 sows in suckling period at the third littering. Practically, the 3 piglet groups were gradually weaned at different age (35, 42 and 56 days) and later, by regular weighing, were followed up the body masses until to 25 kg weight. Somatometry determinations were performed using scales and primary data were statistically processed according to the established methodology.

Results: After these researches, there were recorded the following aspects: the body weight evolution of piglets was different from a lot to another one, both during sows' lactation and also after weaning period, until the body mass reached 25 kg.

Conclusion: The obtained results pointed out that under bio base conditions the better weaning system of piglets was that of 42 days.

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BIOMETRY APPLIED TO CARPATINĂ GOATS REARED IN THREE AREAS OF MOLDAVIA, ROMANIA

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Keywords: *body traits, breed, historical climate parameters.*

Introduction: There is an increasing concern about livestock biodiversity preservation, generally speaking, and survival of genuine goat species, in particular (Godber *et al.*, 2016). Environmental issues, mainly expressed by carbon emissions and climate changes, are major components of worldwide preoccupations (Thornton, 2010).

Aims: To emphasize the some biometric traits of Carpatină goats, reared in cold climate, in the cold areas of Romania located in the North of the country.

Materials and Methods: 25 Carpatină goat individuals, females (21) and males (4), were selected from 7 farms located in Counties of Moldavia, Suceava, Botoşani and Neamţ, respectively. The following parameters were recorded: body weight, body full length, height at wither, chest girth, horn length, ear length and tail length. Climatic data are available from regional databases. The data were statistically processed with STATISTICA v.8.0 for windows.

Results: Our study emphasizes the mean values of body weight, body full length, height at wither, chest girth, horn length, ear length and tail length, of Carpatină goat reared in cold area of Moldavia. The data are compared to the breed standard. Climatic particularities of concerned areas are also presented. In this respect, historical means of temperature, air humidity, precipitations, and wind velocity are emphasized.

Conclusion: The mean values and dispersion parameters of measured body traits of Carpatină goats show the characteristics of the body development in specific locations of Moldavia, characterized by specific climatic conditions of the mountain area.

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SECTION 8: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

FATAL CHYLOTHORAX ASSOCIATED WITH THROMBOSIS OF THE CRANIAL VENA CAVA (CRVC) IN A DOBERMAN WITH CONGENITAL UNILATERAL RENAL AGENESIS

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Key words: chylothorax, renal agenesis, thrombosis

Introduction: Chylothorax is characterized by the accumulation of chyle within the thoracic cavity as a result of a disturbed circulation in the thoracic duct. Chylothorax has been described in dogs, cats, rats, and humans.

Aims: We intended to report a complex case of chylothorax caused by the characterisation of the jugular vein.

Materials and Methods: A 2-year-old intact female Doberman with a clinical history of progressive renal failure developed sudden respiratory distress and cardiac arrest after central vein catheterization and hemodialysis was performed. The dog was submitted to the Pathology department for necropsy. Gross inspection, cytological and histological analyses were performed.

Results: Necropsy exam revealed a large amount of white-yellow fluid, interpreted as chyle, in the thoracic cavity with secondary bilateral pulmonary atelectasis. Severe thrombosis of the CrVC, extending from the right jugular vein to just cranial to the heart has also been observed. The right kidney and right ureter could not be identified (unilateral renal and ureteral agenesis). The left kidney was slightly irregular and dense, with a reduced cortical to medullary ratio. Histologically, the kidney was characterized by glomerular sclerosis, cystic glomerular atrophy, tubular dilatation, tubular atrophy and regeneration, lymphoplasmacytic and histiocytic interstitial inflammation, interstitial fibrosis and interstitial mineralization. A diagnosis of contralateral progressive familial juvenile glomerulonephropathy (JGN) was made.

Conclusion: In the present case, insertion of a central venous catheter was a predisposing factor to thrombosis of the CrVC and subsequently fatal chylothorax.

CANNULATION OF CAROTID ARTERY FOR INVASIVE BLOOD PRESSURE MEASUREMENT IN RATS

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Keywords: rats, carotid cannulation, blood pressure

Introduction: Experimental studies on small laboratory animals, particularly rats are a widely used model (Ordodi *et al.*, 2005). Blood pressure measurement is one of the fastest and most informative means of assessing cardiovascular function.

Aims: A close monitoring of the animals during the experiment is important to detect early imbalances and prevent any changes that could compromise the results. Carotid artery catheterization is a common procedure that allows precise monitoring of the blood pressure.

Materials and Methods: 30 Wistar rats, weighing 250 ± 27 , male and female were anesthetized with isoflurane. Rats were induced in the induction chamber, maintained on mask and received Tramadol for analgesia 20mg/kg. The rats were placed in dorsal recumbency. A medial incision was made on the supraclavicular region. The carotid artery was exposed by blunt dissection of the muscular layers. A distal ligature was made including the vagal nerve. A simple intravenous cannula with a 24G diameter was inserted and fixed with a proximal ligature, carefully, without obstructing the blood flow in the carotid cannula. A pressure transducer zeroed to the level of the right atrium is connected to the arterial catheter and to the Dräger Infinity Delta monitor. The skin closer was performed.

Results: All the subjects involved in this study were successfully catheterized and the values obtained were within the normal range of this species. Using only inhalatory anesthesia we prevented the hypotension induced by majority of the anaesthetic agents. We obtained good results and didn't have any problems, even if we didn't dissect the vagal nerve from the carotid as other authors describe in their research.

Conclusion: We demonstrate that our model was successful even without the dissection of the vagal nerve from the carotid artery as mentioned in the literature.

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RESEARCH ON THE PHENOTYPIC CHARACTERIZATION OF MRSA STRAINS ISOLATED FROM ANIMALS

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Keywords: *chromogen, methicillin, MRSA, resistance*

Introduction: Currently, both in staphylococci isolated from animals with different diseases, as well as in humans, the MRSA strains (Methicillin Resistant *S. aureus*) are monitored, as the methicillin resistance is associated with the resistance to other antibiotic groups.

Methicillin resistance is encoded by *mec* staphylococcal chromosomal cassettes (SCC*mec*), which are islands of resistance. These strains can be identified by molecular biology tests and tests that reveal several phenotypic characteristics.

Aims: The research was made in order to characterize and identify phenotypically the MRSA staphylococci strains isolated from animals.

Materials and Methods: Researches were made on 240 coagulase positive and coagulase negative strains of staphylococci. Mannitol fermentation was tested on Champman medium, free coagulase was revealed on Baird-Parker medium and to identify *S. aureus subsp. aureus* was used the chromogenic medium Chromatic Staph.

Methicillin-resistant strains were detected by disc diffusion method, using biodiscs with methicillin, oxacillin and cefoxitin. Also, to identify the MRSA strains, was used the chromogenic medium Chromatic MRSA.

Results: The isolates were positive to mannitol and produced complete haemolysis or were unhaemolytic. A total of 44 strains produced free coagulase on Baird-Parker medium, considered coagulase positive strains, while 196 were coagulase negative strains.

The isolates conducted differently to methicillin: 22,08% of strains were resistant, 51,25% of strains were susceptible and 26,66% had intermediate resistance, while the resistant strains to oxacillin were 42,91%.

The increased frequency of methicillin-resistant strains of staphylococci and, particularly, MRSA strains, determined using the cefoxitin disk diffusion test, which is more reliable than methicillin and oxacillin.

On the MRSA chromogenic medium, the methicillin-resistant strains of staphylococci formed colonies with pigment from mauve to orange mauve.

Conclusion: The obtained results by disk diffusion test on resistance patterns to 3 beta-lactams, resistant to penicillinase, indicated a different frequency of the resistant strains to these antibiotics. Cefoxitin disk diffusion test revealed a frequency of 2,51% of resistant strains, that can be considered MRSA strains.

THE PREVALENCE OF ESBL-PRODUCING STRAINS OF *E. COLI*, ISOLATED FROM CALVES WITH COLIBACILOSIS - PRELIMINARY REMARKS

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Keywords: *calves, ESBL, Escherichia coli, antibiorezistance*

Introduction: The animals producing food have become an increasing reservoir of extended spectrum beta-lactamase producing *Enterobacteriaceae*. The calves and cows are exposed to a greater quantity of antibiotics, but the data concerning the prevalence of ESBL-producing *Enterobacteriaceae* are not enough, in comparison with other species of animals used for human consumption, such as birds (Hordijk, 2013)

Aims: The aim of this study was to determine the prevalence of ESBL-producing *E. coli* involved in some episodes of colibacillosis in calves.

Materials and Methods: Faeces samples were collected from 33 calves with the age ranging between 1-2 weeks and that presented clinical signs of colibacillosis. The samples were collected in a sterile medium for the taxonomic isolation and identification of the etiological agent involved, the ESBL screening being conducted subsequently using the ESBL Agar Oxoid Brilliance chromogenic medium. The phenotypic confirmation of the ESBL-producing strains was conducted in accordance with the CLSI standard through the combined disc method.

Results: Following the tests conducted, out of the 33 strains of isolated *E. coli*, 9 (27, 27%) were phenotypically confirmed as being ESBL strains.

Conclusion: The studies that were previously conducted on the dairy farms have pointed out that the young calves rapidly acquire bacterial strains resistant to antibiotics that are often ESBL strains (Hordijk, 2013). The prevalence obtained by us, as well as an insufficient quantity of information concerning the antimicrobial resistance on this segment of species of animals used for the human consumption, support conducting a more thorough study, as well as the identification of ESBL resistance genes, but also of the plasmids that encode the transmission of these genes.

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PRELIMINARY REMARKS REGARDING THE PREVALENCE OF ESBL-PRODUCING STRAINS OF *E.coli* AND *K.pneumoniae*, ISOLATED FROM COWS WITH CLINICAL ENDOMETRITIS

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Keywords: cows, endometritis, ESBL, *Escherichia coli*, *Klebsiella pneumonia*

Introduction: Extended spectrum beta-lactamase (ESBL)-producing organisms pose unique challenges to clinical microbiologists, clinicians, infection control professionals and antibacterial-discovery scientists. Although the prevalence of ESBLs is not known, it is clearly increasing, and in many parts of the world, 10-40% of strains of *E. coli* and *K. pneumoniae* express ESBLs (Rupp and Fey, 2003).

Aims: The aim of this study was to assess the prevalence of ESBL-positive strains of *E. coli* and *K. pneumoniae* in cows with clinical signs of endometritis that were treated exclusively with Oxytetracycline for both diseases of the genital area as well as other bacterial infectious diseases.

Materials and Methods: The study population included 35 Romanian Black Spotted Breed cows with clinical signs of endometritis within a farm in North Eastern of Romania. The samples were harvested using sterile cotton swabs that have been further microbiologically processed. For the phenotypic confirmation of the isolated ESBL strains, were used the combined disk test (CLSI, 2014) and the Oxoid Brilliance chromogenic ESBL Agar medium. The taxonomic classification of the isolated colonies was carried out by testing some minimal biochemical characteristics by using the MIU and TSI tests.

Results: A total of 47 bacterial strains were isolated from uterine secretions, derived from the 35 cows included in this trial. From the total of 47 isolated bacterial strains, 17 belonged to *E. coli* and *K. pneumoniae* species, from which, 6 of them were confirmed as being ESBL-positive.

Conclusion: In this preliminary study, by phenotypic methods was confirmed a prevalence of 35.3% for the ESBL strains of *E.coli* and *K. pneumoniae*, which requires further research to confirm by molecular biology the identification of ESBL resistance genes, but also for the plasmids encoding these gene transmission.

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MONITORING THE TRANSFUSIONAL RESPONSE IN DOGS

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Keywords: *anemia, blood transfusion, cross match, packed cell volume, monitoring*

Introduction: Hemotransfusions are indicated in the treatment of anemia.

Aims: The purpose of this study is testing the efficiency of the ideal formula to calculate the amount of blood used for hemotransfusion in dogs, introduced by BSAVA as an ideal formula to calculate the blood amount administered to an anemic patient; the implementation of a monitoring file according to the needs of the Clinics of FVM to limit the transfusion side effects and to evaluate the post transfusion response in dogs with different pathologies.

Materials and Methods: The experiment has been undertaken on a group of 10 dogs, with ages between 4 months and 10 years. Blood has been sampled from both the donor and receiver for the hemoleucogram, blood type testing and for the cross match, to assess compatibility. Also, 450 ml of blood was withdrawn from the donor, and subsequently the volume needed for the receiver has been calculated, using the studied formula. The transfusion took place under careful clinical monitoring.

Results: During the transfusion, there were no anaphylactic reactions. The tested formula has proven efficient, the following results of the transfusion confirming the utility of the formula. The packed cell volume has grown statistically significant compared to its initial value. The growth of packed cell volume was correlated with the improvement of the other erithroid parameters, including red blood cell count and hemoglobin concentration.

Conclusion: Implementation of a monitoring system leads to a better surveillance of the patient's response to the transfusion. It is important to determine the blood group of a patient who needs more than one transfusion in order to avoid the appearance of alloantibodies and other possible side effects.

EVALUATION OF ANTIOXIDANT PROPERTIES AND BIOLOGICAL ACTIVITIES OF SEVERAL *PLANTAGO* HIDROALCOHOLIC EXTRACTS

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Keywords: antioxidants, oxidative stress, inflammation

Introduction: Previous studies on *Plantago* species revealed the presence of various phenolics, such as flavonoids and phenylpropanoid glycosides, which are biologically active compounds that exhibit strong antioxidant activities. Therefore, *Plantago* species are used for centuries in the treatment of many diseases.

Aims: The present study was aimed to investigate the phenolic profile and the antioxidant properties of several *Plantago* species, which could protect the endogenous antioxidant systems in fighting against reactive oxygen species (ROS) - involved diseases.

Materials and Methods: The phenolic profile was determined using HPLC/MS. The antioxidant activity of the extracts was assessed by three different tests, such as DPPH, TEAC and EPR.. The biological activities were studied on *in vivo* models on rats (turpentine-induced inflammation) and *in vitro* on HUVECs.

Results: The extracts showed a high antioxidant activity, which reveals the efficiency of the polyphenolic constituents to scavenge both DPPH and ABTS radicals. *P. arenaria* hydroalcoholic extract exhibited the strongest antioxidant activity, as compared with *P. cornuti*, *P. lanceolata*, *P. major* and *P. media*. Turpentine-induced inflammation significantly increased the oxidative stress, as seen in TOS values, as well as in MDA and CAT activity, but a significant improvement was observed after treatment with *P. arenaria*.

Conclusion: In the present research work, we demonstrated that *P. arenaria* hydroalcoholic extract exhibited the strongest antioxidant activity *in vitro* as a DPPH scavenger, but also *in vivo* by reducing the inflammatory response *via* decreasing the nitro-oxidative stress.

Acknowledgements. Financial support from the National Authority for Scientific Research and Innovation - ANCSI, Core Programme, Project PN16-30 02 03 is gratefully acknowledged.

REQUIREMENTS REGARDING THE EMPLACEMENT OF STORAGE PLATFORMS FOR HOUSEHOLD WASTE BINS

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Keywords: *domestic pollution*

Introduction: The large amount of stored waste is still a big concern for Romania and according to the legislative provisions, until 16th of July 2016, it has to be reduced at 35% from the total amount of waste stored in 1995 (2). Attempting this goal depends on the extent to which the population perceives the need of selective collection, recycling and residue minimization and on the way in which the local authorities facilitates the proper conduct of this process and ensures compliance with the hygiene and public health standards in relation to the location of household waste pre-collection containers.

Aims: The aim of this paper was to verify if the provisions contained in the Order no. 119/2014, for the approval of Hygiene and public health standards regarding the population's living environment, are complied with.

Materials and methods: In this regard, there were conceived questionnaires concerning the emplacement of storage platforms for containers used for selective collection of household waste, containing the requirements stipulated in Chapter 1 – Hygiene standards regarding the housing areas, article 4, point a) (1).

Results: Following the observations, it was found that the waste bins were not placed on any special designed platform, but on the sidewalks or concreted platforms, in front of the blocks of flats. After the measurements were performed, we noticed that the distance between the bins and the windows of the flats, which has to be not less than 10 meters, is not complied and, by not having any special designed platforms, the bins are not enclosed, nor provided with a drainage slope and collecting trap connected to the sewage system, as well as neither with a washing system. Instead, by being made of plastic materials, the bins are impermeable.

Conclusion: It has been found that in the living areas taken into study, the requirements stipulated in Order no. 119/2014, for the approval of Hygiene and public health standards regarding the population's living environment, in Chapter 1 – Hygiene standards regarding the housing areas, article 4, point a), are not complied with.

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2. ***, Government decision no. 349/2005, regarding the storage of wastes.

NEOVASCULARIZATION ASSESSMENT IN CANINE MAMMARY CARCINOMA – A CASE REPORT

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Keywords: CEUS, malignancy, microvessel density, neovascularization

Introduction: The frequency of mammary gland tumors in canines is three times higher than in women (Gal *et al.*, 2011). Contrast enhanced ultrasonography (CEUS) is a noninvasive clinical method, that uses special contrast agents (CAs), their role being to layout the microvasculature of different lesions.

Aim: The aim of this particular method, in this case, was to establish if we can evaluate the malignancy of a mass, given the fact that neovascularization is a malignancy marker.

Materials and Methods: The case is represented by a Silky Terrier breed female dog, 5 years old, that was presented initially with an enlarged polycystic mammary gland and a nervous lactation. The female was initially diagnosed with polycystic mastosis. After 2 more months the mass became denser and enlarged. Before the ovariohysterectomy and unilateral mastectomy surgeries have taken place, a B-Mode standard ultrasound, CEUS and a pulmonary X-ray were performed. The sample was fixed immediately after excision in 10% neutral buffered formalin for 24 hours and embedded in paraffin wax. Serial sections were cut at 4 µm from each block and stained with hematoxylin and eosin (H&E). After the embedment in paraffin wax, sections were cut from the block and mounted on poly-L lysine coated slides. The process was realised by using rabbit anti-VEGF receptor 2 antibodies (dilution 1:100, Linaris Biologische Produkte GmbH, Germany).

Results: Our results integrate this case in “fast in” and “slow in” (type 2 curve). The histological diagnosis was established as a simple cystic papillary carcinoma with a malignancy grade 2. The mean value of the MVD was 13.75 which is a low MVD.

Conclusion: We cannot determine a correlation between CEUS and a tumor’s malignancy, and so further studies are needed.

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OBSERVATIONS REGARDING THE STRUCTURE OF THE PAROTID AND MANDIBULAR GLANDS IN RABBIT

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Keywords: *acini, mandibular, parotid, rabbit.*

Introduction: Major salivary glands have a major role because of their numerous functions. The most important role is food digestion through their secretion (saliva), which contains different enzymes, water, mucopolysaccharides and lubricating glycoproteins. Saliva intervenes not only in local nonspecific defense mechanisms, but also in the specific ones. Their structure differs from one species to the other, being linked with the type of food.

Aims: The purpose of this study is to investigate the structure of two major salivary glands in adult rabbit – the parotid and the mandibular gland.

Material and Methods: The biological material was represented by 5 rabbits, approximately 6 months old, from a private breeder in Cluj, sacrificed by the owner for own consumption. We harvested the parotid and mandibular glands, fixed them in 10% buffered formalin, dehydrated in ethanol (70°, 95°, absolute), clarified in n-butanol and embedded in paraffin. We sectioned the tissue at a 5 µm thickness, stained the sections with Goldner's trichrome method and examined them with an Olympus BX41 light microscope, equipped with a digital camera.

Results: The parotid gland consists of a single type of acini and judging by their general aspect, they are serous and moderately polymorph in both shape and size. The relative small number of intralobular ducts and their caliber is particular in this gland. In the mandibular gland, all acini are similar, and regarding their general aspect, they can all fall under the serous category. From this point of view, they resemble the ones in the parotid gland, but significantly differ from those regarding their size and shape, being obviously larger in size and more polymorph. Likewise, the intralobular excretory ducts in the mandibular gland are visibly larger and more numerous.

Conclusions: In rabbit, the parotid and mandibular glands resemble one another regarding their histoarchitectonics and type of acini, which are serous in both glands. The main difference between them is the fact that the acini from the mandibular gland are considerably bigger and much more polymorph.

ASSESSING THE INTRALOBULAR DUCTS IN MOUSE MANDIBULAR GLAND

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Keywords: *granular, mandibular, mouse, percentage, striated.*

Introduction: Salivary glands are composed of acini and excretory ducts and present certain structural and functional particularities depending on the type of alimentation. In humans and most of the mammal species, the system of excretory ducts contains the intercalated and striated ducts. The mandibular gland in adult mouse, but also in other rodents, has a complex system of intralobular ducts: intercalated, granular and striated ducts. The granular ducts are situated between the striated and the intercalated ones, being well expressed in the rodents.

Aims: The aim of our study was quantifying the intralobular ducts in mouse.

Materials and Methods: We used five adult male mice from University of Medicine and Pharmacy “Iuliu Hațieganu” Cluj-Napoca. The subjects were sacrificed after exposure to inhalatory anesthesia. We harvested the mandibular glands, immersed them in 10% buffered formalin and histologically processed them using the standard paraffin embedding. We sectioned the tissue at a 5 μ m thickness and applied Goldner’s trichrome staining procedure. We examined them using an Olympus BX41 light microscope, endowed with a digital camera. We captured images using the 20X objective on four different microscopic fields for each animal. We calculated the average values and percentage for each type of duct out of the total.

Results: Intralobular ducts are more numerous than the ones from mandibular gland in most of the mammal species. After counting each type of intralobular ducts from 20 fields, we found that the granular ducts are the most numerous, with an average of 36.6 ducts/field, followed by the intermediary ducts and the striated ones. Expressing these values in percentages, results that 70.73% from the total ducts present on the field are granular, followed by the intermediary ducts with 19.90% and striated ducts with 9.37%. In other words, the granular ducts are 7,546 times more than the striated ducts and 3,554 times more than the intermediary ones.

Conclusion: The present study highlights the fact that the mandibular gland in adult mouse contains a great number of intralobular ducts, among which the granular ones are the most numerous, followed by the intermediary ones, while striated ducts are present in smaller numbers.

EPIDEMIOLOGICAL AND PATHOLOGICAL DATA REGARDING TUMORS OF THE INFERIOR GASTROINTESTINAL TRACT IN DOGS OVER A FIVE YEAR PERIOD (2010-2015)

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Keywords: *cancer, intestine, stomach*

Introduction: Gastric and intestinal tumors are rare in animals. On the other hand, in humans these type of tumors are very frequent, one of the most common cancer being the gastric and colon adenocarcinoma.

Aims: In the current paper we assessed the incidence of canine inferior gastrointestinal tract tumors that were diagnosed in the Pathology Department (Faculty of Veterinary Medicine, Cluj-Napoca, Romania) over a five year period (2010-2015). Beside this epidemiological study we realized a complex macro - and microscopical description of various types of primary or metastatic gastro-intestinal neoplasia.

Materials and Methods: The study was carried out on dogs presented for necropsy to the Pathology Department of the Faculty of Veterinary Medicine of Cluj-Napoca with different gastric and intestinal tumors. Tumoral specimens were collected from all cases and analyzed for histopathological diagnosis. We also analyzed the distribution of canine gastrointestinal tumors in relation to age, breed and sex.

Results: The highest prevalence of gastrointestinal tumors was in older animals aged between 11 and 13, which clinically showed non-specific gastrointestinal signs. Regarding the breed, the highest prevalence was in mixed-breed dogs and in Boxers. No sex predisposition was noticed, the difference between males and females being very small.

Conclusion In dogs the intestinal metastases of different tumors are more frequent than primary intestinal tumors. The Boxer is the most affected breed according to our results. Although the incidence of these tumors is low, there is a continuous increase in the number of cases over the period of our study. Further studies are necessary for the establishment of the main risk factors for this type of tumors.

NANO-CLAYS USED AS A DRUG DELIVERY SYSTEMS IN MEDICINAL APPLICATIONS: A REVIEW

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Keywords: *montmorillonite, clays mineral, pharmaceutical applications, biomedicine*

Clay minerals are naturally inorganic cationic exchangers. Based on this physiological properties they undergo ion exchange with basic drugs in solution. Clay particles are dispersed in aqueous solutions and the entrapment of the bioactive molecules is achieved by inducing coagulation in nanoclay dispersion or grinding the clay and the drug together using high temperatures. The real interest is in polymer clay nanocomposites that have advantages like enhanced mechanical and rheological properties. Ca^{++} montmorillonite has also been used extensively in the treatment of pain, colitis, diarrhea, stomach ulcers, acne, etc. Polymers can also act as a drug delivery system that can have either synergistic effects with the entrapped drug, or is capable to mediate the side effects of the encapsulated drug (Suresh *et al.*, 2010). These benefits have been used to create new generation of drugs, that has generated a great interest for research and pharmaceutical companies (Batra *et al.*, 2011).

The main goals of this review is to characterize physico-chemically the clays minerals, (particularly the bentonites) used as nano-carriers, as well as to describe the biological (and beneficial) properties of these natural minerals for human & animal health (Suresh *et al.*, 2010). The drug-clays mineral interactions have been observed and studied as a possible way to modify the drug release or target drug release or to improve the drug better dissolution. The nano-clay particle can be incorporated into a polymeric host carrier, to control the diffusion rate of a dispersed slow-release material. The nano-clay particle reduces the porosity of the material or otherwise obstructs the diffusion of the active material that is being released (Suresh *et al.*, 2010). New strategies are reported for increasing drug stability by using the clays mineral (bentonites). The therapeutical effects of the clays mineral's active principles used as dermatological and gastrointestinal protectors, laxatives, antidiarrhoeals, cosmetics, as well as for many other beneficial properties are described. Also, the application of the clays minerals in geotherapy, pelotherapy, paramuds & in aesthetic medicine is largely presented and discussed in the context of the international literature (Carretero, 2012). The nano-clays drug delivery systems have a bright future in pharmaceutical applications and diagnostic in the coming years and have great potential compared to other nanopharmaceutical delivery system (dendrimer, carbon based nanomaterials, neosomes etc).

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THE IMPACT OF TWO CHRONICAL DISEASES ON THE BEHAVIOUR AND WELFARE OF A GIANT SCHNAUZER – A CASE REPORT

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Keywords: *Giant Schnauzer, hyperuricosuria, canine symmetrical lupoid onychodystrophy*

Introduction: The Giant Schnauzer was derived from the Standard Schnauzer by crossing with the Great Dane and the Bouvier des Flandres in the 1800s. There are several inherited diseases and predispositions reported in this breed, including hyperuricosuria (HUU) (Karmi *et al.*, 2010) and symmetrical lupoid onychodystrophy (SLO) (Wilbe *et al.*, 2010).

Aims: Taking into account the increased awareness regarding the health and welfare of pure-breed dogs, we want to underline the need for careful breeding policies by presenting a patient with not one, but two chronical diseases linked to genetical disorders.

Materials and Methods: Kara is an 8 yrs old Giant Schnauzer neutered female that was diagnosed with HUU at the age of 4 and SLO at the age of 5. The HUU has led to multiple episodes of bladder infection and requires a low purine diet. The SLO requires daily treatment and supplements and has led to the loss of all nails, with periodical recurrences in one or more toes. Therefore, Kara undergoes periodical clinical examinations. The owners were required to fill in an Emotional State Profile sheet, to assess her behaviour.

Results: Kara undergoes a mean of 2 episodes of cystitis and 4 periods of lameness/year, despite full compliance of owners and state of the art clinical care. The lameness score ranged from 1/5 to 3/5. She is described as non-playful, very unsure and very attention-seeking by her owners.

Conclusion: Owner compliance is essential in chronical patients. Kara is permanently showing signs of mild discomfort with intermittent periods of moderate to severe discomfort manifested by house soiling and lameness. Her conditions are manageable, but such misfortunes could be avoided by rigorous selection of breeding dogs with emphasis on their health.

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BIOACTIVE POTENTIAL OF CHITOSAN MEMBRANES

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Keywords: *bioactive, biomaterials, chitosan, stem cells, regenerative medicine*

Introduction: Mesenchymal stem cells represent an attractive source for cell-based tissue engineering (Brown *et al.*, 2013, Chunxiao *et al.*, 2015). Tissue engineering needs a combination of cells, scaffolds and biologically active molecule. Chitosan and chitosan derivatives are promising candidates as scaffolds for tissue engineering and also have the ability to release various bioactive molecules (El Sadik *et al.*, 2015).

Aims: The aim of our study was to evaluate the bioactivity of chitosan membranes after coculture with dog gingival mesenchymal stem cells.

Materials and Methods: Chitosan powder (Sigma-Aldrich) was dissolved in acetic acid solution (1%) and was added on coverslip glass placed in Petri dishes. A concentration of 2×10^4 gingival mesenchymal stem cells derived from dog was seeded on hitosan membrane. Cell proliferation (2h, 24 hours, 9 day) was assessed with Alamar blue (Sigma) test and cell adhesion with DAPI (4.6-diamidino-2-phenylindole) (Sigma-Aldrich). After 28 day, the cultures were fixed and the proteoglycans, were visualized with Dimetil Blue (Sigma-Aldrich); the optical density were evaluated using a microplate reader (BioTek Synergy 2) at 550 nm. Cells cultured on plastic dishes were used as negative controls.

Conclusion: Our results demonstrated that chitosan membrane promote cell adhesion proliferation and chondrogenic differentiation and may represent an important tool in human and animal regenerative medicine and implantology.

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EQUINE SYNOVIAL FLUID– SOURCE OF MESENCHYMAL STEM CELLS

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Keywords: *equine, mesenchymal stem cells, regenerative therapy, synovial fluid*

Introduction: Regenerative medicine and tissue engineering are relatively new fields in the treatment of equine orthopedic injuries (Fan *et al.*, 2009, Fülber *et al.*, 2016). Mesenchymal stem cell from different sites and biomaterials represents important tools for regenerative therapy implementation.

Aims: The aim of our study was to evaluate the equine synovial fluid as a potential source of multipotent mesenchymal stem cells isolation.

Materials and Methods: Equine synovial fluid was obtained from tarsometatarsal joint during arthroscopic procedure. Samples were collected in a sterile syringe and transferred to sterile vials. After centrifugation the samples were cultured in MEM (Gibco) supplemented with 10 % of fetal bovine serum (Sigma-Aldrich) and 1 % antibiotic antimycotic 1x (Sigma-Aldrich). Cultures were incubated at 37 °C, 90% humidity and 5 % CO₂. After 72h, non-adherent cells were removed and the medium was replaced. The expansion, replication abilities, immunophenotypic features and trilineage differentiation capacity were evaluated.

Results: Our results indicated a fibroblastic-like morphology, expression of specific markers (CD105, CD90, CD49 and CD44) and trilineage (osteogenic, chondrogenic, adipogenic) differentiation capacity for synovial fluid derived mesenchymal stem cells.

Conclusion: This study demonstrated the specific characteristics of equine synovial fluid derived stem cells, ideal candidate for equine regenerative medicine and especially a new therapeutic strategy of joint pathologies.

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BEHAVIOURAL RESPONSES OF STALLIONS TO A NOVEL OBJECT

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Keywords: *behavioral indicators, novel object test, stallions*

Introduction: The way in which the horse reacts to novelty is crucial for safety of both horses and humans.

Aims: The aim of this study was to test the response towards a novel object in Lipizzaner and Romanian Draft stallions. In addition the effect of the object's color on the behavioral response of the horses was investigated.

Materials and Methods: The novel object test was performed in Lipizzaner (n = 11) and Romanian Draft (n = 8) stallions. The novel object was represented by balls of same dimensions and three different colors. The experiment was performed in four stages: analyzing the stallions' behavior in their living environment, than introducing, one by one, the balls with different colors in the box of each stallion, in the other three stages, at two days interval. Each stallion was observed during 45 minutes in each stage (15 minute/color ball), assessing a series of behavioral indicators: the frequency of snuffling, neighing, facial expressions, the position of the ears, attitude and different ways to interact with the novel object. The data were analyzed using the SPSS statistical software (Mann–Whitney and Friedman test). The value of minimal significance was considered at $P < 0.05$.

Results: The observations resulted in different behavioral patterns: curiosity (approaching and exploring the object), fear (avoidance towards the novel object), playfulness (moving, trying to bite the object) or indifference (absence of reactions). There were no significant differences in the response of the horses to the novel object in the three stages, or between the different breeds. An important result was the absence of discrimination of color differences; the stallions were behaving similarly, irrespective to the color of the ball.

Conclusion: Based on the obtained results it can be concluded that the stallions were receptive to the novel object, they liked the balls, and these can be used to alleviate the monotony in the periods of individual housing in boxes.

THE METABOLIC PROFILE IN LAYING CHICKS OF THE ROSSO BREED AFTER 180 DAYS OF FEED SUPPLEMENTATION WITH ORGANIC SELENIUM

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Keywords: *biochemistry, hematology, laying chicks, selenium.*

Introduction: Selenium is a trace mineral with antioxidant properties, which, by mediating by the glutathione, indirectly protects the hemoglobin against the risk of oxidation by peroxides through three antioxidant enzymes: superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and catalase (Avanzo *et al.*, 2001; Bartholomew *et al.*, 1998; Combs and Combs, 1986).

Aims: From the research done globally, it has been established that selenium through diminishing lipids peroxidation, through the direct action on glutathione peroxidation and thus the reduction of oxidative stress has a beneficial role on the production of meat, eggs, and the overall health of the poultry. Nutritional stress is the most important factor and includes the high level of feeds with polyunsaturated fatty acids, deficient in vitamin E, selenium, zinc or manganese, as well as the excess of iron and vitamin A, the presence of toxins and toxic compounds (Ghergariu, 1980).

Materials and Methods: The experiment was done on 20 laying chicks from the Rosso race, 6 weeks old at the start. The chicks were divided in 2 batches, and one of the batches received feed enriched with organic selenium (Sel-Plex). After 180 days biological samples were harvested by cubital vein puncture and haematological and biochemical determinations were made. The results were tabled, graphically represented and biostatistically interpreted

Results: In the experimental batch significant growths were observed in the erythrocyte constants: erythrocyte count, hemoglobin, hematocrit, MCV and MCH. Of the biochemical markers significant growths were observed in: ascorbic acid, lipids and serum pseudocholinesterase. The following parameters dropped significantly: proteinemia and blood sugar. Significant changes were also observed in cholesterol, calcium, magnesium and selenium value.

Conclusion: In the present paper we have shown the beneficial role of organic selenium on some haematological and biochemical markers, resulting in a growth of erythropoiesis, and at the same time an intensification of the metabolic processes in the experimental.

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EFFECT OF LINGONBERRY EXTRACTS ON BLOOD PRESSURE AND MYOCARDIUM IN PARACETAMOL INTOXICATION

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Keywords: blood pressure, lingonberry extract, myocardium, Paracetamol, rats

Introduction: Lingonberry fruit (*Vaccinium vitis-idaea*) contain anthocyanins, which give red color to their maturity (Li *et al.*, 2011). Urinary disinfecting and antifungal action is due to benzoic acid released by digestive enzymes. Paracetamol is an analgesic which primarily is hepatotoxic and not at least nephrotoxic. *In vitro* and *in vivo* studies have shown that the analgesic nephrotoxicity is determined by the increase of ROS in the kidney (Zhao *et al.*, 2011), resulting blood pressure increases.

Aims: Highlight the mode of cranberry extracts (1:1 and 3:1) action as protective agents of the myocardium and blood pressure in paracetamol induced toxicosis in rats.

Materials and Methods: white female Wistar rats, weighing 135 ± 20 g were divided into 6 groups of 7 animals each: control group (C); Paracetamol treated group (P) - 75 mg acetaminophen/100 g bw for 10 days. 1:1 lingonberry hydroalcoholic treated group (Lha), (200 mg/100 g bw (80 μ g benzoic acid/100 g bw) for 15 days. 3:1 lingonberry dried extract group (Ld), 100 mg/100 g bw (112 μ g benzoic acid/100 g bw), for 15 days. P+Lha (PLha) and P + Ld (PLd) treated group.

Results: Blood pressure increases following administration of paracetamol and decreases under treatment with lingonberry extract, more obvious to 3: 1 lingonberry dried extract. Administration of Paracetamol, lingonberry extracts used simple or in combination with Paracetamol does not affect the myocardium histological structure. Histoenzymological there is a slight decrease of SDH activity in the groups P and PLd and an increase in Lha group. CyOx activity is increased in Lha and Ld group.

Conclusion: The dried lingonberry extract has no apparent action on the myocardium instead has antihypertensive properties more obvious than the lingonberry alcoholic extract.

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Acknowledgements. This paper is based on work supported by the ANCS under grant number PN-1619 BIODIVERS/2016.

PHYTOCHEMICAL CHARACTERIZATION, ANTI-INFLAMMATORY AND ANTI-ULCER ACTIVITY OF A SPONTANEOUS SUCCULENT *DELOSPERMA RESEII*

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Keywords: *Delosperma resii*, anti-inflammatory, anti-ulcer, saponins, tannins.

Introduction: In Algeria, the study of traditional medicine and treatment by plants is of particular interest. This country is known by, the diversity of its climate, and the nature of its soil and the wealth of its medicinal flora.

Aims: To value this floral heritage with medicinal and economic interest, our choice concerned to an underestimated plant in traditional medicine, it is about the magic carpet (*Delosperma ressei*). This plant belongs to the family Aizoaceae. The genus *Delosperma* includes about 150 species of shrub and perennial succulent, a persistent or semi persistent foliage, growing in hilly plains.

The current work reveals through the phytochemical screening and the study of some pharmacological properties, anti-inflammatory and antiulcer effects, the curative virtues of a spontaneous succulent *Delosperma ressei*.

Results: The results of our study revealed the wealth of our plant in tannins and saponosides. Leuco-anthocyanins and flavonoids exist in average levels.

The percentage of reduction of edema of posterior left legs of mice pretreated by Diclofenac reached 50,89%, however, in mice treated with the extract of saponins this percentage reached 36.59%. After treatment of individuals of experimental group by tannins extract 10 % we noticed that the value of ulcer index falls to 20 %.

Conclusion: Our findings suggest the potential use of *Delosperma resii* as a novel natural bioactive agent to treat or prevent inflammatory and ulcerous diseases. Further studies will be necessary in the future to explore the chemical composition and the toxicity of this medicinal plant.

MICROSCOPICAL ASPECTS CONCERNING THE PRESENCE AND DISTRIBUTION OF MITOCHONDRIA IN INTRALOBULAR AND INTERLOBULAR DUCTS FROM RAT PAROTID

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Keywords: mitochondria, ducts, parotid, rat

Introduction: In striated ducts, saliva is concentrated by changing the electrolyte composition. Organization of the basal cytoplasm of the cells reflects their involvement in water and electrolytes transport, thus the main function of striated ducts is to transform saliva from isotonic to hypotonic. In the basal half of striated ducts, there are numerous mitochondria, arranged vertically.

Aims: This study aims to highlight certain microscopical aspects concerning the presence, density and disposition of mitochondria in intralobular and interlobular ducts from parotid parenchyma in rats.

Material and Methods: We harvested parotid samples from five Wistar rats and fixed them in Orth's solution. After postchromization in potassium dichromate, samples were embedded in paraffin, sectioned and stained with Heidenhain's iron hematoxylin.

Results: In the intralobular ducts' segment lined by cuboidal cells, mitochondria have a medium density and dispose throughout the whole cytoplasm with the same density and an irregular arrangement. The part where the intralobular ducts' wall becomes columnar (striated ducts), mitochondria appear to be more numerous in comparison to the anterior segment and the majority are disposed in the basal half, parallel one to another and perpendicular to the basement membrane. In the apical half, mitochondria are fewer, with a less arranged disposition. In the interlobular ducts, mitochondria density is somehow lower in comparison to the previous segment, without any differences regarding their disposition.

Conclusions: In intralobular ducts lined by cuboidal cells, mitochondria dispose throughout the whole cytoplasm without a regular orientation.

In intralobular ducts, whose walls are formed out of columnar cells, most of the mitochondria are disposed vertically in the basal half, while the apical part contains less mitochondria, oriented in all directions.

In interlobular ducts, mitochondria have a similar disposition to the one in the striated ducts, but they are less numerous.

STRUCTURAL PARTICULARITIES OF THE EPITHELIUM LINING THE LAMB EPIGLOTTIS

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Keywords: *epithelium, epiglottis, lamb*

Introduction: Epiglottis presents a central axis, formed out of elastic cartilage and dense irregular connective tissue with numerous seromucous glands, covered by an epithelium.

Aims: Because of the fact that in the consulted specialty literature there is no information regarding potential structural differences among species, we aimed to highlight the type of epithelium lining the lamb epiglottis.

Materials and methods: We harvested samples from the epiglottis of 3 hybrid Merino lambs being approximately 3 month old and subsequently processed them for histological examination, by paraffin embedding technique. As for the sections, we stained them with Goldner's trichrome method.

Results and discussion: The epithelium lining the whole surface of the epiglottis is non-keratinized stratified squamous epithelium. Concerning the thickness of the epithelium, there are significant differences between the two sides of the epiglottis. Thus, on the pharyngeal side, the epithelium is almost twice as thick as the one on the laryngeal side. Moreover, the basement membrane of the epithelium lining the pharyngeal side is curved, with large amplitude and high density folds. Towards the free end of the epiglottis, the epithelium becomes thinner and at the same time, the amplitude and density of the folds become smaller and smaller. On the laryngeal side, the epithelium becomes thinner and the folds of the basement membrane become more faded. From place to place, there are few taste buds present, but only in the epithelium lining the laryngeal side.

In the depth of lamina propria, seromucous glands can be observed, but we did not notice any excretory ducts opening on the pharyngeal side of the epiglottis, only on the laryngeal one.

Conclusions: In lambs, the epithelium lining the epiglottis is non-keratinized stratified squamous throughout the whole surface. The epithelium on the pharyngeal side is almost twice as thick as the one on the laryngeal side, and its basement membrane's folds are denser and more ample in comparison to those on the laryngeal side. The epithelium lining the laryngeal side of the epiglottis presents some taste buds and the opening of the excretory ducts.

ANTHRACOSIS IN A BABOON FROM A ZOOLOGICAL GARDEN. A CASE REPORT

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Keywords: anthracosis, baboon, macrophage, zoo

Introduction: Anthracosis belongs to pneumoconiosis group and its etiology can be ascribed to: coal dust, living in a polluted and smoky environment etc. We usually encounter the pulmonary form, but other forms such as mediastinal and esophageal were also reported. Attempting to elaborate a database with diseases in baboons, Bommineni *et al.* (2011) tracked down pulmonary anthracosis in 78 among the 4297 studied animals.

Aims: Baboons are useful animal models for medical research, thus description of any kind of pathology can aid in better understanding diseases that emerge in both baboons and humans.

Materials and Methods: A 23 old male baboon, with right-sided heart failure condition, accompanied by stasis, died. The animal was subsequently brought to Department of Necropsy Diagnosis at UASVM Cluj-Napoca. During necropsy, we harvested lung samples, which were processed for histological investigations.

Results: Upon microscopic examination of lungs, we highlighted clusters of macrophages disposed perivascular and perialveolar. Their cytoplasm was filled with black particles, which induced hypertrophy and distorted the involved macrophages; the nucleus of these cells was masked by the coal particles. In areas where macrophages carrying coal particles were better represented, we observed a fibroplastic reaction (mature fibrous connective tissue). Because of the degenerative necrosis of macrophages, we could identify coal particles with a granular aspect in the perialveolar septa. The rest of the pulmonary parenchyma was normal, without densification foci, instead a mild multifocal septal congestion was observed.

Conclusion: The animal taken into study presented mild pulmonary anthracosis, which did not induce major structural and functional alterations, therefore it evolved without clinical manifestation.

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ARONIA MELANOCARPA ANTIOXIDANT POTENTIAL AGAINST CHROMIUM VI INDUCED MORPHOLOGICAL CHANGES IN ENDOCRINE PANCREAS

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Keywords: *Aronia melanocarpa*, chromium, pancreas

Introduction: Hexavalent chromium is known as strong oxidizing agent, enters de cells easily and generates reactive oxygen species. It was demonstrated that Cr VI is toxic for liver, kidney, skin, nervous system, female and male reproductive systems. However, chromium effects on endocrine organs are less studied.

Aronia melanocarpa fruits are rich in phenolic constituents: anthocyanins, procyanidins and phenolic acids, which demonstrated to have anti-oxidative, anti-viral, anti-mutagenic, anti-cancer, anti-inflammatory activities.

Aims: Considering the aforesaid the present study was carried out in idea to see if Cr VI induces structural changes in pancreas, given it's property of inducing ROS formation in cells, and if aronia extract can play a protective role.

Materials and Methods: The study was carried out on white Wistar rats divided in 5 groups and exposed as follows: C – control –distilled water, E₁ group – potassium dichromate, hexavalent chromium compound, in distilled water, 75 ppm for three months (this level represents 3x LOAEL, and is dose at which damages were the most severe as the anterior studies have shown); E₂ group - 75 ppm Cr VI + extract of *A. melanocarpa* for three months; E₃ group - 75 ppm Cr VI for three months followed by one month of distilled water; E₄ group 75 ppm Cr VI for three months followed by one month of extract of *A. melanocarpa*. At the end of exposure period pancreas was collected and prepared for histological analysis.

Results: Hexavalent chromium administration induced morphological and functional changes in endocrine pancreas cells. Microscopic examination of histological slides from pancreas revealed the size and number reduction of Langerhans islets and presence of degenerative lesions. Experimental group that received Cr VI combined with aqueous extract of *Aronia* presented almost normal architecture of endocrine cells, and even more vascular changes occurred, probably responsible for repairing phenomena.

Conclusion: The present study showed that Cr VI is taken up by endocrine pancreas cells and disrupts their structure and function. However, the pancreas morphology and activity are preserved in groups treated with *Aronia* extract.

POTENTIALLY USEFUL BIOMARKERS FOR OBESITY

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Keywords: *apolipoproteins, lipid profiling, pets obesity*

Introduction: The mechanism of obesity is a complex one, while in regulating feeding behavior there are other factors that act, among which the hypothalamic centers, the metabolic balance of the internal environment, information's digestive system, endocrine system or adipose tissue response. Excess fat stored in the body exerts a negative influence on the cardiovascular and respiratory system, thermoregulatory, adaptation and defense capacity, endocrine activity, reproduction and production.

Aims: Increased or changing levels of this parameter - cholesterol, triglycerides, LDL, HDL including a parameter less assessed in medical veterinary practice – apolipoprotein B is found in disorders such as obesity, hypolipoproteinemia, nephrotic syndrome, diabetes etc.

Materials and Methods: The study on a group of cats aimed to evaluate specific biochemical parameters of lipid metabolism and Apo-B. This parameter is the protein component of lipoproteins (LDL, HDL, and VLDL) and is involved in transporting lipids from the intestine to the liver and the body cells. Apo-B forms 80% of LDL and 40% of VLDL. The biochemical analyses were done using an automatic biochemistry analyzer and immunoturbidimetric method for apolipoproteins.

Results: The results revealed significant disorders of lipid metabolism with predisposition to obesity, hyperlipidemia and cardiovascular disease.

Conclusion: In the present research work, we demonstrated that this parameter – Apo-B may be a successfully biomarker in veterinary medicine, like medicine.

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ANTIOXIDANT ACTIVITY AND PHYTOCHEMICAL ELEMENTS OF FIVE *ALLIUM* SPECIES

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Keywords: *Allium*, redox behavior, allicin, radical scavenging

Introduction: The alcoholic extracts of *Allium* sp. contain flavonoids as well as other antioxidant natural compounds. The most important class of bioactive compounds in *Allium* is represented by organosulphurous compounds which include allin, allicin, ajoene and some allicin-related degradative products.

Aims: In our study we have proposed to determine a phytochemical pattern of several *Allium* species (*A. cepa*, *A. obliquum*, *A. senescens* ssp. *montanum*, *A. urisinum*, *A. schoenoprasum*).

Materials and Methods: In order to examine the antioxidant activity, we investigated the free radical scavenging activity by DPPH bleaching assay, Trolox equivalent antioxidant capacity (TEAC) assay and Folin-Ciocalteu method for hydrophilic antioxidants quantification. Further, inhibition of hemoglobin ascorbate peroxidase activity and liposome oxidation have been used for pro-oxidative activity determination. Allicin have been determined by HPLC method.

Results: The hydroalcoholic extracts of studied *Allium* species present a high diversity in the light of antioxidant vs pro-oxidant activities. Further, HPLC analysis revealed the presence of some important natural antioxidants (luteolin, quercetin, rutin). Allicin content showed that *A. obliquum* and *A. cepa* var. Roșie de Arieș are the richest extracts in thiosulphinates. Antioxidative and pro-oxidative activities are correlated with the concentration of polyphenols and thiosulphinates.

Conclusion: *A. obliquum* and *A. cepa* var. Roșie de Arieș present the most obvious antioxidant activities. In this case, pro-oxidative properties are not necessarily related with anti-oxidative activities.

Acknowledgements. Financial support from the National Authority for Scientific Research and Innovation - ANCSI, Core Programme, Project PN16-30 02 03 is gratefully acknowledged.

SECTION 9: VETERINARY MEDICINE - CLINICAL SCIENCES

INFLUENCE OF IXODIDAE TICKS ON THE REPRODUCTIVE POTENTIAL OF CATTLE IN THE REGION OF MITIDJA

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Keywords: *Ixodidae, bovine, reproduction, Mitija*

Introduction: Ticks are a very special group of ectoparasites, bloodsucking, transmit a wide variety of pathogens. This pathogen transmitted by ticks promotes the appearance of several diseases such as borreliosis, anaplasmosis, Q fever, Theileriosis, babesiosis. These have an effect on bovine reproductive potential, manifested by fever, anaemia, diarrhea without forgetting the embryonic malformations, abortions and even death of cattle.

Aims: Identification of the types of *Ixodidae* that infest cattle in the region of Mitija and highlighting the existence of influence between the rate of infestation *Ixodidae* ticks and the reproductive potential of cattle

Materials and methods: To harvest ticks, the work period begins with the onset of ectoparasites. Tick harvest were performed on 149 cattle raised in traditional farms distributed in 13 farms in six towns in the region Mitija (Zaouia, Bensalah, Guergour, Douar Saada, Bouromi and the experimental station of the University of Blida). Identification of *Ixodidae* (ticks) that infest cattle in the region Mitija and blood samples for counting erythrocytes and searching protozoa were carried out.

Results: Among 149 cattle examined, 49 were infected with *Ixodidae*, on which we collected 368 ticks. After identification they were divided into 03 kinds; *Rhipicephalus* (55.16%), *Hyalomma* (34.56%) and *Dermacentor* (0.27%). The *Rhipicephalus* and *Hyalomma* kinds showed the highest infection rate of cattle. These two kinds are known to be vectors of bovine Babesiosis and Theileriosis in Algeria.

The analysis of pathogens transmitted by the *Rhipicephalus* and *Hyalomma* kind and counting of red blood cells has revealed that three cattle (15%) were positive. The test of erythrocyte counting has revealed that six cattle (30%) were anemic. These exams can reveal a decrease in reproductive potential in cattle infested with ticks.

Conclusion: The study of vector *Ixodidae* allowed us to understand the geographic distribution and seasonal epidemiology of this disease affecting cattle and reproductive potential.

HAIR MINERAL LEVELS IN DOGS WITH ATOPIC DERMATITIS

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Keywords: *atopic dermatitis, dogs, hair, heavy metals, minerals*

Introduction: Atopic dermatitis is a genetically predisposed allergic disease, characterized by skin inflammation and pruritus. Chronical internal exposure to Ni, Co, and Cr can determine allergic cutaneous reactions (Basko-Plluska *et al.*, 2011), as does exposure to other metals, like Cd, Pb, Cu (Koller, 1980), and Hg (Park and Kim, 2011).

Aims: The study aimed to determine the possible correlation between heavy metal and mineral concentration and presence of atopic dermatitis.

Materials and methods: Research was conducted on six dogs with atopic dermatitis and six clinically healthy dogs. Heavy metal and mineral concentration was determined using the ICP-OES method.

Results: As, Cd, and Hg mean levels were higher in the study group, and Ni and Pb mean levels were higher in the control group, but with no statistical significance. K, Mg, Mo, Na, and Zn mean levels were increased in the study groups, and Al, Ca, Co, and Fe mean level was higher in the control group, but with no statistical significance. However, Cu was significantly decreased ($p = 0.01$) in the study group.

Conclusion: No statistical significance has been registered for heavy metals and minerals present in hair samples from dogs with atopic dermatitis, excepting Cu, which was significantly decreased ($p = 0.01$) in the study group.

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DIAGNOSTIC METHOD OF MALIGNANT NEOPLASM OF NASAL MUCOSA IN DOGS

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Keywords: *conjunctival neoplasm, epithelial neoplasms, nasal lavage, nerve-cell neoplasms, rhinoscopy*

Introduction: The literature debates the nasal cancers problems in dogs on many areas of the nasal mucosa histological structures. We have orientated our attention on the cytomorphological aspects, which we have correlated with the anatomo-clinical and imagistic ones, using two methods: nasal lavage and rhinoscopy.

Aims: The purpose of the study is to analyse the possibility of choosing between the two most useful methodologies for cytological diagnose, based on the clinical aspects of the investigated animals regarding to the advantages and disadvantages of each technique.

Materials and method: 18 dogs were investigated, which presented at the Faculty of Veterinary Medicine Bucharest, with respiratory distress due to obstruction of the nasal cavities.

Results: The sampling for cytological diagnosis was done using the two techniques, the nasal lavage and rhinoscopy. It is most useful to try the lavage first, because it is less invasive, and only then, if case of poor cellularity after centrifugation, or in case of an inflammatory process with unfavourable post-treatment evolution, endoscopy will be used. Cytomorphological diagnosis using after rhinoscopy or nasal lavage have evidenced the following forms of nasal cancer: 10 cases out of 18 were epithelial neoplasms of the olfactory mucosa; 6 cases out of 18 were nerve tumors (malignant melanoma, estesiocarcinoma); 2 cases out of 18 were mesenchymal tumors (osteosarcoma, fibrosarcoma).

Conclusions: The nasal lavage is a good sampling method but has the disadvantage of sometimes encountering an acute or chronic inflammatory process that can shield the tumor process. Rhinoscopy, followed by the biopsy exam, is an excellent method of diagnostic of the nasal neoplasms. The cytomorphological exam performed through rhinoscopy precisely establishes the differential diagnostic between an acute rhinitis and a neoplasm.

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SURGICAL MANAGEMENT OF AN IDIOPATHIC CHYLOTHORAX IN A CAT

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Keywords: *cat, chylothorax, pericardiectomy, thoracic duct, thoracocentesis.*

Introduction: Idiopathic chylothorax is a debilitating disease that can lead to respiratory and metabolic compromise and fibrosing pleuritis (Singh *et al.*, 2012). Despite numerous conditions reported to cause chylothorax, the most common cause is idiopathic. Several treatment options are available once a diagnosis has been made. Common surgical therapies include thoracic duct ligation and pericardiectomy (Tobias and Johnston, 2012). Thoracic duct ligation forces new anastomoses to open between the lymphatic and venous systems. Pericardiectomy decreases right heart and venous pressures, easing flow across and enhancing formation of lymphatic venous anastomoses.

Aims: This article presents the clinical features and surgical management for idiopathic chylothorax in a 2 year old castrated male cat.

Materials and Methods: The cat was presented for consult 2 months after showing clinical signs of coughing, tiredness, little resistance to effort. The patient was treated with antibiotics by another veterinarian, with no improvements. The clinical examination revealed muffled heart and lung sounds ventrally and increased bronchovesicular sounds dorsally. The ventral thorax was hyporesonant on thoracic percussion. Thoracocentesis, echocardiography, pleural fluid analysis and CT examination confirmed the presumptive diagnosis of liquid thorax. Typically modified transudate (chyle) was diagnosed. Most of the volume of chyle was eliminated with the thoracocentesis (70 ml), but reaccumulated in the next 72 hours after the centesis. Complementary diagnostic procedures and the complete history of the cat excluded a traumatic cause. Surgery was recommended and the owner gave his consent for the procedures.

Results: Thoracic duct ligation and pericardiectomy were performed via a tenth intercostal space. The animal recovered well after surgery, with major improvement of the general status and a radiological exam performed 7 days post-surgery showed no signs of liquid.

Conclusion: An idiopathic chylothorax in a 2 years old cat was successfully treated by a standard left intercostal thoracotomy with thoracic duct ligation and pericardiectomy.

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CLINICAL AND MICROBIOLOGICAL STUDY OF UTERINE INFLAMMATORY DISEASES IN DAIRY COWS

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Keywords: *bacteria, dairy cows, endometritis, susceptibility*

Introduction: Endometritis in cows has a variable negative impact on fertility depending on severity, time needed for healing, and the amount of endometrial glands affected.

Aims: The aim of this study was to provide data on clinical and microbiological diagnosis, as well as targeted treatment of puerperal and post-puerperal endometritis in dairy cattle, and to evaluate the post-therapeutic conception rate after artificial insemination.

Materials and Methods: A total of 18 Holstein cows were diagnosed with metritis or endometritis by general clinical examination (history, inspection, palpation and thermometry) and a thorough gynecological exam (rectal palpation, vaginal speculum examination and ultrasound). Following diagnosis, the cows were divided into two groups: group 1, cows with postpartum metritis and group 2, cows with chronic endometritis. Bacteriological examination was carried out from uterine discharge, and susceptibility was tested by diffusion. Treatments were applied according to susceptibility results and artificial insemination was performed in all clinically healthy cows. Post-therapeutic conception rate was assessed by ultrasound pregnancy diagnosis.

Results: In cows from group 1, the most frequently isolated bacteria were: *Streptococcus*, *Staphylococcus* and *E. coli*. Samples from cows in group 2 showed the presence of *Trueperella pyogenes*, *E. coli*, *Streptococcus* and *Staphylococcus*. Intrauterine treatments were made with: Metrosept® (enrofloxacin 2.5g/100 ml; oxytetracycline hydrochloride 5g/100 ml; iodoform 5g/100 ml), Metricure® (cefapirin 500 mg), or a 10% oxytetracycline suspension. Intramuscular administration of Biocillin® (amoxicillin 150 mg/ml) was made only in cows with systemic illness belonging to group one. Estrumate® (cloprostenol, 250 µg/ml) was also given to cows with an active CL. Efficacy of treatments was satisfactory, as only 2 cows from group 2 were culled. Conception rate after the first insemination was 50% in group 1 and 60% in group 2.

Conclusion: Susceptibility tests as well as therapeutic protocols showed that antibiotics which are commonly used to treat endometritis in dairy cows still have a good efficacy against bacteria that are involved in their aetiology.

THE INFLUENCE OF UNDISCRIMINATORY ANTIBIOTIC THERAPY OVER COLIFORM BACTERIA ISOLATED FROM MASTITIC SOWS

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Keywords: *antibiotic resistance, KB testing, mastitis, sow*

Introduction: The bacterial flora present in the mammary gland and in the milk has a big influence over the growth rate of piglets. The Kirby-Bauer disc diffusion method offers valuable information regarding the use of antibiotics, thus avoiding the antibiotic resistance phenomenon that could lead to the devaluation of the female.

Aims: The aim of the study was to evaluate the susceptibility to antibiotics of the coliform bacteria isolated from sow milk in order to assess the antibiotic resistance phenomenon and establish an appropriate protocol for therapy.

Materials and Methods: The study was conducted on a number of 38 sows, previously subjected to an indiscriminatory treatment with antibiotics, independently of their disease. 9 of the animals exhibited clinical mastitis signs, while the others were clinically healthy. Milk was sampled and examined by classical microbiological techniques. After the bacteriological and bacterioscopic evaluation, the sensitivity/resistance against antibiotics was tested in two steps: the resistant colonies identified in all samples during the first step were subjected to testing by Kirby Bauer method using a second batch of antibiotics.

Results: Coliform bacteria was isolated from 55.26% (n=21) of all samples; all colonies were resistant to florfenicol, doxycycline, tetracycline, amoxicillin, streptomycin, ampicillin and enrofloxacin. During the second testing, maximal susceptibility was recorded for: cefquinome, then TETRA-DELRA® and tulathromycin, with resistant colonies or total resistance to neomycin/bacitracin/tetracycline, lincomycin/spectinomycin, trimethoprim/sulfamethoxazole.

Conclusion: The results suggested that the irrational use of antibiotics leads to antibiotic resistance and could compromise the sow in the case of a bacterial re-infection due to lack of antibiotic treatment efficacy.

THE RATE OF SUCCESS OF THE ACCELERATED SOLVENT EXTRACTION (ASE) OF FAT AND ORGANOCHLORINE COMPOUNDS FROM DRIED FISH MEAT SAMPLES

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Keywords: ASE, fish meat, organochlorine compounds

Introduction: The ASE technique applied to food samples increases the productivity of the laboratories for food safety and consumer protection. By using the appropriate combination of solvent, elevated temperature and pressure, the ASE reduces the time required to achieve fat extraction in a safer and more eco-friendly manner. Being automated, it requires no user intervention and it allows unattended overnight operation. (1.) In small analytical laboratories with insufficient staff, the technique would be of great help.

Aims: The aim of the present study was to test the efficiency of the ASE for the extraction of fat and organochlorine compounds in fish meat samples.

Materials and Methods: The experiments were conducted on pike-perch and salmon, brought to the Institute for fish and fishery products, Cuxhaven, Germany. The samples suffered an automated freeze-drying and ASE. A Clean-up with glass columns filled with silica gel was performed and a quantification of 40 organochlorine compounds was achieved using Gas Chromatography coupled with tandem Mass Spectrometry (GC-MS/MS).

Results: The recoveries obtained for organochlorine compounds were around 100%. The exceptions include the chlorobenzene group for which the method appeared not optimal and the internal standards not suitable. In order to have precise results in the routine analysis of the fish samples, correction factors were calculated for all analytes of interest.

Conclusion: We can assume that the ASE used in the fish sample preparation was successful, considering the good recoveries obtained in accordance with the time and energy spent. For better results, we recommend internal standard addition directly in the ASE cell and not after fat extraction.

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Acknowledgement. We gratefully acknowledge the financial support from The German Federal Environment Foundation (DBU Osnabrück).

THE DEVELOPMENT OF AN AUTOMATED CLEAN-UP FOR FAT EXTRACTS IN THE ROUTINE ANALYSIS OF ORGANOCHLORINE COMPOUNDS IN FISH MEAT

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Keywords: *Clean-up, fish, organochlorine compounds*

Introduction: The traditional Clean-up steps often require a lot of time and handling. A lot of chemical waste is released and a great deal of labour and user intervention lengthens the process of sample preparation. An automated Clean-up using High Pressure Liquid Chromatography with Diode-Array Detection (HPLC-DAD) can improve the productivity by offering the desired results in a faster manner.

Aims: The aim of the present study was to develop an efficient HPLC-DAD Clean-up for fat extracts, in the routine analysis of organochlorine compounds in a small analytical laboratories.

Materials and Methods: The HPLC-DAD conditions were established in accordance with the validated traditional Clean-up step of the laboratory. The parameters were applied on a dilution of analytes of interest to identify them after the HPLC-DAD Clean-up and to establish the period of time in which the analytes of interest are eluted. Another set of experiments involved fish oil in order to identify and separate the fat fraction from the analytes. To confirm the findings, extracts of native salmon samples obtained after Accelerated Solvent Extraction were spiked with the analytes of interest before and after the HPLC-DAD Clean-up step. The quantifications were made using Gas Chromatography coupled with tandem Mass Spectrometry (GC-MS/MS).

Results: An HPLC-DAAD Clean-up technique lasting 38 minutes, was developed and optimized. The method efficiently separates the analytes of interest from the fat fraction in the first 11 minutes.

Conclusion: The technique appears to work the 40 organochlorine compounds followed, with small exceptions. Internal standard addition is recommended always before the Clean-up step and not after, preferably before the fat extraction phase.

Acknowledgement. We gratefully acknowledge the financial support from The German Federal Environment Foundation (DBU Osnabrück).

EXPERIMENTAL ACUTE KIDNEY INJURY: RENAL HISTOPATHOLOGY

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Keywords: *acute kidney injury, histopathology*

Introduction: Renal ischemia/reperfusion injury represents one of the major causes of acute kidney injury. Therefore, the identification of a suitable method for preventing and limiting the deleterious effects of ischemia/reperfusion injury is highly required.

Aims: In this experimental study we characterize the morphological alterations of the rat kidney consecutive to bilateral warm renal ischemia for 1 hour and consecutive reperfusion injury. Our study aims to identify a suitable experimental model for testing kidney protective substances when ischemia/reperfusion injury is a contributing factor.

Materials and Methods: Under general anesthesia both renal pedicles of 20 adult male Wistar rats were temporary occluded by surgical clamping using atraumatic microvascular clamps for 1 hour. The animals were housed for three days in the same conditions, followed by euthanasia in the third day after surgery. Kidney samples were obtained for histological examination.

Results: Grossly, areas of congestion and necrosis were observed in the cortex of the kidney. Microscopically, the renal morphological alterations were represented by necrosis and mineralization of the renal tubules and of some glomeruli from the cortex, without any inflammatory infiltrate.

Conclusion: Our study demonstrates that induction of warm renal ischemia/reperfusion injury by bilateral renal pedicle surgical occlusion is a feasible method for obtaining a proper *in vivo* model of acute experimental kidney injury.

SAFETY OF PERCUTANEOUS ULTRASOUND GUIDED RENAL BIOPSY IN DOGS - RETROSPECTIVE ANALYSIS OF 23 CONSECUTIVE CASES

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Keywords: *percutaneous, ultrasound, kidney, biopsy, dogs.*

Introduction: Percutaneous ultrasound guided renal biopsy is an invasive diagnostics technique, essential for the management of patients with acute or chronic kidney disease. Obtained tissue samples analysis will help the clinician perform an etiologic diagnosis, issue a prognosis and orient the therapy of the majority of parenchymal nephropathies.

Aims: To describe the safety of the percutaneous ultrasound guided renal biopsy in dogs.

Materials and Methods: Twenty-three mixed ages, sex, breed and weight dogs suffering from a variety of parenchymal nephropathies were subjected to percutaneous ultrasound guided renal biopsy. All biopsies were performed under general anesthesia and aseptic technique using the Medcore biopsy gun. Obtained samples were extemporaneously examined, on site, and if more than 10 glomeruli were identified, the sample was declared proper for histological processing and examination. Samples obtained for microbiological culture were introduced in microbiology collection and transport tubes and shipped for culture and/or antibiogram.

Results: Post biopsy ultrasound scans did not reveal parenchymal or intraabdominal hemorrhage except in one patient, with prolonged clotting times that developed a massive left kidney intraparenchymal hematoma. Gross hematuria was present in all 23 patients and resolved after 1-2 days.

Conclusion: Percutaneous renal biopsy is a safe and reliable diagnostics technique which can be used in the majority of patients except those who suffer from impaired hemostasis.

CORNEAL EXAMINATION WITH OCT

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Keywords: *cornea, early diagnosis, OCT, prevention*

Introduction: Today in veterinary practice the examination of the cornea performed by direct and indirect ophthalmoscope and fundus camera. However with these instruments it is not possible to examine the corneal histology. With Optical Coherence Tomography (OCT) we are able to examine the different types of ulcer in a histology like level.

Aims: Our main goal to work out a method which makes possible to diagnose the different types of corneal acute and chronic corneal diseases and be able to determine the alterations of the corneal structure without the use of classical histological processes. We also had the intention to determine the average thickness of the cornea in dogs.

Material and Methods: We used Optical Coherence Tomography (OCT). Its principal of operation is similar to the ultra sound systems, but instead of sound it applies a special laser light to scan, which let us examine the retinal layers in vivo with 5µm resolution (Schuman *et al*, 2004.). In our clinical practice we performed the OCT examination of 50 dogs, between the age of 3 months and 15 years old.

Results: During our study, with the OCT, we were able to examine and determine the different types of corneal ulcers and their depths. We have taken pictures of different corneal diseases, abnormalities (cyst, oedema, deep perforating ulcer, corneal pigmentation). On the OCT picture of a corneal oedema, you can easily examine the different structural layers, how they get separated from each other and became thicker. On the pictures of corneal ulcer is clearly visible that the structure of the cornea is disintegrate within the area of the ulcer. The corneal pigmentation on the OCT picture appears as a high density lane above the epithel layer. We also managed to take a picture of a foreign body pierced into the cornea and we were able to measure the size of the wound caused by. Furthermore we made series of picture of the recovering process due time and treatment.

Conclusions: With the use of OCT certain diseases either genetically or chronic can be diagnosed, even in early stages without the application of histology. It is also possible to determine which layer of the cornea affected by alteration.

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TREATMENT ASSESSMENT AND DISEASE EVOLUTION OF 27 DOGS SUFFERING OF GASTROINTESTINAL DISORDERS – RETROSPECTIVE STUDY

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Keywords: *dogs, evolution, gastrointestinal disorders, treatment*

Introduction. Gastrointestinal disorders are the main cause for dog owners to present to clinicians given the variety of symptoms expressed by the patients and also the discomfort caused to the animal.

Aims. The study tried to assess the treatment and evolution of the disease over the course of 3 different revisits, each revisit taking place after four to six weeks from the previous visit.

Materials and Methods. The study was conducted over a period of 3 years, between 2011-2014, on 27 dogs of different ages and breeds, all suffering of gastrointestinal disorders.

Results. To reach the goals of the research, the drugs that have been administered to the patients have been categorized as corticosteroids, non-steroidal drugs, protective, H2 antagonists, antibiotics, chemotherapeutic agents, anti-parasitic, cyclosporine and other drugs (vitamins, electrolytes, glucose, etc.), while the evolution of the disease appreciated if the patients have completely (no disease symptoms) or partially (not all initial symptoms expressed) recovered, or the treatment was ineffective and the dogs did not recover at all.

The results showed that most of the patients responded to treatment after the second revisit (85%), while after the third revisit, just one patient did not improve its health condition (3,7%).

Conclusion. In the present research work, we assessed the treatment of gastrointestinal disorders and the disease outcome that depends on the establishment of an appropriate treatment scheme.

STUDIES REGARDING THE INDUCTION OF ANGIOGENESIS IN ASEPTIC NECROSIS OF THE FEMORAL HEAD IN DOGS

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Keywords: *femoral, head, necrosis, aseptic, angiogenesis*

Introduction: Aseptic necrosis of the femoral head in dogs occurs because of a decrease in the local blood supply, which can have various causes.

Aim: The aim of the paper was to evaluate the efficiency of a new method for angiogenesis stimulation in dogs with aseptic necrosis of the femoral head.

Materials and Methods: This study was conducted on a number of 8 dogs (n=8) of different breeds (mostly small and medium sized dogs), aged between 7 and 15 months, suffering of aseptic necrosis of the femoral head with different degrees of severity. The patients were previously subjected to various treatments with anti-inflammatory drugs and analgesics. Aseptic necrosis of the femoral head diagnosis was assessed based on radiological examination. In all of the patients, in order to stimulate local angiogenesis, two holes were made in the femoral head, with a length approximately equal to the femoral head thickness. The holes were made with 3 mm. diameter drills, that are commonly used in osteosynthesis. In four of these patients (50%), hydroxyapatite powder was placed inside the drill holes, while in the rest of the cases (50%) no active substances were introduced into the created holes. Postoperative evolution was monitored for 2.5 months.

Results: There was found an improvement and a partial recovery of the affected tissue in the patients with hydroxyapatite powder added in the drill holes, in comparison with the patients without any active substances added in the holes. In these last cases, a more efficient healing and recovery of the articular surfaces was observed. These aspects were assessed by radiological examination and morphometrical measurements.

Conclusion: The method performed proved to be an effective alternative for stimulating the angiogenesis in dogs with aseptic necrosis of the femoral head.

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PARASITIC CONTAMINATION OF PUBLIC PLACES AT NEW HOUSING DISTRICTS OF BELGRADE

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Keywords: *public places, parasitic contamination, helminth, protozoa, New Belgrade*

Introduction: Permanent increased of number of dogs present a hygienic and ecological problem of urban environment because we had a permanent contamination at public places are more with its faeces. From these reason until 1993, we performed permanent parasitological control of grass area and public places at Belgrade (Pavlović *et al.*, 2015)

Aims: We presented our results of parasitological examination performed at public places of new housing places of Belgrade - New Belgrade area during 2015.

Materials and Methods: We examined 98 samples of soil at green area and public places and 80 samples of dog faeces. Samples were collected from park Prijateljstva, Ušće, Kej oslobođenja, Dunavski i Savski kej, places nearby Sava center, Bloka 23, 45, and 65. Samples were collected from April to June in a chess-board manner at distance of 1-1,5m according to the extent on the study area, and up to depth of 2-3cm and were examined by sedimentation and floatation method (Euzéby, 1981).

Results: Parasites contamination was detected at 45.91% (45/98) soil samples and 60.0% (48/80) dog's faeces. *Toxocara canis* were found at 31.63% soil samples *Dipylidium caninum* at 19.9%, *Ancylostomidae spp.*, *Trichuris vulpis* at 16,32%, *Toxocaris leonina* at 14.28% and *Taenia* -type helminths at 5.1%. In dog faeces samples *Toxocara canis* were found at 27.5% faeces, *Dipylidium caninum* at 25.6%, *Ancylostomidae spp.* at 24,5%, *Trichuris vulpis* at 11,25%, *Toxocaris leonina* at 8,75%, *Taenia* -type helminths at 6.6%, *Giardia intestinalis* at 18,5%, *Ampeba spp.* at 9.9%, *Isospora canis* at 4.5% and *Cryptosporidium spp* at 4.3%

Conclusion: The results show the potential risk of human infection with the found parasites as well as the constant threat of infection of dogs in these areas.

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NORMAL VALUES OF URINE ELECTROLITES IN HEALTHY DOGS

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Keywords: *electrolytes, dog, urine, normal values*

Introduction: No many details regarding the urine electrolytes in dogs are known, but in human medicine measurement of urine, Na^+ , Cl^- and K^+ is rather than common in hospitalized patients, and these urine electrolytes are useful in the diagnostic evaluation of volume status, hyponatremia, acute kidney injury, metabolic alkalosis, hypokalemia and urine anion gap (urine net charge) (Alluru, 2013). The sodium-retaining effect of aldosterone at the collecting duct takes longer because of the time necessary for new protein synthesis involving the epithelial sodium channel, the Na/K-ATPase , and the ROMK potassium channel. These effects of aldosterone are best determined by a decrease in urinary sodium concentration and an increase in urinary potassium concentration. (Schrier, 2011)

Aims: The main initiative for this research was the determination of reference values for the normal values of electrolytes in urine of dogs.

Materials and Methods: This research was done on 10 dogs with age between 6 months up to 8 years old that were in excellent health, after clinical and paraclinical examination. Ultrasonographic examination of urinary tract was performed with Esaote My-Lab 40, using a linear probe LA 523, complete blood count (CBC) was performed with Abacus Junior Vet automatic analyzer (Diatron Messtechnik, Hungary), Biochemical analysis of 8 blood parameters: glucose, phosphorus, urea, creatinine, ALAT, ASAT, total proteins and albumin, was performed using a Screen Master Touch laboratory photometer. Ionometer 3 EH-F Fresenius was used in order to determine the electrolytes in blood and also urine of all the cases. Na^+ , K^+ , ionized Ca^{2+} , normalized Ca^{2+} as well as pH were detected. Various chemical substances (protein, glucose, ketones, bilirubin, occult blood, urobilinogen, pH, nitrite, leukocytes) are measured semi quantitatively in the urine by reagent strips Uripath 10 and we also do urine sedimentation, and only those were used in order to determine the reference values of electrolytes in urine.

Results: The values of Na^+ in urine of healthy dogs varied from 12,1mmol/l up to 240,9mmol/l. The values of K^+ in urine of healthy dogs varied from 31mmol/l up to 95,5mmol/l. The values of Ca^{2+} in urine of healthy dogs varied from 0,11mmol/l up to 1,78mmol/l.

Conclusion: In the present research work, we demonstrated that this method can be used for determine the concentration of electrolytes in urine.

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BACTERIAL PATHOGENS ASSOCIATED WITH RESPIRATORY DISEASES IN FARROW-TO-FINISH PIG HERDS IN VOJVODINA REGION

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Keywords: *respiratory diseases, swine, Vojvodina*

Introduction: Intensifying of swine industry increases the frequency of swine respiratory diseases regardless of applied measures for their control. Occurrence of swine respiratory diseases is dependent on the whole range of factors, including farming system, nutrition, genetic factors, overall herd health status.

Aims: The aim of the study was to assess the etiology of respiratory disease in fatteners by examining gross pathological lung lesions together with bacteriological testing of lung samples from died and slaughter pigs from herds with a known clinical respiratory problem.

Materials and Methods: This study was conducted in conventional farrow-to-finish pig herds located in Vojvodina region. The applied research methods included epidemiological, clinical and gross pathological examination of diseased pigs on the farm and bacteriological testing (lungs, mediastinal lymph nodes). At the slaughterhouse, thoracic cavity organs from in total 360 fatteners were examined and observed gross pathology changes were recorded. Moreover, the tissue samples of altered respiratory organs were collected to bacterial examination. The standard bacteriological diagnostic methods was performed.

Results: At post mortem examination lung lesions in large number of died animals were observed. By bacteriological examination of pathologically changed lung tissue *Pasteurella multocida*, *Haemophilus parasuis*, *Trueperella pyogenes*, *Arcanobacterium haemolyticum*, *Streptococcus suis* type 1 and *Streptococcus dysgalactiae* were detected. Despite the fact that pathological changes indicative for *Actinobacillus pleuropneumoniae* were frequently observed, this bacteriological agent was seldom detected by laboratory testing.

Conclusion: In the present research work, the changes in the respiratory organs were evident at high rate in clinically healthy fatteners. In spite of applied prophylactic measures, the presence of numerous bacterial agents responsible for swine respiratory diseases was established.

Acknowledgment: This work was supported by the Ministry of Science and Technological Development of the Republic of Serbia, grants TR 31071.

LEGS AND CLAWS CONDITION AND LAMENESS IN SOWS

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Keywords: *claw lesions, lameness, leg swellings, sows, welfare*

Introduction: Lameness is a multi- factorial condition that depends on managerial as well as genetic variables, but often is related to legs and feet condition of the animals. This significant welfare problem is a major cause of lost productivity for the pig industry and one of the reasons for sow culling (Nalon *et al.*, 2013).

Aims: Considering data about sow's lameness in Serbian pig farms are insufficient, the aim of the study was to give an overview of legs and claws condition and the presence of lameness in sows at one industrial farm.

Materials and Methods: Total 130 animals in different stages of the production cycle (90 dry i.e. pregnant and 40 lactating sows) were observed. The occurrence of leg joints swellings; claws condition (toes length, dew claw condition, cracked wall) and lameness (in animals in group boxes) were visually recorded and then classified according to the Welfare quality assessment protocol for pigs (2009) and the Zinpro claw lesion identification (Feet First Team, 2010).

Results: Findings proved the occurrence of one or more of examined conditions in 40% of pregnant sows and in 45% sows in lactation. In more than 20% of pregnant sows lameness was presented. There was statistically significant positive correlation between the occurrence of lameness and leg swellings and between lameness and claw condition in pregnant sows (in both cases $p < 0.0001$).

Conclusion: The results show that lameness is a significant problem in the studied farm. In general, at farm in Serbia more attention should be given to monitoring of sows' physical condition and behavior, to minimize the occurrence of welfare problems and to reduce production losses.

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HOCKS AND HOOVES CONDITION AND CHANGES IN BEHAVIOUR OF DAIRY COWS IN TIED SYSTEM

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Keywords: *behaviour, dairy cows, hoofs, hock injuries, welfare*

Introduction: Claw horn disorders, infectious diseases of hooves and leg injuries cause lameness in dairy cows (Olechnowicz and Jaskowski, 2011). A lame cow is easily recognized while walking. In tied system, hock and hoof injuries are common, and some of them is easy to spot. However, behaviour that indicates pain in the hooves often remains unnoticed which compromise welfare status of affected animals.

Aims: The aim of the study was to determine the incidence and character of the changes in the hocks and hoofs among tied dairy cows, and also behavior of cows with those changes.

Materials and Methods: The study was conducted at intensive dairy farm with tied system of keeping animals, observing total 150 cows from different production groups. Hock and hooves condition, as well as behavioral changes on standing animals were checked. For scoring of these parameters methods by Grandin (2013) and Leach and Whay (2009), respectively, were used.

Results: In all categories of examined cows changes were found: in hocks (mostly the loss of hair and redness without swelling), in hooves (usually redness in interdigital region and/or redness of the coronary edge), and in behaviour (mostly position the peaks of the hooves to the side). The most of the animals without changes in behaviour were in the category of heavily pregnant heifers.

Conclusion: Solving problems on cows' hooves and injuries in tied system is complex. It requires changes in farm management and significant engagement of employees. *Inter alia*, dairy cows' health and welfare can be improve by constant education and stimulation of personnel, as well as appliance of effective methods of recording and control of hoof problems.

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URINARY CAPILLARIASIS IN A DOG WITH HYPERTROPHIC CYSTITIS: CAS REPORT

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Keywords: *Capillaria plica*, hypertrophic cystitis, bladder biopsy, treatment

Introduction: *Capillaria plica* (syn. *Pearsonema plica*) is the commonly known bladderworm that affects canids worldwide. Its localization includes the urinary bladder and sometimes the pelvic area of the kidneys or the ureters. Although canine capillariosis is frequently asymptomatic, it can cause symptomatology in the lower urinal tract, therefore diagnostic methods such as urine sedimentation technique should be performed whenever urinary pathology is present or suspected.

Aims: A case report with canine capillariasis is presented in order to highlight the involvement of *Capillaria plica* in urinary pathology in dogs, as there is not sufficient information regarding the prevalence of this parasite in our country and efficient treatment protocols.

Materials and Methods: A 6-years-old sterilized American Staffordshire Terrier female was brought to the clinic with fever, apathy, loss of appetite and abdominal pain. Blood tests revealed an acute inflammatory syndrome and abdominal ultrasound marked a hypertrophic cystitis. Therefore a sedimentation urine test was performed and was intensively positive to *Capillaria plica*. The dog was also diagnosed with trichcephalosis, therefore a treatment with milbemycin oxime was chosen.

After 2 weeks of therapy (milbemycin oxime every 7 days, antibiotics and anti-inflammatory drugs), bladder biopsy was performed. Histopathology revealed a hemorrhagic cystitis and the presence of a *Capillaria plica* female in the mucosa of the bladder. Another dose of milbemycin oxime was administered followed by levamisole after one week.

Results: A reduction of the numbers of *Capillaria plica* was observed in the sedimentation urinary test that was correlated with a slight improvement of the clinical signs of the dog, but we cannot conclude that the protocol was efficient against *Capillaria plica*.

Conclusion: Our case report suggests the involvement of *Capillaria plica* in hypertrophic cystitis and also the need of finding a more efficient antiparasitic treatment for the disease.

PREVALENCE OF SUBCLINICAL MASTITIS IN THE LOCAL GOATS IN THE PROVINCE OF LAGHOUAT (ALGERIA)

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Keywords: *goat, prevalence, sub-clinical mastitis*

Introduction: Subclinical mastitis is a disease of the udder that passes mostly unnoticed. Or several germs associated with it and their presence in milk constitutes a major risk to consumer health.

Aims: Our study aims to determine the prevalence of subclinical mastitis in local goats in Laghouat region (Algeria).

Materiels and Methods: We undertook a study based on the detection of sub-clinical mastitis by Califirnian Mastitis Test (CMT) in 60 goats aged 1 to 9 years and weighing 18 to 45 kg of live weight and whose lactation number varies from 2 to 8.

Results: We found a prevalence of subclinical mastitis reaching 46.6%. A clearly significant difference ($P < 0.05$) is reported on this prevalence compared to age. The highest rate is recorded especially in goats aged between 3 to 7 years with 62% of detected subclinical mastitis, followed by the older goats (over 7 years) with a prevalence of 27%, and at the end the youngest goats (1-3 years) with a prevalence of 11%. A significant difference was also recorded between the different lactation ranks ($P < 0.05$). The goats having the highest rank of lactation were most affected by subclinical mastitis. Prevalence of 46%, 31%, 11% and 8% respectively are found for the 6th rank of lactation and more, 4 lactations, 5 lactations and 1 lactation. We noticed that the majority of diagnosed mastitis was caused by poor hygiene conditions.

Conclusion: This study allows us to conclude that there is a high prevalence of subclinical mastitis in the local goats in the province of Laghouat (Algeria).

SECTION 10: LAND MEASUREMENT, NATURAL AND HUMANISTIC SCIENCES

USE OF A DIGITAL INFORMATION SYSTEM TO ACHIEVE A TOPOGRAPHICAL EMBOSSED PLAN IN FARCASESTI VILLAGE, GORJ COUNTY

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Keywords: *Computing environment, Contour, GPS, Topographic plan.*

Introduction: Any digital representation (numeric) of the relief continue variation in space is called digital elevation model (Popescu G. 2009) (MDA or DEM) or digital terrain model (DTM). Other Z sizes may be shaped elevation with the methods applied to altitude, such as pressure, temperature, acidity of the soil, land pollution, etc. In this case they study generally represent of any themed variable values Z on a continuous area.

Aims: The purpose of this paper is to obtain thematic maps and topographic analyzes determined on the field and processed through the basic programs of AutoCAD, TopoLT and Global Mapper which along with topogeodezical details high up in on the field create a database required to implement a feasibility study, as a previous step of the general cadastre in the Farcasesti village, Gorj county.

Materials and Methods: Topographical surveyings were made with GNSS technology using the RTK-Kinematic method, South V-82 type in Real Time and data processing was performed by specialized graphics programs.

Results: Field data collected with GPS RTK were transferred to a computer using specialized software LeicaGeo Combined Office and other software like Notepad, Excel, Word, AutoCad 2013. The imported data from the field in three spatial coordinates, respectively X, Y and Z, were the basis for drawing up planimetric situation plans by outlining the details of the terrain and elevation.

Conclusion: In the present study, we demonstrated that the use of GPS technology made possible topogeodezical data collection from a large area with high precision in a short time using reduced material and human resources. This allowed us to import data from the field by using topogeodezical specialized programs and accurately achieve the outlines of buildings and perimeter, as verified by superimposing them on orthophotomap. Achiving digital plans using AutoCAD Architectural demonstrated that they can be made with accuracy and precision permitting various analyzes of land, including the construction of contour in 2D and 3D.

TOPOGRAPHICAL SURVEY WORK AND STAKE OUT OF AN AGROINDUSTRIAL BUILDING FROM PERIAM VILLAGE, TIMIS COUNTY

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Keywords: *DXF Generate, Leica Geo Office Combined, topographical works*

Introduction: The paper starts from the premise that countryside youth is an extremely important resource for their communities. Through this project, they can receive support to develop a private family business. The topography used to materialize the projects has an important role, and this is achieved with topographical tools and methods.

Aims: The main objective of the project was to achieve a topographic survey works and mapping of an agro-purpose storage for vegetables and fruits produced by the existing farms from the village.

Materials and Methods: The work theme includes achiving of cadastral plans base on a 1/5000 scale, using measurements for all studied locations and land cadastre units. GPS technology used in thickening RGNS, namely the determination of network support, lead to the lifting of all topographical stake out of the contour points. After that, the points were used as starting points for execution the tracing of the surface construction with the support of a total station.

Results: For topographical survey was used a V82 South GNSS receiver with two frequencies and 7 channels which allows RTK positioning in real time and then it was used permanent topographic station nearby Timisoara (TIM1.2.3). After overlapping the situation plan and plan developed by an architect, it was made the stake out of industrial building's foundation with Leica Total Station 1205+, through the dedicated "Stakeout" software.

Conclusion: Topographical works generally pursue two base objectives: the topographical survey completed by a digital representation of a small land area and staking out the construction building respectively implementing the projects on the ground. This paper demonstrated that it is possible to achieve the optimal time of all field and office operations with precision and accuracy parameters required by the topographical laws and rules.

THE PERCEPTION OF LAND RECLAMATION WITHIN VITICULTURAL LANDSCAPES AS A METHOD OF PROMOTING AND SUPPORTING LOCAL ECONOMIC ACTIVITIES

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Keywords: *aesthetic value, recreational value, local economic activities*

Introduction. VineDivers includes four viticultural regions along a west-eastern transect through Europe: Spain (Denominación de Origen Montilla Moriles, Córdoba, Andalusia), France (AOC “Côteaux du Layon”, Loire), Austria (wine region Carnuntum and Leithaberg, Eastern Austria) and Romania (wine region “Podișul Transilvaniei” – Aiud and Târnave) (www.vinedivers.eu).

Aims. The survey of landscape aesthetics and recreational value is based on *in situ* photographs.

Materials and Methods. First approach was to know how the interviewed people perceive the landscape through the way they live in and/or through their uses. The second approach was to know if the landscape is perceived as an aesthetic item by the interviewed people (and how). The third approach was to know if this landscape is also a known space, in particular in terms of possible interactions between biodiversity and viticulture.

Results. In Romania, the viticulture ecosystem has a low recreational value. In only one site from sixteen visited sites, there were identified hiking, walking or recreational activities. The tourism activities runs near vineyards, for wine tasting or local landmark visiting. The most difficult assessment was to establish if at least one of the landscape among the photographs corresponds to the vision of an economically sustainable viticulture.

Conclusion. The questions asked if at least one of the viticultural landscapes could incite them to buy a locally produced wine. The viticultural landscape (if is well maintained) can become a method of promoting and supporting local economic activities.

References

*** www.vinedivers.eu

Acknowledgements. 2013-2014 BiodivERsA/FACCE-JPI joint call for research proposals, with the national funders UEFISCDI - Romania, FWF Der Wissenschaftsfonds - Austria, ANR - Agence Nationale de la Recherche - France, Bundes Ministerium für Bildung und Forschung - Germania and Ministerio de Economía y Competitividad - Spain. This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CCCDI - UEFISCDI, project number 6/2015

ON THE USE OF SATELLITE REMOTE SENSING FOR RIVER STAGE AND DISCHARGE IN UNGAUGED CATCHMENTS

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Keywords: *Altimetry, Danube Basin, Stage heights, Discharge*

Introduction: The number of operational river gauges world-wide has fallen for geopolitical and economic reasons over the last 15 years. However, this period has seen the launch of a number of altimeter satellites primarily for marine purposes but capable of measuring heights of inland waters. These missions include Topex/Poseidon, ERS, Jason, Cryosat-2 and ENVISAT. Currently, Jason-2 (OSTM), Jason-3, Altika and Sentinel-3 are operational. In addition satellite Synthetic Aperture Radar (SAR) missions such as Sentinel-1 and optical missions such as Landsat-8 can quantify river width, lake extent and flooding.

Aims: The concept of radar altimetry over inland waters and its use as a virtual gauge will be introduced. Differences between the conventional nadir pointing altimeters of say ENVISAT and Jason, the SAR altimeters of Cryosat-2 and Sentinel-3 and the wide-swath altimeter of the planned Surface Water and Ocean Topography (SWOT) mission will be explained. Although altimetry can provide stage heights above the minimum flow level its conversion into discharge is far from simple although empirical relationships exist, typically using river width and slope. The latter parameters extracted from satellite remote sensing allow stage/discharge to be estimated over ungauged basins.

Results: Results from remote sensing missions will be presented and altimetric heights compared against gauge data for a number of major rivers including the Danube and its tributaries. Methodologies to extract discharge from remote sensing data will also be presented as well as SAR images of the 2015/6 flood in Northern England.

Conclusion: This presentation will introduce the use of satellite remote sensing to recover inland water heights and river discharge over ungauged basins.

MONITORING OF BUITURI SLAG DUMP, HUNEDOARA COUNTY IN RELATION WITH ENVIRONMENTAL PROTECTION

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Keywords: *environmental protection, monitoring, planimetric and altitudinal movements
slag dump, technology GNSS,*

Introduction: Detailed analysis of appearance and relief evolution in mining areas cannot be done without mining engineering concepts. Over time, researchers around the world have responsibly been involved in this matter necessary for the development of society, also with obvious implications and repercussions over the quality of life.

Aims: The purpose of the scientific research detailed in this paper comprises in monitoring the slag dump from Buituri, Hunedoara County using space geodetic technology. Slag dump is the result of steel production activities carried out under the steel factory Arcelor Mittal Hunedoara S.A., formerly known as the steel factory Hunedoara - Siderurgica S.A.

Materials and Methods: Therefore it was decided to conduct monthly topographic measurements to monitor possible dynamic changes that may appear in the context of continuous exploitation of the above mentioned slag dump.

Results: Monitoring possible movements is performed by comparing transversal and longitudinal profiles drawn based on zero measurement carried out on 20.05.2011, with the ones obtained after processing of the monthly measurements realized throughout the years 2011, 2012, 2013, 2014, 2015 and 2016. Also, for observing the displacements, comparative charts or tables with records regarding coordinates differences are studied.

Conclusion: The issue of measuring and graphic representation of settlements, horizontal linear movements and landslides for structures such as slag or sterile dumps, requires further studies and interdisciplinary research, creating links between specialists in the fields of terrestrial measurements science and geology.

TOPOGRAPHIC AND CADASTRE WORKS FOR THE ESTABLISHMENT OF AN ANIMAL FARM WITH NPRD FUNDS, MEASURE 121, VĂRĂDIA, CARAŞ-SEVERIN COUNTY, ROMANIA

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Keywords: *NPRD (National Plan of Rural Development), Leica 805 and 1200, Stereographic 1970, TopoSys, TransDat, WGS 1984*

Introduction: Measure 121 “Modernising agricultural exploitations” aims at increasing the competitiveness of the agricultural sector through better use of human resources and of production factors while fulfilling EU standards; its operational objectives are the promotion of investments in agricultural exploitations in both vegetal and animal sectors for the achievement of new buildings and/or the modernisation of existing agricultural buildings and of their equipment, and the purchase of new machines and equipments. These non-reimbursable funds will be made available with the contribution of Romania (5%) and of the European Union (95%).

Aims: This land survey aims at drawing the situation plan of a pig farm in Vărădia, Caraş-Severin County, Romania, at recording it in the land record of new buildings, and at changing its use category. The land on which it will be established is east from the Commune of Vărădia, 3.2 km far from the residential area of Vărădia, 2.06 km far from Greoni, and 4.2 km from Grădinari. The land in discussion is recorded in the land record no. 30596 with an area of 58,000 m².

Materials and Methods: Topographic surveys were made with a Total Station Leica TC805 and with a GPS Leica 1200. GPS raw data obtained in the WGS 1984 system were turned with a TransDat programme into Stereographic 1970 coordinates. Data processing was done with a Leica Geo Office Combined Programme. The method chosen for land surveying with GPS equipment was Real Time Kinematic; for the total station, we chose the end known coordinate point and orientation-supported routing method. The support points in routing were determined with GPS equipment. Plan surveys were done in the Stereographic1970 projection system and level mapping was done in the Marea Neagră 1975 projection system.

Results: Support points were names S1, S2, S3 and S4. After field measurements, raw data were compensated using the TopoSys programme, and later on reported into the AutoCAD. To map with GPS through the Real Time Kinematic method, we used the reference station in Reşiţa, Caraş-Severin County, Romania.

Conclusion: In this paper we present how we can record in the land record buildings and how we can update use category for an area of 58 000 m² according to the Land record 30596-Vărădia, which initially covered an area of 56,027 m² arable land and 1973 m² haymaking fields, a land within the extra residential area of Vărădia, Caraş-Severin County, Romania. The advantages consist in access roads directly connected to the county road 573A and lack of environmental restrictions; disadvantages: the positioning of the setting relatively excentric within the county.

MODERN LAND SURVEYS FOR THE SITUATION PLAN OF THE UNIVERSITY CAMPUS OF THE “KING MICHAEL I OF ROMANIA” B.U.A.S.V.M. FROM TIMISOARA

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Keywords: *ArcGIS, Leica 805 and 1200, Stereographic 1970, TopoSys, TransDat, WGS 1984*

Introduction: Our University is 70 years old as they established, on July 30, 1945, the Faculty of Agronomy by Royal Decree of King Michael I of Romania published in the Official Monitor of Romania on August 1, 1945, as a component of the Polytechnics Institute. In 1948, the Faculty of Agronomy was turned into the Agronomic Institute. Between 1957 and 1962, it operated as the Faculty of Agriculture and Animal Science, to which, in 1962, they added the Faculty of Veterinary Medicine. In 1968, they established the Faculty of Animal Science. Until 1987, the Agronomic Institute had three faculties: of Agriculture, of Animal Science and of Veterinary Medicine. In 1991, by the Order of the Ministry of Education, the Agronomic Institute becomes the Banat's University of Agricultural Science and Veterinary Medicine and, in 2013, its name changed into the Banat's University of Agricultural Science and Veterinary Medicine “King Michael I of Romania” from Timisoara by Government's Decision no. 493 from July 22, 2013. In 2014, the University was awarded the Certificate of Excellence for “The BEST CAMPUS” category in the international competition “Science and Education” organised in Oxford, UK.

Aims: Taking into account all this, we wanted to draw a situation plan of the University campus based on land surveys and, then, a GIS map.

Materials and Methods: Land surveys for the situation plan were made with a Total Station Leica TC805, TC1205+ and a GPS Leica 1200. Situation plans were made in the projection Stereographic1970 and MN 1975 system. To carry out the land surveys, we chose the close routing method and the end-supported routing methods. These measurements were made in both the Stereographic1970 System and the local reference system. Raw values were processed with a Leica Geo Office Combined programme, and the coordinates WGS 1984 obtained after downloading the GPS equipment were transformed with a TransDat programme. Compensation was done with a TopoSys programme. Compensated values were reported in AutoCAD with TopoLT to make up the situation plans. The GIS map was made with an ArcGIS programme.

Results: The University campus covers an area of 173,729 m². The structure of the learning areas covers a useful area of 12,558 m² and a total area of 31,937 m². The five dormitories total 1,630 places. The cafeteria covers 1,589 m² and has 450 places (*BUASVMT, Self-evaluation report, October 2012*).

Conclusion: In this paper, we present a situation plan of the University campus based on land surveys and its GIS map.



UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE CLUJ-NAPOCA

