Friedrich-Schiller University Jena

Agricultural University of Tirana

Third International Conference

Challenges in Biotechnological and Environmental Approaches

at Agricultural University of Tirana

Albania

Abstract book

23 - 25 April 2019

Conference President

Bari Musabelliu, Rector of the Agricultural University of Tirana

Organizing and Scientific Committee

Fatbardh Sallaku, Agricultural University of Tirana, Tirana, Albania

Ralf Oelmüller, Friedrich-Schiller University of Jena, Jena, Germany

Sulejman Sulçe, Agricultural University of Tirana, Tirana, Albania

Anila Hoda, Agricultural University of Tirana, Tirana, Albania

Irena Sherameti, Friedrich-Schiller University of Jena, Jena, Germany

Agim Ballvora, University of Bonn, Bonn, Germany

Axel Mithöfer, Max-Planck Institute for Chemical Ecology Jena, Jena, Germany

K. Sowjanya Sree, Central University of Kerala, India

Mirela Lika Çekani, University of Tirana, Tirana, Albania

Aleko Miho, University of Tirana, Tirana, Albania

Alush Musaj, University of Mitrovica, Mitrovica, Kosovo

Bajram Berisha, University of Prishtina, Prishtina, Kosovo

Valbona Kolaneci, Agricultural University of Tirana, Tirana, Albania

Alban Ibraliu, Agricultural University of Tirana, Tirana, Albania

Shpend Shahini, Agricultural University of Tirana, Tirana, Albania

Seit Shallari, Agricultural University of Tirana, Tirana, Albania

Endrit Kullaj, Agricultural University of Tirana, Tirana, Albania

Edmond Hala, Agricultural University of Tirana, Tirana, Albania

Etleva Jojiç, Agricultural University of Tirana, Tirana, Albania

Erta Dodona, Agricultural University of Tirana, Tirana, Albania

Fetah Elezi, Agricultural University of Tirana, Albania

Table of Content

Oral Presentations

Sensing environmental and developmental signals *via* cellooligomers

RALF OELMÜLLER

Matthias-Schleiden-Institute, Plant Physiology, Friedrich-Schiller-University Jena, Dornburgerstr. 159, D-07743 Jena, Germany

E-mail: ralf.oelmueller@uni-jena.de

Roots respond to a cocktail of chemicals from microbes in the rhizosphere. Infochemicals in nmol concentrations activate receptor-mediated signal pathways, which reprogram the plant responses to environmental changes. The microbial signals have to pass the cell wall to activate pattern recognition receptors at the surface of the plant plasma membrane. The structure of the cell wall is not only a barrier for the signaling molecules, but also changes permanently during growth and development, as well as in response to microbial attacks or abiotic stress. Recently, cell oligomers (COMs) were identified as novel chemical mediators in *Arabidopsis thaliana*, which inform the cell about the alterations in and around the cell wall. They can be of microbial and plant origin and represent novel invasion patterns. COMs initiate Ca^{2+}-dependent signaling events that reprogram the cell and adjust the expression and metabolite profiles as well as innate immunity in response to changes in their rhizosphere environment and the state of the cell wall. COMs operate synergistically with other signals or their recognition machineries and activates local and systemic responses in the entire plant. They also adjust the performance of the areal parts of the plant to signals perceived by the roots. Here, I summarize our current knowledge about COMs and propose strategies for future investigations.

Keywords: Arabidopsis, cell wall, cell oligomers, Ca^{2+} signaling, systemic response

Genetic diversity of *Cyprinus carpio* from two hatcheries in Albania

XHILIOLA BIXHEKU[1], ANILA HODA[2*], DHURATA BOZO[3], LORENA HYSI[2]

[1]Quality Assurance Agency for Higher Education,

[2]Agricultural University of Tirana,

[3]Sports University, Albania

*Corresponding author email: ahoda@ubt.edu.al;

Cyprinus carpio is an important fish species in Albania. There are two main hatcheries in Albania, that produce fingerlings which are used for restocking reasons. Tapiza hatchery is property of Agricultural University of Tirana and Klosi hatchery is located in the central part of Albania. Four microsatellite markers were used to analyze genetic diversity of two carp populations randomly sampled from these hatcheries. Mean expected heterozygosity value was 0.861 and mean observed heterozygosity was 0.546. Mean number of alleles was 18.375

and allelic richness was 14.015. Inbreeding coefficients were high in both hatcheries: 31.6% in Klosi and 43.5% in Tapiza. Genetic differentiation between populations was 9.9% and the gene flow was limited, 2.28. The results obtained by this study might help both hatcheries in organizing breeding practices.

Keywords: genetic differentiation; inbreeding; gene flow

Genomics of sustainable breeding progress: a mega-study in wheat

AGIM BALLVORA[1*], ANDREAS STAHL[2], KAI VOSS-FELS[3], BENJAMIN WITTKOP[2], CAROLIN LICHTHARDT[4], SABRINA NAGLER[5], TIM ROSE[5], TSU-WEI CHEN[4], HOLGER ZETZSCHE[6], SYLVIA SEDDIG[7], MIRZA MAJID BAIG[1], MATTHIAS FRISCH [8, 3], ELISABETH ROSS[3], BEN HAYES[3], MATTHEW HAYDEN[9], FRANK ORDON[6], JENS LÉON[1.10], HENNING KAGE[5], WINFRIED FRIED[2], HELMUT STÜTZEL[4], ROD SNOWDON[2]

[1]Institute of Crop Science and Resource Conservation, University of Bonn, Bonn, Germany.

[2]Department of Plant Breeding, Justus Liebig University, Giessen, Germany.

[3]Queensland Alliance for Agriculture and Food Innovation, The University of Queensland, Brisbane, Australia.

[4]Institute of Horticultural Production Systems, Leibniz University Hannover, Hannover, Germany.

[5]Department of Agronomy and Crop Science, Christian Albrechts University of Kiel, Kiel, Germany.

[6]Julius Kuehn Institute (JKI), Federal Research Centre for Cultivated Plants, Quedlinburg, Germany.

[7]Julius Kuehn Institute (JKI), Federal Research Centre for Cultivated Plants, Sanitz, Germany.

[8]Institute for Agronomy and Plant Breeding II,Justus Liebig University, Giessen, Germany.

[9]School of Applied Systems Biology, AgriBio,La Trobe University, Melbourne, Australia.

[10]Field Lab Campus Klein-Altendorf, University of Bonn, Klein-Altendorf, Germany.

*Corresponding author e-mail: ballvora@uni-bonn.de

Agricultural production must increase dramatically to sustain the growing world population, and plant breeding has been the major driver of sustained increases in crop productivity during the past 50 years. However, advanced breeding endeavours in most major crops during this period have focussed primarily on selection for high grain yield in high-input cropping systems. This raises concerns that cultivars bred for highly intensive agricultural systems may lack the adaptive capacity to cope with emerging climatic or sustainability challenges. Because high-input agriculture is frequently associated with ecological sustainability penalties, a common assumption is that high-performing modern crop varieties lack the broad genetic base required for adaptation to sub-optimal environments or reduced-input cropping systems. To address these hypotheses, we analysed a large panel of elite

European winter wheat cultivars representing 50 years of breeding progress in one of the most intensive, highest-yielding cereal production systems on the planet. We investigated long-term consequences of breeding progress in 192 European winter wheat cultivars whose release dates spanned the last 5 decades, including the most important and successful cultivars grown in western Europe during their respective period of release. The panel was grown over two years in a total of 36 environments, spanning optimal and marginal soil, water and temperature conditions and including variants comparing contrasting applications of nitrogen fertiliser and chemical plant protection. Analysis of the results in the context of long-term breeding progress provides unique insight into the influence of breeding on crop productivity and sustainability. In particular, our results emphatically contradict the popular hypothesis that intensive breeding for high performance reduces diversity in modern cultivars and thus reduces genetic potential for long-term genetic improvement. Furthermore, an accompanying genome-wide analysis of genetic diversity parameters and selection patterns in association with extensive trait data provided comprehensive insight into how intense artificial selection and breeding impacts diversity and future selection potential in the world's most important cereal crop. We developed haplotype-based methods to analyse genome-wide trait variance, providing a unique basis to identify, implement and recombine useful genetic diversity within existing elite breeding pools and promote sustainable yield progress in future.

Cytogenomics for duckweeds, an emerging crop

PHUONG HOANG AND INGO SCHUBERT*

Leibniz Institute of Plant Genetics and Crop Plant Research (Ipk), D-06466, Gatersleben, Germany

*Corresponding author: Ingo Schubert; E-mail:schubert@ipk-gatersleben.de

The neotenous aquatic duckweeds of the monocot order Alismatales comprise 36 species of the genera Spirodela, Landoltia, Lemna, Wolffiella and Wolffia which vary as to their genome size (160-2203 Mbp/1C) and chromosome number (2n=20-126). We focus on the ancestral genus Spirodela with only two species, *S. polyrhiza* (2n=40) and *S. intermedia* (2n=36), both with a genome size of 160 Mbp.

Using comparative multicolor FISH with pooled fingerprinted BACs as probes and integration of Oxford Nanopore assembly we i) resolved the discrepancies between previous maps for two *S. polyrhiza* clones, ii) revealed no chromosome rearrangements between seven studied *S. polyrhiza* clones and iii) established an updated reference genome map for *S. polyrhiza.*

By cross-hybridization with *S. polyrhiza* BACs to *S. intermedia* chromosomes, chromosome homeology and karyotype evolution between *S. polyrhiza* (n=20) and *S. intermedia* (n=18) were investigated and possible scenarios, depending on the direction of evolution, were suggested.

Based on PacBio read assemblies, reiterative rounds of manual curation to reduce the number of scaffolds and validation by FISH, 134.1 Mbp (~84% of the genome) could robustly be assigned to defined *S. intermedia* chromosomes so far. The number of genes and classes of repetitive DNA are established and compared to those of the sister species *S. polyrhiza.*

Keywords: Duckweeds, genome assembly, genome evolution, genome maps, multicolor FISH, fingerprinted BACs

Interaction between immune host system and intra-erythrocytic *Hepatozoon spp.* parasite-a possible involvement of apicoplast

VALBONA ALIKO*, MIHALLAQ QIRJO, MIRELA LIKA (ÇEKANI),

Department of Biology, Faculty of Natural Sciences, University of Tirana, Boulevard "Zogu I", 25/1, Tirana, Albania;

*Correspondence author: Valbona Aliko; Phone: +355 682212277; E-mail: valbona.aliko@fshn.edu.al

Host-parasite interactions are a powerful evolutionary force, so understanding the nature and consequences and the extent of the impact on the host species is of great interest. There are many parasites that exploit their hosts in more subtle and specific ways. While these may not have detectable effects on host growth, short-term reproduction and survival, their impact on host and parasite fitness can be profound. We studied the effect of *Hepatozoon spp*. parasitism on immune functions of the Balkan water frog, *Pelophylax kurtmuelleri*, inhabiting three wetlands alongside Albanian seacoast with different exposures to anthropogenic influence. Examination of blood smears revealed infection of erythrocytes with elongated (18.5±1.8 x 5±0.4 µm) intra-erythrocytic gamonts (which were banana-shaped with hooked anterior end and blunt broad posterior end) of *Hepatozoon spp*. (Apicomplexa) in 22% of examined frogs. Neutrophil/lymphocyte ratio showed a significant increase (4.5 for $p<0.005$) compared with that of the normal individuals (1.66), proving the immunity-parasitism relationship. A modification of erythrocyte morphology, with enlargement and discoloration of cell were observed, possibly indicating that the parasite may be acquiring host heme during the intraerythrocytic stages. Being the member of Apixomplexa family, *Hepatozoon* may posesses an apicoplast, a secondary endosymbiotic organelle, which can play a role in the process of parasite-synthesized heme. This appears to be a backup mechanism, which is, however, absolutely essential for the parasite growth during the mosquito and liver stages. A further germane understanding of the metabolic crosstalk between the parasite and the host is vital to appreciate the evolution of parasites.

Keywords: Balkan water frog, *Hepatozoon spp*, apicoplast, host-parasite interaction, heme

FLS2^{XL}: extended ligand perception for efficient defense against *Agrobacteria*

ULLA FÜRST, YI ZENG, MARKUS ALBERT, JUDITH FLIEGMANN*, GEORG FELIX

ZMBP - Center for Plant Molecular Biology, Plant Biochemistry, University Tübingen, Germany

*Corresponding author: Judith Fliegmann; Phone: +49 7071 2976667; Fax: +49 7071 295226;

E-mail: judith.fliegmann@zmbp.uni-tuebingen.de

Most plants are able to recognize the most conserved part of the bacterial flagellum, an epitope which corresponds to the peptide flg22, through the pattern-recognition receptor FLS2. *Agrobacterium tumefaciens* infects a large number of plant hosts, causing the economically important crown gall disease. One key to success of this pathogen seems to be evasion of host recognition: *A. tumefaciens* produces modified flagella with an altered amino acid sequence of the flg22 peptide, thereby preventing recognition by FLS2. We screened for plants which were able to detect the modified flg22 epitope from *A. tumefaciens* (flg22$^{A.tum}$), and identified some *Vitis* species that respond to flg22 and flg22$^{A.tum}$ with the same sensitivity in the subnanomolar range. We isolated two genes encoding FLS2-type proteins from *Vitis* and analyzed the functionality of the receptors. Interestingly, while one behaves like FLS2 from tomato or *Arabidopsis thaliana*, the second one recognizes both, flg22$^{A.tum}$and flg22, with the same sensitivity. This receptor, termed FLS2^{XL}for its extended ligand perception, counteracts the evolution of imperceptible bacteria, as a next step in the ongoing arms race between plants and pathogens.

Keywords: *Agrobacterium tumefaciens*, flagellin, receptor, plant-pathogen, co-evolution, *Vitis* sp.

Carnivorous plants: Freaks of nature or putative model plants?

AXEL MITHÖFER

Research Group Plant Defense Physiology, MPI for Chemical Ecology, Hans-Knöll-Str 8, 07745 Jena, Germany

E-mail: amithoefer@ice.mpg.de

As primary producers, autotrophic plants are at the bottom of food chains. Even long before the appearance of flowering plants, the earliest land plants were attacked by microbial pathogens and later on by herbivorous animals. Very likely plants and herbivorous insects interact for more than 450 mio years. Over the millennia, plants have evolved a spectrum of sophisticated recognition, signaling and defense strategies to drastically reduce insect feeding. However, some plant taxa were able to turn the sword around: They became carnivorous.

The carnivorous syndrome in plants have fascinated men at least since mid of the 19th century, not only because of Charles Darwin's pioneer studies on this topic, which have been published in his 'Insectivorous Plants' in 1875. Insectivorous, or in a broader sense carnivorous plants, usually grow in nutrient-poor environments and on poor soils and carnivory has evolved as an additional pathway to supplement nutrients such as nitrogen and phosphate. Thus, plant carnivory involves morphological and anatomical features that are associated with attraction, trapping and killing of prey, followed by its digestion and absorption of the nutrients. Although this is known for more than 100 years, our knowledge concerning the physiology, biochemistry, and molecular biology of carnivory is still limited. However, in recent years proteome and transcriptome analyses have been started, signaling pathways have been identified.

With a focus on the genera *Nepenthes, Dionea* and *Drosera* I will present new data and insights into plant carnivory and I will discuss general aspects of the plant carnivorous syndrome with respect to its evolution.

Keywords*:* Evolution, *Dionea*, *Drosera*, *Nepenthes*, prey digestion, signaling

Isotope ratio mass spectrometry in chemical ecology

STEFAN BARTRAM

Department for Natural Product Biosynthesis, MPI for Chemical Ecology, Hans-Knöll-Str 8, 07745 Jena, Germany

*Corresponding author E-mail: bartram@ice.mpg.de

The measurement of stable isotope ratios in biological material as a tool to investigate several aspects of ecological research has increased tremendously in the last decade. While previously the domain of earth sciences, stable isotope mass spectrometry (IRMS) is increasingly being used in investigating questions ranging from trophic interactions to biosynthetic pathway elucidation. Due to its high sensitivity towards small alterations in isotopic distributions this method is applicable for isotope ratio levels at natural abundance or in experiments with labeled precursor at physiological concentrations.

The given natural distributions of isotopes for e.g. carbon and nitrogen, are global average values whereas the exact values are subject to local and temporal fluctuations, caused by the slightly different behavior of isotopomeric molecules in physical processes and (bio)-chemical reactions. Compound specific IRMS allows to trace changes in, or the cross talks between biochemical pathways without using isotopically labeled precursors.

The range of applications will be discussed by presenting different examples from our recent research. This will include pathway allocation in terpene biosynthesis in lima beans (*Phaseolus lunatus*), elucidation of the "biochemical history" of sesquiterpene cyclase products and the evaluation of the number sesquiterpene synthases involved in the production of the scent of German chamomilla (*Matricaria recutita*). The application of labeled

precursors at physiological concentrations will be demonstrated by the discrimination between sequestration and *de novo* synthesis of defensive compounds in leaf beetles, the nitrogen uptake in carnivorous pitcher plants (*Nepenthes alata*) and the testing of nitrogen fixation in ants and fungi.

Keywords*:* Stable isotopes, biosynthetic pathways, terpenoids, *Matricaria recutita*, *Phaseolus lunatus*, *Nepenthes alata*

Phytoplankton approach in Kune-Vaini lagoon system

MADALENA KOLA, ALEKO MIHO

Department of Biology, Faculty of Natural Sciences, University of Tirana, Albania. E-mails: madalena.kola@gmail.com; aleko.miho@fshn.edu.al

Data about phytoplankton in water bodies of Kune-Vaini lagoon system (Lezha) will be reported. Samplings was carried on every two months (July, September and November 2018, January and March 2019) in 5 stations representing different water bodies of the system. Water samples (200 ml) were taken at about 0.5 m of depth (using the Ruttner bottle) for the quantitative assessment of plankton algae (cells/ml), using an inverse microscope OPTICA; samples were preserved with Lugol's solution (Utermöhl, 1958; EN 15204-2006). Diatom frustules were cleaned by boiling in H_2O_2 cc, and permanent slides were prepared using Naphrax (index 1.69) (Krammer and Lange-Bertalot, 1986–2001; EN 14407:2004). Examinations and photos were carried out using the optic microscope Motic BA310. The preliminary checklist list of algae found in the plankton will be reported, focused mainly in the most dominant or also harmful species. Also ecological considerations will be reported, related with the primary productivity and water trophy of different basins.

Keywords: Lezha lagoons, phytoplankton, primary production, harmful algae

Characterization of the symbiotic interaction of unusual root-colonizing fungal isolates confering salt- and heat-stress tolerance to plants including *Arabidopsis thaliana*

YU-HENG TSENG* AND RALF OELMÜLLER

Matthias-Schleiden Institute, Plant Physiology, Friedrich-Schiller-University Jena,

Dornburger Str. 159, 07743 Jena, Germany

E-mail: Yu-HengTseng; Email- yhtseng10@gmail.com

We study the interaction between root-colonizing fungi and plants, and characterize fungal isolates of *Chaetomium*, *Botryosphaeria*, *Fusarium* and *Trichoderma*, which grow under extreme conditions (e.g. 55°C, 3M NaCl) and confer the specific stress tolerance behaviors to

their hosts. Using *Arabidopsis thaliana* as model system we investigate the molecular basis of these symbioses. The project includes microscopic and molecular characterization of the isolates under different stress conditions, their interaction with Arabidopsis roots, and the characterization of the benefits of both partners in the symbiosis under stress. Besides microscopic studies, measurements of photosynthetic parameters, metabolite profiling, volatile involvement, hormone analyses, nutrient exchange measurements, assays for fungal and plant fitness, as well as bioinformatics-based expression profiling will be studied. The interaction of the fungi with Arabidopsis mutants impaired in recognition of symbionts, signaling, hormone functions, innate immune responses, signaling leading to growth or stress adaptation, or specific metabolite pathways will shine light on mechanisms which are activated by the microbes in the stress-exposed hosts. Chemical mediators (soluble compounds or volatiles) which initiate and maintain the communication between both partners will be investigated. We present our current results on the symbiotic interactions.

Chemical elicitors of root-colonizing fungus *Mortierella hyalina* induce growth promotion in Arabidopsis

SANDRA SCHOLZ[1*], YU-HENG TSENG[1], ANATOLI LUDWIG[1], JOY M. JOHNSON[1,2], RALF OELMÜLLER[1]

[1]Friedrich-Schiller-University Jena, Plant physiology, Dornburger Straße 159, 07743 Jena

[2]Kerala Agricultural University, College of Agriculture, Vellayani, Thiruvananthapuram Kerala 695522

*Corresponding author: Sandra Scholz; E-mail: s.scholz@uni-jena.de

The endophytic root-colonizing fungus *Mortierella hyalina* stimulates growth and biomass production in multiple host plants. This beneficial effect is restricted to the aerial parts, the roots do not show a growth promotion. Furthermore the colonization confers resistance to pathogens like *Alternaria brassicae*. We want to identify the different chemical mediators from both partners, which are released and perceived in that interactions. By analyzing a mutant population, microscopic and molecular characterization of the interaction with Arabidopsis plants, different important elicitors were detected. So was an elicitor of cytosolic calcium elevation identified in the fungus cell wall extract which appeared to be crucial for a beneficial interaction. Additionally the fungus harbored itself a potential N_2-fixing endophytic bacterium which might positively influence the plants performance. Headspace analysis identified a component of the fungus aromatic volatile blend that induced a significant growth promotion effect in Arabidopsis seedlings. Now we want to analyze the perception and signal transduction pathways of the identified elicitors.

Keywords: Growth promotion, Mortierella, Arabidopsis, Calcium

Flowering in a unique Duckweed, *Wolffia microscopica*

K. SOWJANYA SREE[1*], KLAUS-J. APPENROTH[2]

[1]Dept. of Environmental Science, Central University of Kerala, Periye- 671316, India; E-mail: ksowsree9@cukerala.ac.in; ksowsree@gmail.com

[2]Mathias Schleiden Institute-Plant Physiology, Friedrich Schiller University of Jena, Jena, Germany; E-mail: Klaus.Appenroth@uni-jena.de

Duckweeds are floating aquatic monocotyledons belonging to the family Lemnaceae. There are 37 species of duckweeds that are grouped into 5 genera. This plant family includes the smallest and the fastest growing flowering plants known till date. The frequent mode of reproduction is vegetative propagation by budding. Although these are flowering plants, it is not easy to induce flowering in most of the duckweed species under laboratory conditions. However, a species endemic to the Indian subcontinent, *Wolffia microscopica*, is one of the exceptions. The species has been observed to flower frequently in both nature as well as in laboratory conditions. Interestingly, both mother and daughter fronds can flower at the same time although being at a slightly different floral developmental stage. Under laboratory conditions, the flowering percentage differs from clone to clone. Low temperature induces flowering and higher temperature, in contrast, changes the morphology of this unique duckweed species.

Keywords: *Wolffia microscopica*, flowering, temperature, propagation, Duckweed

Phytoplasma-Plant-Interaction I: General aspects

ZIMMERMANN MATTHIAS R.[1]* & FURCH ALEXANDRA C.U.[1]

[1]Plant Physiology, Matthias-Schleiden-Institute for Genetics, Bioinformatics and Molecular Botany, Faculty of Biological Science, Friedrich-Schiller-University Jena, DornburgerStraße 159, D-07743 Jena, Germany.

*Corresponding author: Matthias Zimmermann; E-mail: Matthias.r.zimmermann@bot1.bio.uni-giessen.de;

Tel.: +49(3641)949234

Phytoplasmas cause diseases in more than 1000 plant species worldwide. In Europe, mainly fruit trees, grapevine and forest trees are affected. Apple proliferation, pear decline, apricot chlorotic leaf roll and European stone fruit yellows are of most importance by impairing the size and quality of the fruit and the longevity of trees. For apple proliferation a loss of 125 mio € per year has been estimated for Germany. The diseases are caused by *Candidatus* phytoplasma mali, *Ca.* phytoplasma prunorum and *Ca.* phytoplasma pyri. Infected trees exhibits witches' broom, rosettes, enlarged stipules, foliar reddening, yellowing, undersized

fruits and growth suppression. Phytoplasma infections are systemic, persistent and difficult to control. Due to the inability of phytoplasma cultivation, many aspects are poorly understood. Especially the effect of phytoplasma infection on phloem function and the resulting diseases received little attention in the past. Phytoplasma infection may severely impair assimilate translocation in host plants and might be responsible for massive changes in phloem physiology including signaling components.

Keywords*:* insect vectors, phloem sap, phloem physiology, phytoplasmas, sieve elements

Phytoplasma-Plant-Interaction II: Specific fruit tree phytoplasmas (*Candidatus* Phytoplasma spp.) affect apple much less than peach and pear

GALLINGER JANNICKE[1], ZIKELI KERSTIN[1], ZIMMERMANN MATTHIAS R.[2], GÖRG LOUISA[1], MITHÖFER AXEL[3], REICHELT MICHAEL[4], SEEMÜLLER ERICH[1], GROSS JÜRGEN[1]& FURCH ALEXANDRA C.U.[2]*

[1]Institute for Plant Protection in Fruit Crops and Viticulture, Julius Kuehn-Institute, D-69221 Dossenheim, Germany

[2]Plant Physiology, Matthias-Schleiden-Institute for Genetics, Bioinformatics and Molecular Botany, Faculty of Biological Science, Friedrich-Schiller-University Jena, DornburgerStraße 159, D-07743 Jena, Germany.

[3]Department of Bioorganic Chemistry, Max-Planck Institute for Chemical Ecology, Hans-Knöll-Str. 8, 07745 Jena, Germany.

[4]Department of Biochemistry, Max-Planck Institute for Chemical Ecology, Hans-Knöll-Str. 8, 07745 Jena, Germany.

*Corresponding author: Alexandra Furch; E-mail: Alexandra.furch@uni-jena.de; Tel.: +49(3641)949234

Phytoplasmas cause a bundle of symptoms in their respective host plants. Apple proliferation phytoplasma (Candidatus Phytoplasma mali) cause witches broom, enlarged stipules and dwarf fruits in apple trees, but the infected tree can survive for decades. In contrast, the European stone fruit yellows (Ca. P. prunorum) kills their host tree Prunu spersica within a few years and the pear decline phytoplasma (Ca. P. pyri) kills its host Pyrus communis within few years and sometimes just in weeks. We compared the morphology of healthy and infected plants and investigated various parameters affected by phytoplasmas in these three plant-pathosystems. An infection with Ca. P. mali affected the morphology of apple leaves and the vascular system and reduced the phloem volume mass flow rate. Also diverse phytohormones were affected in different ways by the infections. The vascular system was less affected in peach trees infected by Ca. P. prunorum, but callose depositions affect the

phloem volume mass flow rate. While an infection with Ca. P. pyri did not affected the morphology of pear leaves and the vascular system, callose depositions at sieve plates reduced the diameter of sieve elements leading to an increased phloem mass flow. Phytohormone changes were not detected.

The involved physiological mechanisms are discussed. As parasites that are evolutionarily advanced (which have been existing for a longer period) thus minimize the harm they cause to their hosts, we conclude that the interactions between apple and its respective phytoplasma is the evolutionary advanced system compared to the other plant-phytoplasmapathosystems.

Keywords: Apple, callose, Candidatus phytoplasma spec., mass flow, peach, pear, phloem, vascular bundle, xylem

Use of duckweed (Lemnaceae): Nutrition or bioenergy?

KLAUS-J. APPENROTH[1], K. SOWJANYA SREE[2*]

[1]University of Jena, Matthias Schleiden Institute – Plant Physiology, Jena, Germany. Email: Klaus.Appenroth@uni-jena.de

[2]Department of Environmental Science, Central University of Kerala, Periye, India. *Corresponding author Email: ksowsree@gmail.com

Duckweeds represent the fastest growing angiosperms producing large amount of biomass. Moreover, as a water plant, cultivation does not require use of arable land. This large amount of biomass can be used for different practical applications, dependent on the species or even strains used and on the cultivation conditions. Under optimal growth conditions, the protein content spanned from 20% to 35%,and the amino acid distributions are close to the WHO recommendations, having e.g. 4.8% Lys, 2.7% Met + Cys, and 7.7% Phe + Tyr. The content of trace elements can be adjusted in a wide range by cultivation conditions. The content of starch is under these conditions low (e.g. 20 % per dry weight) providing low energy human food especially for people in industrial countries - in developmental countries, carbohydrates are provided by rice or maize. Thus, duckweeds possess good qualitative and quantitative profiles of nutritional components for its use as human food. Under suboptimal growth conditions (in the presence of salt, heavy metals or in the absence of essential nutrients like phosphate or nitrate) starch is accumulated up to 50 percent of dry weight. Evidently, growth is stronger inhibited under these stress conditions than photosynthesis. The surplus of photosynthate is stored as starch. In biotechnological processes, starch can be digested to sugars and these low molecular carbohydrates can be fermented to alcohols. Thus, duckweed can be used as energy plant.

Production of duckweed biomass requires sufficient light for photosynthesis and temperature above 20^{o}C for growth. In temperate climatic conditions, light is easily limiting during autumn and winter. Providing artificial light for photosynthesis, even using effective LED, might turn the whole process economically not profitable – in contrast to the situation in

warmer countries. Production of duckweed for human nutrition, however, results in high value outcome and investment of more energy for higher temperature and photosynthetic light is easily possible. In developing countries, hygienic conditions for cultivating duckweed are often not easily available.

Zooplankton monitoring in Kune-Vaini lagoon system (Lezha)

RIDJOLA LIKA, MIHALLAQ QIRJO, FUNDIME MIRI

Department of Biology, Faculty of Natural Sciences, University of Tirana, Albania.

E-mails: ridjolalika@gmail.com, mihallaq.qirjo@fshn.edu.al, fundime.osmani@fshn.edu.al

The sampling methodology as integral monitoring process of Kune-Vaini lagoon system (Lezha) and preliminary data on the abundance of the main groups of zooplankton will be reported. Samples were collected using a plankton net (with diameter 25 cm and mesh size 55 μm) and Ruttner bottle (2 L). It has been sampled in 5 stations, trying to represent all the microhabitats in the lagoon system, with a frequency one in two months, starting from July 2018 until March 2019. In each station in total 6 L of water was filtered for quantitative approach; moreover, net samples of horizontal and vertical tows, and sediment samples were collected, all in two replicas. The samples were preserved in formaldehyde 4% and examinations were carried out using the Stereomicroscope OLYMPYS CZX9. The preliminary data show that the holoplankton community results in a low species diversity, consisting of marine neritic species. The species that were found mostly belong to the groups Foraminifera, Ciliophora (Tintinnida) Rotifera and Copepoda. Numerically the zooplankton community was dominated by nauplius larvae. Common to meroplankton were planktonic larvae of Bivalve and Annelida, where the bivalve larvae were the main component. This approach will continue to cover all seasons and preferable more than one year. It will consolidate the reported data on species abundance, fluctuations and interspecies relations during different seasons in this lagoon.

Keywords: Kune-Vaini Lagoon, zooplankton, distribution, abundance

First view on aquatic plants (macrophytes) of Kune-Vaini lagoon system (Lezha)

ISIDORA GJATA, LEFTER KASHTA

Department of Biology, Faculty of Natural Sciences, University of Tirana, Boulevard, Albania.

E-mails: isidoragjata@gmail.com; leka.kashta@yahoo.com

Data about macrophytes in water bodies of Kune-Vaini lagoon system (Lezha) will be reported. Samples were collected in 5 stations representing Kune - Vaini wetland complex, every two months (July, September and November 2018, and January 2019). Sampling is

performed according to 15 - 20 m radius plots, where 20 representative samples of submersed macroalgae present were collected at random, using a long-tail garden rake handled by the boat. The specific coverage of the angiosperms eventually present is determined by Visual Census Technique by boat, or using the rake in turbid water conditions. All the taxa are sorted and examined fresh when possible, or after fixation up to 4% formaldehyde, by means of a stereomicroscope Motic, and a light microscope Motic BA310. Collected algal specimens and angiosperms are dried in Herbarium, too. The preliminary checklist list of algae and angiosperms found will be reported, focused mainly in the most dominant species. Ecological considerations will also be reported, referring to qualitative and quantitative data on macrophytes at different stations.

Keywords: Aquatic macrophytes, Kune-Vaini lagoon, algae, angiosperms, distribution

An evaluation of Vitamin D and bone turnover markers levels in postmenopausal Women in Albania.

ESMERALDA HOXHAJ[1*], ANILA MITRE[2]

[1]Intermedica Center, Tirane, Albania.

[2]Department of Biology, University of Tirana, Albania.

*Corresponding author Email: hoxhaj_esmeralda@yahoo.com

Vitamin D is a lipophilic prohormone that is synthesized in the skin in response to sunlight, although diet may be a sourse of much lower amounts of Vitamin D. Receptors of the active form of Vitamin D (VDR), have been identified in the cells of the intestinal epithelium, renal tubules, bone and other tissues and organs, which indicates a broad spectrum of $25(OH)D_3$. Besides its role in intestinal calcium absorption, calcitriol may also affect bone health directly, as its receptors are expressed by osteoblasts. The consequences of vitamin D deficiency are secondary hyperparathyroidism and bone loss, leading to osteoporosis and fractures, mineralization defects, which may lead to osteomalacia in the long term, and muscle weakness, causing falls and fractures. Therefore, we aimed to investigate the association between serum levels of 25(OH)D and bone turnover markers in postmenopausal women, and their impact on osteoporosis. In this two – years study (2017 - 2018), we described the epidemiology of vitamin D status across women population in Albania and its potential associations with bone biomarkers (OC, PTH, ALP). Our study showed a clear seasonal variation of bone turnover markers and a negative *Pearson* correlation between serum 25(OH)D and osteocalcin (OC) ($r = -0.37$, $p < 0.05$). Osteoporosis leads to decreased hydroxyapatite crystal formation and hence results in increase in serum osteocalcin levels. We found reduced 25(OH)D concentrations in postmenopausal women (21.71 ng/mL), and showed that a deficient 25(OH)D concentration is associated with significantly increased markers of bone resorption and decreased bone mineral density (BMD) values.

Keywords: 25-Hydroxyvitamin D, osteocalcin, bone biomarkers, bone density

Climate changes adaption interventions of the Kune-Vaini lagoon system (Lezha) - ecological approach

ALEKO MIHO, MAJLINDA VASJARI, LORETA VALLJA, LEFTER KASHTA, MIHALLAQ QIRJO

Faculty of Natural Sciences, University of Tirana, Albania. E-mails: aleko.miho@fshn.edu.al; majlinda.vasjari@fshn.edu.al; loreta.vallja@fshn.edu.al; leka.kashta@yahoo.com; mihallaq.qirjo@fshn.edu.al

A Master Research Program is set up between the Department of Biology and the Department of Chemistry, Faculty of Natural Sciences, University of Tirana, focused on the ecological approach of the Kune-Vaini lagoon system (Lezha). The Program is covering the monitoring of three important biotic components: Phytoplankton, Zooplankton, and the development of Aquatic plants (Macrophytes), all in response to Kune-Vaini Project intervention (tidal channel). It is in parallel with monitoring of Physical and chemical parameters, nutrient profile and chlorophylls in Kune-Vaini system. This Program is based on the Agreement between the Ministry of Tourism and Environment and the University of Tirana, aiming to support students and strengthen long-term capacity of both partners on ecosystem based Adaptation under the project 'Building the Resilience of Kune-Vaini Lagoon System through Ecosystem based Adaptation' (Kune-Vaini project), founded by UNEP, GEF and Albanian Government.

Keywords: Lezha lagoons, Kune-Vaini project, Master program

Correlation of thyroid antibodies with thyroid hormones in autoimmune thyroid disease

SIDORELA DERVISHI*

Intermedica Center Laboratory

Email: sidorela.dervishi70@gmail.com

Autoimmune diseases have a high prevalence in the population, and autoimmune thyroid disease (AITD) is the most common organ specific autoimmune disorder resulting in the dysfunction of the thyroid gland (hypo or hyperfunction). The clinical diagnosis of autoimmune thyroid diseases (AITD) is usually confirmed by detection of various antibodies in the patient's blood or by histopathological evaluation. In this study, I evaluated the prevalence of serum antibodies and assessed the correlation between antibodies and thyroid dysfunction. Included in this study were 400 patients, them underwent testing for thyroid function and thyroid antibodies. 304 were females and 106 were males, the age of them ranged from 20-65 years. Thyroid peroxidase antibodies (TPO Ab) tested positive in 82 % of

patients and negative in 18%. Antithyroglobulin antibody (ATG Ab) estimation was positive in 59% patients and negative in 41%. By thyroid function testing and serum antibody evaluation, of the 328 TPO- positive patients, 64% were hypothyroid, 8.2% were hyperthyroid and 27.8 % euthyroid. In 236 ATG Ab - positive patients, 60% were hypothyroid, 6.9% were hyperthyroid and 33.1% were euthyroid. But in the 164 ATG Ab-negative patients, 61.5% were hypothyroid. In our study TPO Ab was more sensitive than ATG Ab in predicting hypothyroidism. Hypothyroidism was the most frequent thyroid dysfunction in patients with positive TPO and ATG antibodies.

Keywords*:* Antithyroid antibodies, antithyroglobulin antibodies, hyperthyroidism, hypothyroidism, thyroid peroxidase antibodies, autoimmune thyroid disease

Occurrence of West Nile Virus antibodies in equines and its mosquito vector species in Kosovo

AGIM REXHEPI[1], KRISTAQ BERXHOLI[2], PETRA EMMERICH[3], JETON SPAHIU[1], BLERTA MEHMEDI[1], NESADE MUJA[4], AYKUT ÖZKÜL[5], KURTESH SHERIFI[1*]

[1]Faculty of agriculture and Veterinary, University of Prishtina "Hasan Prishtina", Kosovo

[2]Faculty of Veterinary Medicine, Agricultural University of Tirana, Albania

[3]Department of Virology Bernhard-Nocht-Institut für Tropenmedizin, Hamburg, Germany

[4]Faculty of Mathematics and Natural Sciences, University of Prishtina "Hasan Prishtina", Kosovo

[5]Faculty of Veterinary Medicine, University of Ankara, Turkey

*Corresponding author Email: kurtesh.sherifi@uni-pr.edu

West Nile virus (WNV) is a mosquito-borne zoonotic flavivirus that causes sporadic disease outbreaks in humans, horses and birds. This study was conducted to evaluate the occurrence of WNV in the equine population, and presence of main mosquito vector in Kosovo. Previous serological data in samples collected in horses in Kosovo in year 2010, WNV antibodies were not detected. Between January - May 2018, 260 equine serum samples, and 626 mosquitoes were collected and pooled (on average 10 individuals per pool) during July 2018, from all seven regions in Kosovo. Equine serum samples were tested by IgG ELISA assay (INGEZIM west Nile COMPAC), and mosquitoes were identified and pooled according their species. Results showed that WNV antibodies were present in 27 out of 260 horse sera (10.38%), detected in all seven regions in the country. All positive ELISA samples were confirmed by plaque reduction neutralization test (PRNT), neutralizing antibody titers of 1:10 to 1:80. In locations where equine samples were positive to WNV antibodies, *Culex spp*. were detected in 78% (21 out of 27 locations), and in two equine ELISA positive location were trapped only *Phlebotomes spp*. and *Anopheles spp*.. This study provides the first evidence of WNV circulation in equines and presence of main WNV vector *Culex spp.* in Kosovo.

Keywords*:* West Nile virus, ELISA, PRNT, Kosovo, *Culex spp*., equines

Water chemistry of Kune-Vaini lagoon system – an ecological approach

LORETA VALLJA*, ALMA SHEHU, NEVILA BROLI, DENISA MUÇA

Department of Chemistry, Faculty of Natural Sciences, University of Tirana

*Corresponding author E-mail: loretavallja@yahoo.com

The present study was carried out for the evaluation of environmental state of water media of the Kune - Vaini lagoon system (Lezha, Albania) with regard to physico-chemical and chemical parameters. Water samples were collected at five stations of the lagoon, aiming to represent different water bodies of the ecosystem. Temporal variation on the water quality parameters was also evaluated by sampling on different periods of the year, during July 2018-March 2019. Chemical analysis for the determination of parameters such as pH, DO, BOD5, major anions and cations were conducted in accordance with the standard methods recommended by APHA/AWWA, 2017. Obtained results have shown that the temporal and spatial variation of water quality parameters was more evident for DO, BOD5 and phosphates. The water quality of Kune-Vaini lagoon was evaluated based on the criteria set by EPA.

Keywords: lagoon, water quality, temporal variation, spatial variation

Photosynthetic characteristics of lichens related to daily courses of light temperature, air humidity etc: a field study from Piora valley Ticino, Switzerland

DONALD SHUKA[1*], ANXHELA RREDHI[2], BESIMI GURRA[3], REINHARD BACHOFEN[4]

[1]Department of Biology, Faculty of Technical Science, UV

[2]Matthias Schleiden Institute, University of Jena "Friedrich-Schiller"

[3]Department of Biology, Faculty of Natural Science, UT

[4]Institut für Pflanzenbiologie, University of Zürich

*Corresponding author Email: evadonald.ds200@gmail.com

At high altitudes do to absence of vegetation of woody and scrubby plants, lichens are dominant primary producers. However, they must be adapted to high radiation under drought stress and low humidity. In this study, the initial chlorophyll fluorescence in dry and rehydrated lichens was measured at environmental light conditions to study the dependence on humidity. Diurnal fluctuation of photosystem II (PS II) activity was measured with apocket chlorophyll fluorimeter PEA on *Xanthoria elegans* that occur in stony wall surfaces

of buildings and siliceous rocky surfaceof Centro di Biologia Alpina, Piora Valley, Ticino Switzerland.

The result shows that although complete desiccation lead to a loss of photosynthetic activity as measured the fluorescence parameters Fo, Fv, Fv/Fm was recovered fully after 10 minutes of rehydration process. The photosynthetic activity measured as Fv/Fm values show also a maximum value 0.63-0.67 after increase of humidity with 50%. The photosynthetic activity was decreased with temperature increase above 20^{o}C. In addition, we determine that fluorescence in lichens is related especially to the water content of the lichen tissue and indirectly to the drought environmental stress.

Keywords: Lichens, fluorescence, Alps, dehydration/rehydration

Estimation of TSI (nitrite-nitrogen) for evaluation of trophic state in Kune-Vaini lagoon system

SONILA DUKA, MAJLINDA VASJARI, URMA RAMA

Department of Chemistry, Faculty of Natural Sciences, Tirana University, Albania

E-mail: soniladuka@hotmail.com

Now days it is much easier to convey to the public the status and nature of a lagoon through an index, which provides the scientific accord of eutrophication and character of the lagoon which is monitored. Many trophic state scales, water quality indices and measures of an assessment of water quality and tropic status of lakes, estuaries and marine coastal areas are abundant in the literatures. In this paper nitrogen-based trophic state index was used for the estimation of status of eutrophication in Kune-Vaini lagoon system. Nitrite-nitrogen (NO_2-N) is preferable because its relation to other criteria of trophic state as chlorophyll-a (Chl-a), also this element is preferable over nitrate because the former decreases the fluorescence and affects photosynthesis, thereby controlling primary production.

This study was realized in the framework of on-going project "Climate changes adaption interventions of the Kune-Vaini lagoon system (Lezha, Albania) - ecological approach". Five sampling stations are selected aiming to perform the water monitoring on the Kune-Vaini lagoon, with a frequency of bimonthly: July 2018, September 2018, November 2018 and January 2019. Water analyses were conducted by using standard methods reported on the "Standard Methods for the Examination of Water and Waste Water" (APHA/AWWA, 2017).

Keywords: Lezha lagoons, Kune-Vaini project, trophic state index

Host-specific and tissue-dependent orchestration of microbiome community structure in traditional rice paddy ecosystems

WEIJUAN HUANG[1,2,3#], SARAH GILBERT[2], ALEXANDER POULEV[2], KENNETH ACOSTA[2], SARAH LEBEIS[4], CHUNLIN LONG[1] AND ERIC LAM[2]*

[1]College of Life and Environmental Sciences, Minzu University of China, Beijing 100081, China;

[2]Department of Plant Biology, Rutgers the State University of New Jersey, NJ 08901, USA;

[3]Guangdong Bioengineering Institute (Guangzhou Sugarcane Industry Research Institute), Guangzhou 510316, China;[4]Department of Microbiology, University of Tennessee, Knoxville, TN 37996, USA

Authors for correspondence: Eric Lam: Tel +1-848-932-6351; E-mail:eric.lam@rutgers.edu

Rice and the aquatic macrophyte duckweed are two monocotyledonous plants that often coexist in paddy fields. While farmers plant rice, duckweed frequently populate rice paddy fields naturally. They represent plant components for an agroecosystem that is more productive and environmentally sustainable. The interplay between microbes and the two potential plant hosts in this ecosystem however remains unexplored. In this work, we compared the bacterial microbiome structure between duckweed and rice, and between rice roots and aerial tissues from rice paddy fields of ethnic communities in the mountainous province of Guizhou, China. While bacterial community profiles are distinct between tissues types, they are similar within replicates from a single site as well as between sites. Our results suggest under field conditions that host-specific and tissue-dependent factors sculpt the bacterial community structure in the plant host. This conclusion is corroborated by results from culture-dependent approaches in which *Pantoea* spp. isolated from rice aerial tissues can strongly attach and colonize gnotobiotic duckweed in spite of their low representation in the duckweed microbiome. Characterizing auxin-producing bacteria isolates from both rice and duckweed identified potential plant growth-promoting bacteria that may help improve growth for both duckweed and rice in paddy fields.

Keywords: Duckweed; *Lemna aequinoctialis*; microbiome; paddy ecosystems; *Pantoea*; rice

The value of laboratory testing of ceruloplasmin, copper and urinary copper in detection of Wilson disease

INA TOSKA

Intermedica Laboratory

Corresponding author e-mail: ina.toska@yahoo.com

Wilson disease is a genetically determined copper accumulation disease, that usually presents between 6 and 40 years, but it can affect older and younger as well. Disease results from lack or dysfunction of copper transporting ATPase. Copper is absorbed and transported to the

liver, but the absence of a hepatocellular P-type ATPase prevents the incorporation of copper in ceruloplasmin, so copper accumulates in brain, kidney, liver and cornea. Urinary copper is increased as well. Cp is an α2-globulin that contains approximately 95 % of the total serum copper. Hereby, measurement of Cp, copper and urinary copper are useful test for diagnose and this is the aim of our study. For a period of ten years, are analyzed 341 patients suspect for Wilson disease from Albania and Kosovo, recommended from gastro-hepatology departaments. Methods used for measurements are immunoturbidimetric for Cp, colorimetry for copper and atomic absorption for urinary copper. All data are analyzed with SPSS version 20. As results ROC curve with combination of copper and ceruloplasmin increase sensitivity and specificity in detection of Wilson disease and two biomarkers correlate with each- other. The analysis of linear regression showed that decrease of ceruolplasmine increase the possibility to have Wilson disease.

Keywords: Ceruloplasmin, copper, urinary copper, regression, analysis

Elemental and molecular imaging with fast ions in plant biology

PRIMOŽ PELICON[1,*], PRIMOŽ VAVPETIČ[1], BOŠTJAN JENČIČ[1], MITJA KELEMEN[1], PAULA PONGRAC[1], ESTHER PUNZON QUIJORNA[1], MARJANA REGVAR[2], IVAN KREFT[3], KATARINA VOGEL-MIKUŠ[1,2]

[1]Jožef Stefan Institute, Jamova 39, SI-1000, Ljubljana, Slovenia.

Phone: +386 1 588 5450; fax: +386 1 588 5377.

[2]Biotechnical Faculty, University of Ljubljana, Večna Pot 111, SI-1000 Ljubljana, Slovenia.

Phone: +386 1 320 3300; fax: +386 1 257 3390.

[3]Nutrition Institute, Tržaškacesta 40, SI/1000 Ljubljana, Slovenia.

Phone : +386 5 906 8870; fax: +386 1 300 7981.

E-mail: primoz.pelicon@ijs.si; primoz.vavpetic@ijs.si; bostjan.jencic@ijs.si; mitja.kelemen@ijs.si; paula.pongrac@ijs.si; esther.punzon-quijorna@ijs.si; marjana.regvar@bf.uni-lj.si; ivan.kreft@guest.arnes.si; katarina.vogelmikus@bf.uni-lj.si

Microscopy as basic tool in biomedicine is developing with very high pace, along with new modalities complementing the information on the tissue morphology. These complementary modalities enable the imaging of elemental distributions, chemical imaging of their oxidation states, as well as the distribution of selected molecules in the tissue and inside the individual cell. Quantitative elemental imaging with sub-micrometre resolution is possible with micro-Particle Induced X-ray Emission (PIXE), a technique using a scanning focused proton beam with the energy of 3 MeV. Micro-PIXE resembles more commonly available Energy Dispersive X-ray (EDX) analysis at scanning electron microscopes. However, micro-PIXE features approx. thousand-times higher elemental sensitivity, bringing the microscopy capabilities to map the trace elements in plants with concentrations in the order of 1 ppm (one

part per million), mapping simultaneously in a single scan the elements from Na to U. The technique is extensively used for the research in plant biology, i.e. elemental and nanoparticle uptake from soils, mineral composition in cereals, etc. Alternatively, molecular distributions in biological tissue are captured with imaging mass spectroscopy techniques. Among them, a novel MeV-Secondary Ion Mass Spectrometry (SIMS) technique provides high molecular yields of non-fragmented molecules, which makes it appropriate for distribution studies of secondary metabolites in the plant tissue. Detection of molecules with masses of up to 2 kDa is possible with imaging resolution better than 1 micrometre. Micro-PIXE and MeV-SIMS techniques are available for users within Transnational access programme, funded by EU, within the EU H2020 project No. 824096 "RADIATE".

Keywords: plant tissue, elemental imaging, molecular imaging, PIXE, MeV-SIMS, mass spectroscopy

Glr channels in blue light-controlled plant development and movements

WERONIKA KRZESZOWIEC, ANNA HEBDA, ALEKSANDRA LISZKA AND HALINA GABRYŚ*

Department of Plant Biotechnology, Faculty of Biochemistry, Biophysics and Biotechnology,

Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland

*Corresponding author E-mail: halina.gabrys@uj.edu.pl

GLRs (glutamate receptor-like channels) are plant counterparts of mammalian GLR receptors involved in signal transduction in the central nervous system. The aim of this work was to test a working hypothesis that GLR channels are involved in blue light-controlled growth and movement processes in *Arabidopsis thaliana*. We investigated photomorphogenesis and skotomorphogenesis of seedlings, phototropism and chloroplast movement responses. Parameters of all studied processes were analyzed in the presence of inhibitors MK-801 and CNQX, known for blocking two subfamilies of iGLR channels, NMDA and AMPA respectively. Root growth was inhibited by CNQX and, to some extent, promoted by MK-801 in both, light and dark conditions. While in blue light hypocotyl growth was inhibited by CNQX only, in the dark MK-801 started to work as in roots. This shows that both types of channels, AMPA-like and NMDA-like, play different roles in modulating the seedling growth. Neither inhibitor affected phototropism. Thus calcium channels other than GLRs must be involved in the light signaling pathway that leads to hypocotyl bending. Both inhibitors were required to reduce chloroplast movement parameters. Currently chloroplast responses to blue light are investigated in GLR mutants to identify the channels involved.

The study was supported by Polish National Science Centre, grant no 2016/23/B/NZ3/02141.

Keywords: Arabidopsis, chloroplast movement, hypocotyl, phototropism, root growth

Role of fibroblasts in epithelial-mesenchymal transition in bladder cancer cells

GLEDJAN CAKA[1*], RAJAN SINGH[2], KARLHEINZ FRIEDRICH[2]

[1]Faculty of Natural Sciences, University of Tirana, Tirana, Albania

[2]Jena University Hospital, Institute of Biochemistry II, Jena, Germany

*Corresponding author Email: gledjan.caka@fshn.edu.al

The microenvironment of tumor cells is critically involved in tumor development and progression. Tumor associated fibroblasts (TAFs) represent a major constituent of the tumor stroma. Tumor cells are operative in the activation of TAFs, while TAFs in turn contribute to tumor cell malignancy. In recent years it became evident that stromal fibroblasts are crucially involved in cancer progression. This work describes the mechanism of communication between fibroblasts and urinary bladder cancer (UBC) cells. This was done by western blotting, cell staining and flow cytometry. Migration of bladder cancer cell lines RT112 and Cal-29, representing two different grades of de-differentiation, was enhanced by co-cultivation with TAFs. Tumor cell-derived Interleukin-1α (IL-1α) was identified as a major mediator of the stimulation effect for the release of Interleukin-8 (IL-8). On the other hand, fibroblasts have a stimulating influence in regards to the invasion and migration on UBC cells for the levels of E-cadherin and Vimentin.

Keywords*:* Fibroblasts, TAFs, cell lines, microenvironment

Induced recruitment of RasGAP to control Cyclin D expression

LEDIA VASJARI[1,2*], STEPHANIE BRESAN[1,3], IGNACIO RUBIO[1,4]

[1]Institute of Molecular Cell Biology, Center for Molecular Biomedicine, Jena University Hospital, Hans-Knöll-Str.2, 07745 Jena, Germany; [2]Current address: Faculty of Natural Sciences, University of Tirana, Bulevardi Zogu I, no. 25/1, 1001 Tirana, Albania; [3]Current address: Institute of Microbiology, Stuttgart University, Allmandring 31, 70569 Stuttgart, Germany; [4]Current address: Dept. for Anesthesiology and Intensive Care, Forschungszentrum Lobeda (FZL), Jena University Hospital, Am Klinikum 1, D-07747 Jena, Germany

*corresponding author: Ledia Vasjari, E-mail: lediavasjari@gmail.com

Cell proliferation is controlled by a complex, orchestrated machinery where the ultimate "players" that promote progression through the cell cycle are Cyclin-Cyclin Dependent Kinase (CDK) complexes specific for each phase. Among all cellular signaling pathways, the Ras-Raf-ERK pathway is widely considered as one of the key regulators of cell cycle control machinery. Numerous studies have confirmed the role of Ras in driving cell cycle progression through the induction of Cyclin D. Despite all attempts to identify the precise

activation pattern of Ras, there are still many gaps in understanding it, partially due to the lack of appropriate technical approaches. We have developed a new experimental method to acutely inhibit Ras through the induced recruitment to the plasma membrane of the catalytic domain of the Ras-GAP NF1. Our findings show that Ras activity is required for quiescent cells to continue progressing in G1 and enter S phase. Temporal dissection of G1 phase demonstrated a requirement for Ras activity until mid G1. Ras control of cell cycle progression was achieved upon inhibition of Cyclin D accumulation and retinoblastoma phosphorylation. Contrary to our expectations, the major mediator of Ras signaling appeared to be Erk whereas PI3K/Akt signaling served as a concomitant in supporting the expression of Cyclin D and consequently transition from G1 to S phase. Our findings demonstrate the necessity of endogenous Ras signaling during G1 phase and the different engagement of effectors from oncogenic Ras.

Keywords*:* cell cycle, proliferation, Ras, Cyclin D, PI3K/Akt

Sensitivity of early life stages of *Pelophylax shqipericus* to xenobiotics

BLERTA TURANI[1*] AND VALBONA ALIKO[2]

[1]University College "Qiriazi"; High Professional College; Food Technology, Tirana, Albania;

[2]University of Tirana, Faculty of Natural Sciences, Tirana, Albania

*Corresponding author: Blerta Turani, E-mail: blertaturani@yahoo.com

The success of assisted reproduction technology applied in amphibians greatly depends on environmental factors. Nowadays, aquatic environment has been increasingly degraded by anthropogenic contaminants, which can affect early life stages of amphibians since they are water closely related. This study evaluate the sensitivity of *Pelophylax shqipericus* embryos to 0.05, and 0.1 mg/L copper exposure for 24h by assessing growth, hematological alterations and possible malformations. Susceptibility increased from fertilization to stage 40Gosner, in which the 24h-LC 100 were 0.058 mg/L, with an increased resistance observed from this stage onward. Malformations were observed at all developmental stages observed, with the most common being poor larval development and growth, incurved spinal cords and tails, reduced reaction to different stimuli, loss of equilibrium and shortening of swimming distance. Erythrocyte abnormalities like deformed cells and their nuclei, vacuolated erythrocytes and karryorhectic cells were the most hematological alterations evaluated for both concentrations 0.05 and 0.1 mg/L of copper ($p<0.1$). The high sensitivity of frog embryos to copper and probably to other xenobiotic, make them particularly vulnerable to environmental stress and importantly affect the reproductive success of species. Using frog embryos for acute toxicity tests can provide a useful information on several meaningful endpoints of amphibian reproduction and developmental process.

Keywords*:* *Pelophylax shqipericus*, embryos, reproduction success, developmental stages, sensitivity, copper

Assessment of physical chemical parameters of leachate from waste landfill in Kosovo

TAFË VESELAJ[1], RIFAT MORINA[2*], FATBARDH SALLAKU[3]

[1]Kosovo Environmental Protection Agency, Street "Luan Haradinaj" Government Building (Ex Rilindja) 10 000 Pristine, Republic of Kosova;

[2]University of Mitrovica "Isa Boletini", PIM, Trepca 40000 Mitrovice, Republic of Kosovo

[3]Agriculture University of Tirana – Faculty of Agriculture and Environment, Republic of Albania

*Corresponding author; rifat.morina@umib.net ; tafe.veselaj@gmail.com

Waste landfill in Kosovo is burdened with mixed (heterogeneous) waste, dominating organic wastes by over 40%. Water drainage streams other than concentrations of organic matter contain many other polluting elements. The purpose of the study is to evaluate some physico-chemical parameters of discharge of landfill streams. In the study are included the landfill in Peja, Prizren, Podujeva and Gjilan. Organic waste at landfills affect the value of parameters such as pH, total suspended matter (MTS), total organic carbon (TOC), chemical oxygen demand (CHOD), biochemical oxygen demand (BOD5), total nitrogen (NT) and total phosphorus (PT) and other parameters. High concentrations of these parameters in landfills show high levels of organic waste. Organic waste at the landfill passes into a process of physical, chemical and biological digestion. Treatment of landfills, it reduces pollutant emissions in the environment.

Keywords: landfill waste, water discharge pollution.

Assessment of the surface water pollution from the oil extraction industry in Marinza oil field, Fier, Albania

GAVROSH ZELA[1*], JAMARBER MALLTEZI[1], SULEJMAN SULÇE[1], AIDA BANI[1], ELSA ZELA[2]

[1]Envrionmetal Department Agricutural University of Tirana,

[2]Lecturer of English Language, Agricutural University of Tirana,

Coresponding author email: gavroshzela@gmail.com

Pollution of surface waters from activity of oil extraction industry in Marinza by the oil extraction industry in Albania has a long history. This study would compare data available from a comprehensive environmental monitoring performed during 2007-2008 and measurements taken during 2014 – 2017to review whether there are discharges in surface waters level in the area.

Albpetrola public Albanian company carrying out oil extraction in the area has been the only operator until 2005. Since 2006 there has been operating also a private foreign company for oil extraction in the area.

The study focuses on the surface waters situation in the studied area (Marinza oil field). The new monitoring and championing of representative samples were taken in vicinity of places of samples taken during the environmental baseline carried out in 2007-2008. The environmental baseline at the time used the Location Conceptual Model for sampling.

This survey compares the current surface waters with the baseline and to check whether there are any changes according to the environmental standards.

Finally, the study should reveal the actual situation and suggest a list of good practices for improving surface water quality in the area that could be implemented by all relevant stakeholders in the oil extraction industry.

Keywords:surface waters, oil extraction, crudeoil.

Poster

Presentation

Determining the best fit equations to represent the cumulative particle – size distribution curves in soils of Albania

BESNIK GJONGECAJ

Department of Agro-environment and Ecology, Faculty of Agriculture and Environment, Agriculture University of Tirana, Tirana, Albania

Corresponding author e-mail: bgjongecaj@ubt.edu.al

There is no doubt about the need to replace the textural triangle by the cumulative particle-size distribution curves in the research context of Albanian soils. Beside all, it creates the necessary space to establish the relationships between the cumulative particle-size distribution curves and the most important hydraulic properties of soils. Therefore, having the cumulative particle-size distribution curve belonging to a specific soil, it becomes possible the recognition of hydraulic properties of this very soil. There are many efforts to determine the best fit equation reflecting the cumulative particle-size distribution curves. However, the best fit in our research seems to be exponential law function in its closed form. This conclusion became possible to be drawn based on a considerable large textural database collected throughout the soils of Albania. Whether this conclusion is true for the soils where the clay predominates, silt and sand predominate; or whether it has the same significance as for fitting to the process of data transfer from one scheme to another, it requires further research.

Keywords: cumulative particle-size distribution curve, exponential law function, textural triangle

Sandy dunes vegetation in Narta

RUDINA KOÇI[1*] AND ALMA IMERI[2]

[1]Agricultural University of Tirana, Faculty of Agriculture and Environment; [2]Agricultural University of Tirana,Faculty of Agriculture and Environment

*corresponding author: Rudina Koci, E-mail: rudikoci@gmail.com

Extensive dunes occur on exposed coastline of Narta area from Vjosa mouth till Old Beach of Vlora. This region in particular has some of the largest dunes anywhere in Albania, with one of the largest expanses at "Zverneci hills".

The sandy belt along the coastline is completely bare of vegetation to a length sometimes extending up to 30 m.

The Phanerogamic vegetation appears after this nudded belt, in a sandy belt already washed away by the considerable amounts of salt as a result of rain waters.

Pioneer species *Cakile maritima, Xanthium strumarium subsp. italicum, Salsola kali*, at the beginning isolated become more frequent when leaving the coastline. The vegetation of this sandy belt belongs to the pioneer association *Cakilo-Xanthietum italici*.

Gradually going away from the coastline and as the high of sandy dunes is increased, the physiognomy of vegetation is imparted by the species *Ammophila arenaria subsp arundinaceae, Elymus farctus, Echinophora spinosa* etc. Ammophiletum association constitutes the last most evolved phase of the vegetation of sandy dunes or the borderline between dune vegetation and the Mediterranean pine forests. These forests are relatively going, cultivated (30-40y ago) recently in order to stabilize the sandy dunes and protect the agricultural lands.

The physiognomy of this formation is imparted by the species *Pinus maritima, P.pinea, P. pinaster*. The shrub layer is represented by typical Mediterranean species such as *Pistacia lentiscus, Erica manipuliflora, Myrtus communis* etc, characteristic species of the *Class Quercetea ilicis*. At the soda forest the shrub layer totally absents. The reason is a very high density of woody layer. These forests appear also very danger in many sectors (old beach of Vlora. Special interest in this formation present the endemic species such as *Orchis albanica Goelz and Reinhard* as well as a hybrid form *Orchis x paparisti*.

Keywords*:*.Sandy dunes, phanerogamy, Mediterranean pine forests, endemic species

Statistical processing of the data for the presence of Q fever in human population in Western Macedonia

MIJE REÇI[1*] AND LEONORA QOKU[2]

[1]Faculty of Natural Sciences and Math, Study Program of Biology, University of Tetova, Tetovo, Macedonia; [2]Faculty of Natural Sciences and Math, Study Program of Biology, University of Tetova, Tetovo, Macedonia

*corresponding author: Mije Reci, E-mail: mije.reci@unite.edu.mk

Q fever is an acute and rarely chronic, zoonotic disease. It is caused by *Coxiella burnetii*, an obligate intracellular, pleomorphic coccobacillus. It survives unfavourable conditions in the form of endospores and is extremely resistant to environmental effects. People are usually infected by inhaling the infected aerosol. The aim of study was to examine the frequence of Q fever in the human population in Western Macedonia and determining the statistical trend with descriptive and conclusive statistical methods.The serological test was conducted using the ELISA test kit. The serum isolated from the blood was kept at -30°C until testing. The sera were properly diluted based on the respective protocol using purified antigen of *C. burnetii*. A total of 520 serums were checked of all ages from people with different epidemiological conditions, of which 114 resulted positive, with positivity rate of about 21.90%. The standard deviation of the infected population in general is 8.53, where in the

female gender is higher than the masculine gender, while the age group of the two sexes the standard deviation ranges from 0.84 to 4.98.The statistical analysis of the data results, prove that there is a connection and similarity among the samples from five regions in terms of the spread of the Q fever infection inhuman population, this is proven by the credibility boundaries with the Kloper-Pirson method. The frequency 78% negative per sample 520 is gained within the median limits from 74% to 86% of the sample.

Keywords: Zoonotic disease, *Coxiella burnetii*, infection, standard deviation, regions

Polymorphism of glutenins and gliadins in wheat hybrids from species *Triticum durum, Triticum aestivum* and *Triticum dicoccum*

LEONORA QOKU[1], MIJE REÇI[2], GAZMEND ISENII[3]

Faculty of Mathematics and Natural Sciences, State University of Tetovo

*corresponding author: Leonora Qoku; E-mail:leonora.qoku@unite.edu.mk

Polymorphism of high molecular weight glutenins and gliadins in hybrid combinations received by diallel hybridization of three different wheat species of genus *Triticum*: *Triticum durum* (durum wheat), *Triticum aestivum* (soft wheat) and *Triticum dicoccum* (emmer wheat) were analyzed. High molecular weight (HMW) glutenins were examined with sodium diodecylsulfate polyacrilamide gel electrophoresis (SDS-PAGE) and gliadins with polyacrylamide gel electrophoresis in acid conditions (A-PAGE). Polymorphism of gliadin bands from Gli-1locus and HMW glutenins from Glu-A1, Glu-B1 and Glu-D1 locuses were evaluated in F_2 generation. Protein markers were analyzed for determination of phylogenetic relationship between wheat species for better understanding of wheat taxonomy.

Gliadin bands in α zone from *Triticum aestivum* genotypes differ entirely compared with those in *Triticum durum* and *Triticum dicoccum*. Gliadin band γ 48 was found only in cultivar *iva* and was not present in other analyzed genotypes. On electrophoregrams, highest polymorphism was identified in ω zone. Presence of allele *l* in Gli-B1 locus connected with rye translocation 1B/1R was detected in cultivar *skopjanka* and *MT 6/2* and has influence in decreasing wheat quality. Highest genetic distance was found between *Triticum aestivum* and *Triticum dicoccum*. Coefficients of genetic similarity and genetic distance were used to construct phylogenetic tree and two clusters were observed. *Triticum aestivum* genotypes are in first cluster and genotypes from *Triticum durum* and *Triticum dicoccum* in second cluster. In second primary cluster two subclusters are present. By analysis of gliadin polymorphism, inheritance is codominant in interspecies hybridization.

Keywords: *Triticum durum*, *Triticum aestivum*, *Triticum dicoccum*, glutenins, gliadins, quality, SDS-PAGE, A-PAGE, locus, alleles, Glu-1, Gli-1, rye translocation 1B/1R, F_2 generation, phylogenetic tree, interspecies hybridization

Evaluation of phosphorus in Cola drinks in Albanian market

ANISA PEÇULI[1]*, NERTIL XHAFERAJ[1], ANILA KOPALI[1], AIDA SHKURTI[1], FATJON HOXHA[1]

[1]Agriculture University of Tirana, Faculty of Biotechnology and Food, Department of Agro-Food Technology Kodër Kamëz, SH1, Tirana 1000, Albania

*corresponding author: Anisa Peculi, E-mail: apeculi@ubt.edu.al

Phosphates are inorganic compounds, based on the element phosphorus (P), and combined with oxygen to form phosphates (PO_4), the form in which phosphorus is present in nature. Phosphate occurs naturally in the form of organic esters in many kinds of food, like meat, potatoes, bread, and milk. In the body, they are broken down to simple phosphate ions (PO_4), the basic building block of the many different biological molecules which include phosphorus. Inorganic phosphat is commonly used as an additive in industrial food production for a range of purposes including maintaining natural colours and flavours, acidity buffering, leavening, stabilization of texture, shelf-life quality.

High levels of phosphorus in the blood, has been associated with adverse health effects like organ damage, most notably of the kidneys, lower calcium levels which lead to brittle bone diseases,vascular calcification and cardiovascular diseases. Because of the potential damage to health from excessive phosphate consumption, a labeling requirement is advised for foods with added phosphate. Our study aim was the evaluation of phosphate concentration in cola drinks in Albanian market and compliances with the current legal limits regarding this additive set by the Europian regulations. Phosphate concentration of selected drinks were evaluated using an UV spectrophotometric procedure. The results obtained indicated that phosphate concentration in cola drinks ranged from 887 mg/L to 1800 mg/L. European regulations allow up to 700 mg/L of phosphate in cola drinks, a quantity that provide already 50% to 75% of the recommended daily allowance of phosphate for adults.

Keywords: inorganic phosphor, UV/Visible Spectrophotometer, Soft drinks, EU Regulations

Pomological characteristics and chemical content of the pomegranates (*Punica granatum* L) in EX SITU

TATJANA KOKAJ*, ARIOLA MORINA, HAJDAR KUCI,

Agricultural University of Tirana

*Corresponding author E-mail: tkoka@ubt.edu.al

Pomegranate (*Punica granatum* L) is a fruit very important for our life, especially in the last years information for this fruit and content fruits is more increase. This fruit belong the Mediteranean climate and the Mediteranean spread plant. The varieties were collected in

pomegranate ex situ in UBTirane and the characteristics ore traits pomological and chemical are different for each traits. The different among varieties are different for different character pomological, chemical and morphological traits the difference are until 5 days for each phase. Fruit weight ranged 250 g to 900 g; aril is red, pink, white and dark red. The number of seed ranged 330 g to 500 g. The weight seed ranged 120 gr to 462 g,chemical traits are different for each trait chemical analyses such are: 1. Accession of Shg 111 – ph is 3.04 when Shg 112 is 3.73 and Shg 113 is 3.02. 2. Accession of Shg 111 - Vit C mg/100 g is 9.2, Shg 112 is 13.6, Shg 113 is 10.15. 3. Accession of Shg - 113 - Dry matter is 15.61, 112 is 18.11, Shg 113 is 115.46. 4. Accession of Shg 111 – Sugar is 15.5, Shg 112 is 18.11, Shg 113 is 15.15. Accession of Shg 111 – poliphenol mg/l is 831.29, Shg 112 – 1251.09, Shg 113 691.68. For Shg 111 - antocian is 133.59, Shg 112 is 283.05, Shg 154.46. For at all traits of pomegranate to realize statistical analyses.

Evaluation of caffeine in soft and energy drinks by means of UV/Visible Spectrophotometer

NERTIL XHAFERAJ*, ANISA PEÇULI, ANILA KOPALI, AIDA SHKURTI, FATJON HOXHA[1]

Agricultural University of Tirana, Faculty of Biotechnology and Food., Department of Agro-Food Technology Kodër Kamëz, SH1, Tirana 1000, Albania

*corresponding author: Nertil Xhaferaj, E-mail: nxhaferaj@ubt.edu.al

1,3,7-trimethylxanthine widely known as Caffeine is a naturally alkaloid usually found in coffee beans and tea leaves or fruits. Around sixty plant species contain caffeine. Due to the fact of making the drinks addictive, Caffeine is added as flavoring agent and is the most common additive in soft and energy drinks. Caffeine as alkaloid directly affect at central nervous system as stimulant. When is consumed above at acceptable amount causes various physiological effects. Taking into account the effect on human body caused by consumption of high amount of caffeine, our study was to investigate the presence (qualitative and quantitative) of caffeine in soft and energy drink available in market. Among different methods for determination of caffeine such as HPLC, GC-MS, FTIR and many others, the UV-VIS is a tool frequently used for routine caffeine determination in beverages. Caffeine absorb at UV-VIS region with maximum absorption band at 271 nm.

In present work we undertook various experiments to determine the pH and levels of caffeine concentration in ten soft drinks and five energy drinks available in local market of Albania. pH levels were measured by pH meter. Concentration of caffeine in drinks was performed by a simple and fast standard UV spectrophotometric method. The minimum caffeine level of soft drinks was observed in *Brand-7* (26.8 mg/L), while the highest concentration of caffeine was observed in *Brand-9* (60 mg/L). Unlike the soft drinks, the concentration of caffeine in energy drinks were slightly higher with minimum amount at *Brand-4* (62 mg/L) and

maximum at *Brand-5* (152 mg/L). The pH range of soft drinks were (2.51 to 3.34) and in energy drinks (2.33 to 3.49).

Keywords: Caffeine, UV/Visible spectrophotometer, soft and energy drinks

Drought tolerance and thiols molarity in seedlings of two *Aegilops* accessions

VJOLLCA IBRO [1], ARIOLA BACU[2], ANXHELA KALOSHI[1], ENKELEDA COKA[1], FRANS KOKOJKA [2]

[1]Department of Agricultural Sciences, Faculty of Agriculture and Environment, Agricultural University of Tirana

[2]Department of Biotechnology, Faculty of Natural Sciences, University of Tirana

*Corresponding author e-mail: vibro@ubt.edu.al

Different species of the genus *Aegilops*, as wild relatives of wheat, are valuable sources of genes for wheat improvement, especially for the tolerance to abiotic stresses as drought and salinity. Thiols are actively involved in the maintenance of cellular redox homeostasis and in plant responses to almost all stresses. The most studied of thiols, glutathione can be found as reduced glutathione (GSH), which is oxidized to a disulphide form (GSSG), which in turn is recycled to GSH by a glutathione reductase. The redox potential of GSH/GSSG, which is responsible for the maintenance of cellular and extracellular homeostasis, is affected not only by the ratio GSH/GSSG, but also on the changes in synthesis and/or degradation of GSH. The recent study compared the seedlings drought tolerance for two *Aegilop*s accessions. Seedlings height, dry weight, first leaf length and leaf dry weight, have been evaluated prior to exposing to drought conditions. The seedlings were grown without irrigation for two weeks, and after that the number of survived seedlings, their fresh and dry matter were evaluated. The GSH content was also measured under controlled conditions, during the first three weeks after germination. For these, seeds were planted in pots with soil in laboratory conditions; GSH content was determined on extracts from stems, roots and leaves based on Ellman's test. From the results of the data processing via Software (*Sigma Plot 13.0)*, can be concluded that among the two *Aegilops* accessions do exist significant differences related to seedlings thiol molarity, drought tolerance, biometric parameters, and that the conical ear *Aegilops* accessions show advantages toward the cylindrical ones.

Key words: *Aegilops*, conical/ cylindrical ear, thiols, drought tolerance.

Analyse of life forms and floristic elements of some medicinal plants in Bredhik Reserve, Sharr Mountain in Kosovo

AVDYL BAJRAMI[1*], ERTA DODONA[2], HAXHI HALILAJ[1], XHAVIT MALA[3]

[1]PhD candidate, Department of Plant Production, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania

[2]Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania

[3]Ministry of Environment and Spatial Planning -DAPK "Sharr Mountain"

*Corresponding author Email: bajramiavdyl@gmail.com

This study represents the results for inventory of medicinal plants on the territory of Bredhik Natural Strict Reserve (Sharr Mountain, Kosovo) during 2018. The inventory of medicinal flora, are made for the first time in this area. The study shows the presence of 92 taxa within 70 genera and 42 families. Their taxonomic structure, life forms and biological types are discussed. Detailed information on their phytogeographical structure by major floral types and conservation status of taxa is presented too. The species with any conservation status by the International Legislation are 60 or 65.22% of the total taxa's number. The analysis of life forms has shown that medicinal flora in this area is predominated by hemi cryptophytes (43 species) and phanerophytes (32 species). The phytogeographical elements are dominated by taxa of chorological types Euro Mediterranean – Sub Mediterranean, Boreal – Sub boreal, Euro-Asian and Euro-Siberian. The relic species are 16 (17.4% of the total species number) and are represented mainly by tertiary relicts. The biological types are represented mainly by *perennial herbaceous plants* (53.26%), followed by *trees* (18.48%) and *shrubs* (15.22%). The presence of a high number of threatened species (listed in IUCN List and European Red List of Medicinal Plants), indicates the importance of this Reserve for biodiversity conservation.

Keywords*:* Flora, conservation status, relict species, medicinal plants

Experimental modeling of subcutaneous endometriosis

SARA GJURGJI[1] AND MARIYA PETROSYAN2

[1]Saint Petersburg State University, Developmental biology department, University Embankment, 7-9, Sankt-Peterburg, Russia, 199034; [2]Research Institute of obstretics, gynecology and reproductive medicine them. D.O.Otta, Mendeleyevskaya Liniya, 3, Sankt-Peterburg, Russia, 199034

*corresponding author: Sara Gjurgji, E-mail: sgjurgji@mail.ru

Surgical modeling of endometriosis was carried out by auto-transplantation of uterus horn's fragments on the outer side of the anterior abdominal wall of female rats. One month after modeling pathology in 80% of the animals showed successful formation of bulky formations that characterize the disease of endometriosis. The histological analysis of implanted tissues

resembled endometriotic growths in women: they contained glands surrounded by stromal tissue. Through immunohistochemical analysis in the samples of implants, expression of markers CD34 and VEGF1 was established, which confirms the presence of angiogenesis and vasculogenesis processes that are crucial for the development of endometriosis.

Thus, in the surgical modeling of endometriosis by transplanting uterine fragments into the subcutaneous region, a high percentage of endometriotic tissue preservation and growth is observed. This approach allows you to explore the impact of new geno-therapeutic drugs with their local injection, and also contributes to the least trauma to animals.

Keywords: Endometriosis, angiogenesis, endometrial tissue, subcutaneous surgery

Chemical profiling, antimicrobial and antioxidant activity of Albanian thyme essential oil

ERJON MAMOCI[1*], ANISA PECULI[2], MARIA FE ANDRÉS[3] AZUCENA GONZÁLEZ-COLOMA[3]

[1]Department of Food Science and Biotechnology, Faculty of Biotechnology and Food, Agricultural University of Tirana, Kodër Kamëz, 1029 Tirana, Albania

[2]Department of Agro-Food Technology, Faculty of Biotechnology and Food, Agricultural University of Tirana, Kodër Kamëz, 1029 Tirana, Albania

[3]Instituto de Ciencias Agrarias. Consejo Superior de Investigaciones Científicas. Serrano 115-bis, 28006 Madrid, Spain

*Corresponding author Email: mamocie@ubt.edu.al

The present study shows the chemical composition, antifungal, antibacterial and radical scavenging effect of the essential oil from wild *Thymus vulgaris* L. Chemical analysis of essential oil was done by gas chromatography mass spectrometry (GC-MS). Antibacterial activity was tested using disc diffusion method on three food borne diseases while antifungal activity was tested on colony growth of three postharvest pathogens in volatile phase. The free radical scavenging activity of the oil was measured *in vitro* by 2,20- diphenyl-1-picrylhydrazyl (DPPH) assay. GC-MS analysis identifies 30 components with thymol and p-cymene as main component, 35.4 and 26.93% respectively. The oil of thyme (5 μL/disc) gave higher inhibition zones on the tested bacterial strains, *Escherichia coli* ATCC 25922, *Salmonella typhimurium* ATCC 14028 and *Staphylococcus aureus* ATCC 6538 compared with antibiotic cefazolin (30 μg/disc). In volatile phase, thyme oil (0.14 g/L) showed good antifungal activity on *Penicillium italicum*, *P. digitatum* and *P. expansum*, with percentages of mycelial inhibition 60, 71.4 and 73.5% respectively. The activity of the oil was fungistatic. Scavenging effect of the oil on DPPH radical varied from 36.4, 50.5 and 76.1% depending the concentrations used (1, 2 and 5 mg/mL). The *in vitro* biological activity of thyme oil can be attributed to fenolic compounds thymol and p-cymene.

Keywords*:* *Thymus vulgaris*, thymol, p-cymene, antibacterial, antifungal, DPPH.

Heavy metal accumulation in liver tissue of two fish species of Adriatic sea

ENKELEDA OZUNI**, DORIANA BEQIRAJ, PËLLUMB ZALLA, ILIR DOVA

Agricultural University of Tirana

Faculty of Veterinary Medicine

*Corresponding author e-mail: enkeledaozuni@hotmail.com

The concentration levels of mercury, lead, cadmium and chrome were measured in liver tissue of two valuable fish species of Adriatic Sea, *Lophius piscatorius* and *Trachurus trachurus.* The level of heavy metals was measured by using atomic absorption spectrophotometer (AAS). Concentration levels of heavy metals in liver tissue of both fish species ranged as follows: Hg 0.05 – 1.45; Cd 0.030 – 0.98; Cr nd – 0.131mg/kg wet weight; Pb resulted always below the detection level (nd) in both liver tissue of fish species. As expected, the levels of heavy metal in liver varied significantly between fish species. The results of our study sustain the fact that liver tissue is an important target location of heavy metals accumulation. Based on these findings, *Lophius piscatorius* and *Trachurus trachurus* should be object of further investigation with the final goal to safeguard the population who constantly consume them.

Keywords: heavy metals, Lophius piscatorius, Trachurus trachurus

The endemic and relict alpine–subalpine plant species in Shutman Natural Reserve of Kosovo and their conservation status

HAXHI HALILAJ[1], LIRIKA KUPE[2], AVDYL BAJRAMI[1*], XHAVIT MALA[3]

[1]PhD candidat, Department of Plant Production, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania

[2]Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania

[3]Ministry of Environment and Spatial Planning -DAPK "Sharr Mountain"

*Corresponding author Email: bajramiavdyl@gmail.com

On the territory of the Sharr National Park of Kosovo there are 16 strict natural protected areas, one of which is Shutman Reserve. The biodiversity of endemic and relict plants in Shutman has not been completely described. The present study is the first on this subject in the Shutman Reserve. The purpose of the study is to investigate the biodiversity of endemic and relict plant species and their conservation status. The material was collected during the vegetative period May – September 2018. The plant list of important plant species within this

paper contains 42 vascular plants. 24 species are Balkan endemics, 2 species are sub-endemics, 2 species are steno-endemics and 1specie is Central and Southeastern Europe endemic. Nearly 12 of Shutman's investigated vascular plants are tertiary and glacial relicts. A total of 24 taxa have some protection status. The biological type of species represented mainly by perennial herbaceous plants (95%). The largest percentage of floristic elements to describe appertain the Balkan type (40.48%) and Boral type (9.52%), whereas the hemicryptophytes dominate among the life forms, with 59.52%. The data of the paper showed that Reserve of Shutman has a very high level of endemic and relict species.

Keywords*:* Vascular plants, endangered species, floristic element, life form.

Determination of the proper time and effectiveness of insecticide, for protection against coodling moth

NIKOLIN KARAPANCI[1], BESNIK SKËNDERASI[2]

[1]AgriNet Albania Foundation, Korçë, Albania

[2]Fan S.Noli University, Korçë, Albania

Corresponding author e-mail: n.karapanco@yahoo.com

In Albania, apple is one of the most important tree, especially in the coldest north and south - eastern areas, with a production of 80,000 tons per year. Main developed region for this fruit is Korca, it's provide about 65% of production with 70% of the total number of apples trees planted in Albania. The tendency to increase the apple production per unit of surface, also to introduce new varieties and rootstocks has opened up many problems for apple growers especialy with the management of key pests and diseases as coodling moth. Important is the increase of reliability for the effectiveness of the chemical preparations used. It is necessary to conduct a series of studies to provide the proper answer and assistance to apple growers in this direction.

This study is based on several experiments aims on the determination of the proper time of application and the effectiveness of insecticides. For this purpose, three insecticides with the lowest negative impact on the consumer and the environment (l.a.granulosevirus, cpgv, l.a indoxacarb, l.a. diflubenzuron) were tested, with the dosage and predetermined amount of solution used. Insecticide treatments were carried out based on monitoring and by alternating preparations and for two basic cultivars Golden Delicious and Star King in both generations of the pest. The effectiveness of insecticides was determined by the rate of infection for each cultivar, compared to control trial.

This experiment could serve to the apple cultivars to increase the reliability on the chemical preparates for the proper time, dosage and the amount of solution used.

Keywords: insecticide, effectiveness, coodling moth, generation

Anthropometric measurement and agility abilities of children aged 11-14 years in a rural school of Durrës country, Albania

LAURA GJYLI[1]*, MIRELA ÇEMERI[2], GAGAN MATTA[3], FATON DACI[4]

[1]University "AleksandërMoisiu", Durrës, Albania,

[2]Vadardhë School,Sports University of Tirana, Albania,

[3]Department of Zoology and Environmental Science, Gurukula Kangri Vishwavidyalaya, Haridwar, India,

[4]Albanian Association of Physiotherapists, Albania,

*Corresponding author email: lauragjyli@yahoo.com

Anthropometry (the use of body measurements to assess nutritional status) is a applicable and practical technique to assess children's development. Malnutrition is a major public health problem and it is report that about half of all child death's worldwide. In September 2018, there are studied twelve anthropometric parameters in total as four anthropometric measurement like weight (kg), height (cm), umbilical circumference (UC, cm), gluteal circumference (GU, cm), two dependent variables as body mass index (BMI), ratio UC/GC; and six agility abilities as 10x5m Shuttle Test (sec), Sprint 30m test (sec), Long Jump (cm), Sit Up Test (how many in a minute), Push-Up (how many in a minute), 1 Mile Walking test (min) as dependent variable. The study is made in a sample of 192 children, part of a rural school of Durrës Country, Vadardhë, including teenagers of 11- 14 year old divided by gender. The total mean of BMI in teenagers resulted 18.5 categorized as healthy weight, but also it was evident that the mean of the boys of 11, 12, 13, 14 year old and girls of 11, 12, 13, 14 year old were normal or healthy weight between 5th percentile to less than the 85th percentile according WHO. There was a strong positive correlation between BMI and weight, UC, GU.Studying ability activities resulted a strong negative correlation between Long Jump and 30m as ability activities.

Keywords: anthropometric parameters, teenagers, Vadardhë school, linkage

Assesment of genetic diversity of Phaseolus germplasm by morphological quantitative characters

VALBONA HOBDARI*[*], BELUL GIXHARI, FETAH ELEZI, DORIANA BODE

Institute of Plant Genetic Resources, Agricultural University of Tirana, Tirana, Albania

*Corresponding author e-mail: vhobdari@ubt.edu.al

Study for characterisation and pre-evaluation of genetic diversity present in the Phaseolus germplasm stored in Albanian genebank analysed 50 local Common bean accessions of different origins for 9 quantitative morphological characters. The study of morphological

quantitative characters carried out in the Valias Experimental Didactic Field of Agriculture University of Tirana during the two growing seasons (2017, 2018) had the objective to characterize and select those accessions with favourable characteristics for use in breeding programs. ANOVA, PCA and cluster analysis reveal considerable amount of diversity between common beans, and identified the variances of the Principal components and the proportion of the total variance each factor accounts for. Most of the quantitative morphological traits showed significant differences among important agro economic characters. PCA and cluster analysis (Ward's method) carried out for morphological data divide the whole Phaseolus germplasm into six groups in respect of genetic diversity and similarity among common bean accessions of different origin. The study identifies traits with agronomic interest, which account for genetic diversity and the demarcation of distinguishable morphological groups which will facilitate the maintenance and agronomic evaluation of the collections.

Keywords: Genetic diversity, Phaseolus germplasm, morphological characters, clusters analysis

The impact of daily walk on several semen parameters of bulls kept for reproduction - Study case: Genetic Center of Kosova "GenKos"

HAMIT MANAJ[1], RREZE GECAJ[1], XHAVIT BYTYQI[2], SKENDER MUJI[1], BAJRAM BERISHA[1*]

[1]Animal Biotechnology, Faculty of Agriculture and Veterinary, University of Prishtina, Kosovo;

[2]Genetic Center "GenKos", Vitomirica, Kosovo.

[*]Corresponding author e-mail: bajram.berisha@uni-pr.edu

The objective of this study was to analyze the impact of daily walk (30 minutes per day) on several semen parameters of bulls kept for reproduction in Genetic Center of Kosova "GenKos". This center is the only one in Kosovo and the region where harvesting, processing and gathering of bulls is used for the artificial insemination of cattle. In our experiment we included two groups of Simmental bulls each consisting of three animals: the control group (the current fitness conditions from the last three months were analyzed) and the experimental group that was subjected to a 30 minutes of daily walk for 4 weeks. In our experiment, we analyzed the effects of walking (30 minutes/day) on the physical condition of bulls (steps/30 minutes), the time needed to harvest the bulls (seconds), and spermatozoid mobility of the ejaculate (%). We continued to collect these experimental semen parameters also in the next two weeks after the experimental period. Based on our analysis, since the second week of the experiment, an important statistically significant increase in the number of steps during the 30 minute walking strokes was found. This increase in the number of steps has continued during the ongoing period of the experiment. Based on the statistical analysis of our research it can be concluded that the daily walk of bulls had a positive impact on their

physical condition. Although the physical activity did not clearly affect the time needed to harvest the bulls (seconds), however a slight impact on spermatozoid mobility of the ejaculate (%) was measured. Therefore, the results of this current research have shown that the daily walk of bulls, affects some of the parameters of semen used for artificial cattle insemination in Kosovo.

Keywords: bull, daily walk, sperm, spermatozoid mobility

Physico-chemical and rheological properties of some different varieties of grain cultivated in Albanian areas.

ALKETA SHEHAJ[1]*, KLOTILDA SULA[1], ARTJONA LAZE[2], RENATA KONGOLI[1] ROLAND HYSA[3]

[1]Faculty of Biotechnology and Food, Agricultural University of Tirana/PajsiVodina, KodërKamëz, Tiranë, Albania

[2]Department of Chemistry, Faculty of Biotechnology and Food, Agricultural University of Tirana, PajsiVodica St., 1029 Tirana, Albania

[3]Fabrika e Miellit "Tirana"/ Blv "TeodorKeko" Tirana, Albania

*Corresponding author e-mail: ashehaj@ubt.edu.al

Wheat is one of the earliest grain varieties which is used massively in Albania for the production of various types of flour. The quantity of wheat that is used in Albania is mostly imported from other countries. Nowadays a lot of farmers are cultivating different varieties of wheat in their parcels as need for improving their life and economy. The quality assessment of grain varieties cultivated in our country comes as a need to evaluate the quality of Albanian products and to see where they stand against State and European standards. For the qualitative evaluation of grain varieties that are cultivated in our country, around eleven varieties cultivated in the Tirana and Lushnja district were considered. For the evaluation of physical characteristics, the weight of 1000 beans(37.9%), hectoliter weight (68.5 kg/Hl), grain moisture (15%), impurities (3.5%), sensory characteristics and defects were taken into consideration. Regarding chemical analysis, several analyze of acidity, ash, gluten (26%) content and proteins have been considered. To assess the rheological qualities, another set of analyzes was undertaken such as water absorption ability (61%), resistance to extension, extensibility, etc.

Relatively the wheat varieties produced in Albania have an average quality, also the flour produced by it. They have relevant protein content but good rheological properties, which helps to produce the finest quality products.

Keywords: wheat, physic-chemical analyses, rheological properties, gluten

Long-term coastal habitat dynamics in Buna delta severely influenced by hydropower dams along upstream Drini River

KRISTI BEGO*, MIHALLAQ QIRJO, FERDINAND BEGO

[1]Departament of Biology, Faculty of Natural Sciences, Tirana University

Corresponding author e-mail: kristi.bego@hotmail.com

Long-term deltaic habitat dynamics in Drini-Buna river, influenced by hydropower activity upstream of Drini river were studied by using GIS and satellite imagery processing. Coastal habitats in the Buna river delta were mapped and classified, following their long-term dynamic during 1960-2018, a time period when important events occurred such as the construction of HPPs. Drastic changes in river flow and sediment regime brought the delta progradation to a halt. The delta front has lost its typical "shovel" shape and has receded about 660m, with the island of "Franc Jozef" being lost in the process. With a sedimentation budget thirteen times lower than prior to HPP construction, the delta has become more susceptible to intensive coastal erosion. Degradation of the delta is followed by the redistribution and accumulation of sediments along Velipoja beach in Albania (up to 812 m) and Velika Plaža in Montenegro (up to 608 m). The reduced river flow has led to the entrapment of fine sediments along the river banks instead of being discharged into the sea. In turn, this resulted in an increasingly narrower riverbed on both Buna river's branches, especially on the eastern branch from 505 m wide in 1960 to 348 m wide in 2014). Coastal habitats (dunes, estuaries, halophytic and brackish marshes, coastal lagoons) got shrank in their surface area, with dunes being the most affected habitat, losing 982 ha or 63% of their total surface between 1960 and 2014. Other relevant changes include rapid urbanization and uncontrolled development of touristic activities, further contributing to habitat loss, and increased stress to wildlife.

Keywords: GIS, Buna river delta, HPP, coastal erosion, digital mapping, habitat dynamics

Inheritance of spike traits in F_1 generation in wheat depending on parents' genetic diversity

SHUKRI FETAHU[1*], SALI ALIU[1], IMER RUSINOVCI[1], DUKAGJIN ZEKA[1], AVNI BEHLULI[1], TRINGA LEKA[2]

[1]University of Prishtina "HasanPrishtina", Faculty of Agriculture and Veterinary, Kosova;

[2]Food and Veterinary Agency, ZonaIndustriale, Fushë Kosovë.10000 Prishtinë, Kosova.

*Corresponding author Email: shfetahu@hotmail.com; shukri.fetahu@uni-pr.edu

The aim of the research was to assess the inheritance of wheat spike length (SL), based on the parents diversity as genes donors, identification and determination the best cross

combinations in the F1 generation, as well estimation of heterosis indicators as relation: parents / offspring (P1 / F1 and P2 / F1). Field trials were conducted during the years: 2016/17 and 2017/18, at the Experimental Didactic Farm of Faculty of Agriculture and Veterinary in Prishtina. Experimental design, for evaluation it was an (RCBD), with plot size $1m^2$ in three replications. The experimental formula were: (Parents, 20-P + F1-genotype, 10-GF1) x (Replications, 3-R) x (Plants, 10P) = 900 results. The mean genes value effect (μ) and genotype variation (gv) for (SL) were: for female parents set (P1) was μ(8.99cm $spike^{-1}$) and gv(±38.93 %); for the male parents set (P2) was μ(8.40 cm $spike^{-1}$) and gv(±39.66 %); mid-parent (MP) was μ(8.69 cm $spike^{-1}$) and gv (±30.67%); for better parent (BP) was μ(9.31 cm $spike^{-1}$), and gv(±37.61%), and for F1 generation was μ (10.07 cm $spike^{-1}$) gv(±22.74%). The magnitude of variation for heterosis was Ht (3.47 to 35.30%) and for Hb was (-11.39 to 28.57%). Through, the cross combination of parents, it was possible to identify the superior genotypes in F1 generation (G5; G13 and G24) for SL=11.0cm $spike^{-1}$. The obtained results were with wide range variability and highly significant differences between parents and genotypes of the F1 generation, on the level of LSDp=0.05 and LSDp=0.01.

Keywords*:* Wheat, inheritance, parents, spike, F1-generation, heterosis.

The impact of oak chips during alcoholic fermentation in stabilizing the color of red wine of Sheshi Zi

KRENAR GOZHDARI, FATBARDHA LAMÇE, MAMICA RUÇI, INDRIT SHIMAJ, ONEJDA KYÇYK*

Faculty of Biotechnology and Food, Food Research Center, Tirana, Albania

*Corresponding author: e-mail: okycyk@ubt.edu.al

In Albania the autochthonous cv Sheshi Zi it is well-known for red wine production. During the wine production the main problem in this variety is the collapse of its color after alcoholic fermentation. The purpose of this study is to assess the impact of oak chips during alcoholic fermentation in color stabilization. In this study, 100 kg of Sheshi Zi grapes were taken from Lundra, Tirana. For the production of wines were followed two different vinification schemes (with and without oak chips). Every three days the phenolic compounds of wines were analyzed by spectrophotometric methods, such as the index of polyphenols, total tannins, total anthocyanins, color index, color tonality and color intensity. The obtained results were statistically processed with Statistix 9 software. This increase in tannins due to the presence of chips in fermentation positively influenced the stabilization of the wine color since the increase in the tannin quantity had a significant difference in the index ($P \leq 0.007$), the tonality ($P \leq 0.000$) and the intensity of the color ($P \leq 0.0001$).

The result shows that the addition of oak chips during alcoholic fermentation increases the amount of tannins which affect the stabilization of the red wine color.

Keywords: Red wine, Sheshizi, alcoholic fermentation, chips, tannins

Albanian forest role to the climate change mitigation and national economy

NEHAT ÇOLLAKU[1]*, ELVIN TOROMANI[1], DRITAN AJDINAJ[1], ERION ISTREFI[2]

[1]Faculty of Forest Sciences, Agricultural University of Tirana, Albania.

[2]Ministry of Tourism and Environment (Project of Environment Services), Tirana, Albania

*Corresponding author e-mail: nehatcollaku@ubt.edu.al

Albania has ratified the Kyoto Protocol in 2005 and recently has prepared the third National Communication to Mitigate the Greenhouse Gases (GHG). The main contributors in terms of GHG emissions (CO2 eqv.) according to this report were; (i) Energy sector (47.9%), (ii) Agriculture (14.26%), (iii) Industry (11.37%),(iv) Land Use Change and Forestry (20.64%) and (v) Waste (6.64%). Forestry sector has e great potential to GHG emissions by changes in management practices and wood use. The total estimated wood fuel consumption is 2.658.268 m^3 equivalent with 651.4 ktoe or 7,577000 MWh energy (FAO, 2016). This amount of energy might be provided also from other sources like electric energy, natural gas etc and the economic value is estimated around 387 million euro (EUR) with a 3.45% contribution in total GDP of Albania. Wood fuel use for energy purposes, significantly contribute to offsetting GHG emissions, therefore good practices in forest resource management and wood use must be implemented. To mobilize more wood from the forest sources at national level, efficient and effective measures need to be developed and applied. The objective of this study is to highlight the efficient and effective measures developed in Albania, to increase the role of forestry sector to meet energy demand and mitigate GHG.

Keywords: climate change mitigation, wood fuel consumption, contribution, national economy

Iodine deficiency in Alpine goats in some rural areas of Elbasan district

KASTRIOT BELEGU[1]*, NEZIR GJONI, BEJO BIZHGA2, PËLLUMB ZALLA[1], GERALD MUÇA[1]

[1]Department of Morphofunctional Modules Department,Faculty of Veterinary Medicine, Agricultural University, Tirana, Albania

[2]Department of Preclinic Subjects, Faculty of Veterinary Medicine, Agricultural University, Tirana, Albania

*Corresponding author e-mail; kastriot.belegu@ubt.edu.al

The biggest polluter in the entire country has impoverished the earth and negatively impacted the flora, the fauna and the people in the are of the former metallurgical combine in Elbasan

for the period 1987-2018, i.e 40 years. Besides the increase in % of high levels of phenols in the blood, the % of neoplasms has considerably increased both among humans and animals, too. Our observations will focus on the lack of iodine in the alpine goat in the surroundings of the metallurgical combine. An increase in numbers of dead fetuses is observed in the last 4 years due to the lack of iodine. This cases are relevant among calves, piglets, lambs and goats. Autochthonous species have been far more resistent than improved species. The most affected species have been the alpine ones.The percentage of morbidity cases of this race was about 12% in the villages of Katundi i Ri, Bradashesh, Balldren, Vidhas, Paper, Mjekes, Bujqes, Jogodine and Muriqan. The frequency is inversed with the increase in distance from the metallurgical combine.

Keywords: Milk goiter, iodine deficiency, thyroid gland, triiodothyronine, tetraiodothyronine, thyroxine

The effect of "Natuphos" phytase on improving of performance parameters of weaned piglets in albanian farm conditions.

REZANA PENGU[1*], ETLEVA DELIA[2], AGIM KUMARAKU[2]

[1]Faculty of Agriculture, Fan. S. Noli University Korce, Albania

[2]Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania

*Corresponding author e-mail: rezanap@yahoo.com

Today's studies demonstrate the nutritional and ecological importance of using microbial phytase in the feeding of monogastric animals, such as pigs and poultry. The use of phosphorus containing grain cereals, oats and their by-products is relatively low. Only 20-40% of phosphorus is used by the animal organism, the rest 60-80% is in the form of phytic acid**,** which can also be called anti nutritional factor.

The aim of this study was to test the effects of the microbial phytase (NATUPHOS) on the performance parameters of weaned piglets in albanian farm condition.

The microbial phytase preparation (*Aspergillus niger,* NATUPHOS) was supplemented to a basal ration 750 FTU/kg feed and the effects on growth performance of weaned piglets were studied. The supplementation of microbial phytase improved slightly daily weight gain, feed conversion ratio and reduces the amount of inorganic phosphorus needed to maximize growth and bone mineralization and markedly reduces fecal excretion of phosphorus. Overall a positive effect of the microbial phytase on performance parameters was observed.

Keywords: Weaned piglets, microbial phytase, performance parameters, P- reduction

α-thujone induces cytostatic and anti-invasive effects in the populations of malignant glioblastoma multiforme cells *in vitro*

MACIEJ PUDEŁEK, JESSICA CATAPANO, PAWEŁ KOCHANOWSKI, KRZYSZTOF MROWIEC, MIROSŁAW GOFRYD, NATALIA JANIK-OLCHAWA, KAROLINA UZNAŃSKA, JAROSŁAW CZYŻ AND DAMIAN RYSZAWY*

Department of Cell Biology, Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland

*Corresponding author email: damian.ryszawy@uj.edu.pl

Raw materials obtained from *Thuja occidentalis* L. are widely applied in the ethnomedicine and phytotherapy of numerous ailments, incl. scurvy, cystitis, rheumatism and cancer. α-thujone is the main component of *Thuja occidentalis* essential oil, which has been suggested to possess anti-tumor activities. α-thujone easily penetrates the blood-brain barrier (BBB). Therefore, we examined its effects on the malignancy of glioblastoma multiforme cells, with special emphasis on the mechanisms of its effect on cell viability and invasiveness. The effect of α- thujone administered at the concentrations between 10 μg/ml – 500 μg/ml on the morphology, viability and proliferation of T98G and U87 GBM cells were estimated with brightfield microscopy, trypan blue assay and cell counting, respectively. These assays were complemented by the analyses of pro-apoptotic and anti-invasive activity of α-thujone, estimated with flow image cytometry, time-lapse video microscopy and TIRF microscopy. Mechanistic studies on autophagy and oxidative stress induction were performed with western-blot analysis and fluorescence microscopy using CellROX reagent and Premo™ Autophagy sensors. In our experimental model α- thujone exerted the attenuating effect on the viability and proliferation of GBM cells when administered at the concentrations between 100 μg/ml – 500 μg/ml. It was correlated with the induction of apoptosis in GBM cell populations and considerable inhibition of GBM cells motility. Mechanistic analyses demonstrated the induction of oxidative stress in tumor cells and activation of their "suicidal" autophagy. In conclusion, our observations demonstrate that α-thujone exerts pro-apoptotic and anti-invasive effects on GBM cells. They confirm the potential of α-thujone for the treatment of glioblastoma multiforme

This work was financially supported by the Polish National Science Centre (UMO-2015/19/D/NZ3/00273 to D.R.

In silico analysis of osteocalcin gene in Cyprinidae

XHILIOLA BIXHEKU[1], ANILA HODA[2*], VILSON BOZGO[2]

[1]Quality Assurance Agency for Higher Education,

[2]Agricultural University of Tirana,

*Corresponding author email: ahoda@ubt.edu.al;

Cyprinidae family includes a large number of fish species, where the most popular are zebrafish (*Danio rerio*), grass carp (*Ctenopharyngodon idella*) and common carp (*Cyprinus carpio*). In this study, osteocalcin in *Cyprinus carpio* was investigated, regarding physicochemical characteristics, structural properties and phylogenetic relationship using several available bioinformatic tools. Sequences were retrieved from Genbank. Sequence alignment of the gene and protein sequence were done with ClustalW. The information provided here is a theoretical overview that will help to get an idea about the predicted protein structure.

Keywords: osteocalcin, bioinformatic tools, sequence alignment

Estimation of Extractable Potassium in some selected soils in Albania.

JULITA SULA, FATOS HUQI, ILIR KRISTO*,

Agricultural University of Tirana, AgroEnvironmenatl Department, Tirana, Albania

*Corresponding author e-mail: ilirkristo@yahoo.com

Exchangeable and nonexchangeable forms of potassium are important indicators for assessing the potential of soil for the supply plants with potassium. There are carry out several studies to evaluate the exchangeable and nonexchangeable forms of potassium in some Albanian soils with CAL and EUF extraction methods, as well as the relations between them.

The purpose of this study is to evaluate the exchangeable forms of potassium using different extraction methods as Mehlich III, Ammonium Acetate and Water as well as nonexchangeable forms of potassium extracted with 1 N solution of HNO_3.

For this purpose, 9 soil samples were collected in the western regions of Albania. The samples were analyzed for the contents of exchangeable and nonexchangeable forms of potassium according to the respective methods. The results show that the soil contains 467.3 – 1002.7 mg K kg^{-1} soil when extracted with 1 N solution of HNO_3. Amount of potassium extracted with the Mehlich III method was 72.6 – 379.5 mg K kg-1 soil, with Ammonium Acetate was 61.1- 328.9 mg K kg^{-1} soil, and with Water was 7.6 – 83.6 mg K kg^{-1} soil.

A good correlation exists between the quantity of potassium extracted by Ammonium Acetate and Mehlich III, but not with water extraction.

Key words: Potassium, Exchangeable and Nonexchangeable forms, extraction methods,

Potassium fixation capacity in some selected soils in Albania.

JULITA SULA, FATOS HUQI, ILIR KRISTO*

Department of Agro-environment and Ecology, Faculty of Agriculture and Environment, Agriculture University of Tirana, Tirana, Albania

*Corresponding author e-mail: *ilirkristo@yahoo.com*

Although a lot of studies are conducted in Albania, little is known and published about soil potassium status. Most of studies has been to know the level of exchangeable forms of potassium. Up to now, there are no publications about the capacity of soils in Albania for K fixation. The objective of this study is to make a assessment of the capacity of some soils for K fixation

Capacity for K fixation of soils is an important indicator affecting the status of soil K and its availability to crops.

Potassium fixation characteristics were studied in 7 selected soil samples collected in the western regions of Albania.Soils have exchangeable K extracted by 1M NH_4OAc in range from 109 mg K kg^{-1} soil to 238 mg K kg^{-1} soil and nonexchangeable K extracted by 1 N HNO_3 in range from 467 mg K kg^{-1} soil to 830 mg K kg^{-1} soil. To determine K fixation 5 g of each soil sample were weighed into 50-mL plastic bottles and equilibrated for 24 h at room temperature after adding 1000mgKkg^{-1}soil. A known volume of standard K solution was added to each bottle to make the final soil– solution ratio of 1 : 5. Another set of soil samples was similarly treated with distilled water (control set). After equilibration soil samples were analyzed for K in 1MNH_4OAc extract. The K fixation was calculated as follows:

K fixed = added K + NH_4OAc-extractable K of control sample – NH_4OAc-extractable K.

Results shown a K fixation capacity of studies soils in range from 57 mg K kg^{-1} soil to 334 mg K kg^{-1} soil.

Keywords: Potassium, K fixation, Exchangeable and Nonexchangeable forms,

Investigation of green space changes in Tirana-Durres region

ENKELEJD LEKAJ; ZYDI TEQJA*

Department of Horticulture and Landscape architecture; Agricultural University of Tirana, Albania.

*Corresponding author Email: zteqja@ubt.edu.al

Albania is still in a transition period. After 1990 it has gone through very rapid change processes in almost all social-economic aspects of life. An important part of these changes is the rural/urban population structure. In 1989 in urban areas lived just 35.5% of the population while in 2011 it was over 53%. Actually 41.4% of Albanian population lives in Tirana-Durres region (Tirana prefecture 895.160 and Durres prefecture 290.126 people). In this area now the main economic operators are concentrated. The urbanization process in many cases has been illegal and has caused serious damages to public spaces and has disturbed the ecosystem services both in urban and rural areas. Green space is a crucial element of sustainable management and should be a key instrument to guide future management and planning. Green space types of Tirana-Durres region in 2000, 2006, 2012, and 2018 are investigated based on the elevation data and land use/cover for those years. Spatiotemporal changes of different types of green space were evaluated. The results show that between 2000 and 2018 arable land in west lowland area and forests in hilly and mountain areas were the main types of green space both in Tirana and Durres prefectures. The investigation revealed that large areas of cultivated land in suburban areas of the main cities of the region were changed to other types of land cover, mainly artificial surface. The findings of this research could help the process of green space management and planning.

Keywords: Green space, land cover, Tirana-Durres region

Advanced technology of energy use of biomass. The study: the cremation of the distilled waste of sage in Albania.

ADI SHAMKU[1], ANDONAQ LONDO LAMANI[2]

[1]Agricultural University of Tirana;

[2]Polytechnic University of Tirana

Corresponding author e-mail: shamkua@yahoo.it

Biomass waste management systems with low environmental impact, which are able to protect the health and safety of inhabitants, are now gaining global attention. There is currently an increasing interest in new renewable energy generation methods, where its production from biomass is constantly growing. Burning or incineration is a known method for disposal of biomass residues. One of the main objectives of the National Energy Strategy

for 2018-2030 for Albania is to provide incentives for implementing the necessary climate change policies, such as achieving renewable energy (RES) and efficiency energy targets and reduce negative environmental impacts. According to a study by the Ministry of Agriculture in the field of renewable energies and specifically in assessing the potential of biomass in our country, the conclusion is reached that biomass represents a considerable source which has not yet been fully exploited.

In this paper, there is going to be presented the most advanced technology that is used in our days, to burn the waste after the distillation of sage. Like we know, the practice methods for the burning of biomass and waste that are used for electric uses, for example to produce heat and electricity, they are

- Burning in grilling boilers

- Burning in boilers with food from below

- Fluidized bedding technology

This article treats arguments that technology with dusty bedding the most appropriate and is one efficient technology for the cremation of biomass, secondary fuels and coal, as well as for combustion of other combustible waste.

There are two essential factors that give impetus to the application of this technology in the energy industry:

First, the use of this technology is possible to burn with efficient fuel efficiency with low calorific power such as household waste or other combustible waste.

Second, an avand of this is that it gives the possibilty of a low chance of pollution from the cermation, without the need of the expensive machines of cleaning of the gaseous current.

Keywords: Biomass, electrical energy, renewable energy source.

Variability of chamomile (*Matricaria chamomilla* L.) populations as a valuable medicinal plant in Albania evaluatedby morphological traits

NDRIÇIM ZHURI[1*], BELUL GIXHARI[2], ALBAN IBRALIU[1]

[1]Agronomic Science Department, Agricultural University of Tirana, Tirana, Albania

[2]Institute of Plant Genetic Resources, Agricultural University of Tirana, Tirana, Albania

Corresponding author e-mail: cimizhuri@yahoo.com

Study for the evaluation of variability of 30 chamomile (*Matricaria chamomilla* L.) samples, representing 10 chamomile populations collected in nine different natural growing areas of Albania (Berat, Fier, Skrapar, Tirana, Lezha, Lushnja, Korca, Kucova and Kruja), using morphological traits was carried out in the Experimental field of Agricultural University of

Tirana, during two growing seasons. The 10 chamomile populations, grown in a randomized block with three replications, were assessed by seven quantitative morphological characters (plant height, number of principal branches, length of internodes, leaf length, number of cones produced per plant, fresh cones yield and dry cones yield). ANOVA, PCA on correlation and cluster analysis reveal presence of significant diversity, and the association among different morphological characters. Comparisons of means for each pair using Student test ($t = 2.08596$ and $\alpha = 0.05$) show the significant differences between chamomile genotypes at the $P_{0.05}$ and $P_{0.01}$ levels of the probability. Relationships between the morphological characters and chamomile genotypes using Principal Component analysis found the morphological traits: plant height, number of cones produced per plant, leaf length and internode length as the most important for the PC1 that account for 36.46% of the total variance, and internode length, fresh and dry yield of cones for the PC2 that account for 31.24% of the total variance. Cluster analysis (Ward's method) divides the whole chamomile populations into three cluster groups. Correlation relationships among morphological quantitative traits range from 0.27 (internode length and dry yield of cones) to 0.76 (number of cones produced per plant and leaf length). The study identifies number of cones produced per plant, leaf length and internode length as characters with agronomic interest which account for evaluation of genetic diversity and breeding programs of chamomile populations.

Keywords: Chamomile(*Matricaria chamomilla)*, morphological characters, cluster analysis.

Evaluation of genetic diversity of cowslip populations (*Primula veris* L.) in Kosovo, based on some phenotypic traits and indicators.

MUZAFER LUMA[1] NDOC FASLIA[2]

[1]Agricultural Faculty, University of Prishtina, Kosovo.

[2]Department of Plant Sciences and Technologies Agricultural University of Tirana, Albania

Kosovo's territory is very rich in medicinal plants, and one of these plants is cowslip (*Primula veris* L.),which grows in almost all areas of the country. The study is focused in the western and eastern parts of Kosovo, in which are collected 20 cowslip samples, that represent 10 typical populations of this plant, distributed throughout the country. During three years (2016-2018), the populations included in this study, were analyzed for a number of bio-morphological indicators, as well as chemical analysis of the phenol content in flowers and roots are carried out.

For the analyzed populations, the plant phenological stages have been carefully observed, and a number of indicators and features have been measured. These phenotypic features and indicators have to do with: the number of flowering stalks, plant height, the number of leaves per plant, the size of the leaf, the number of flowers per plant, color of the flowers and leaves, the number of seeds, the type of the root system, etc. From the data obtained for each sample, the average parameters for each population are calculated , and then a statistical data

processing is done. Based on the data processing, it is very evident that cowslip populations are characterized by a great diversity, between populations, as well as within the populations themselves. Diversity is present in the plant height, the height of the flowering stalks, the number of flowers per plants, the time of flowering and fructification etc. Some of these populations, such as those collected in Leqenat (P1M1) and Gollak (P8M1), have a great interest to be cultivated by the farmers, in the territory of Kosovo.

Keywords: plant diversity, plant population; phenotypic traits; chemical analysis

Participatory approach for a better management of Protected areas: the case of Llogara National Park

ANILA BOSHNJAKU*, LEDIA THOMA

Faculty of Economy and Agribisiness, Agricultural University of Tirana

*Corresponding author e-mail: aboshnjaku@ubt.edu.al

Despite the engagement and involvement of Albania in international conventions related to sustainable development and environmental protection that promote the concept of participatory planning and management of protected areas , it turns out that interest groups and local communities in the Llogara National Park are not adequate lyand qualitatively involved in decision-making processes, and even have insufficient information. The formalized dialogue between the managers of the Protected Area and local communities is not at the required level. It is therefore necessary to increase the awareness of communities on their role in decision-making and management processes and their representation in forums that have to set a dialogue platform with park managers

In this paper we : i) analyze the current situation regarding stakeholder participation in decision-making processes; ii) identify the problems faced regarding stakeholder participation in the Park Management; iii) propose actions to involve actors to take part in the consultative dialogue for promoting their role for a more qualitative management of the Park.

The analyses is based on a combination of data gathered from the review of recent documentation and publications, meetings as well as data from interviews conducted with representatives of different interest groups. The questionnaire prepared for this purpose enabled the realization of about 30 interviews. The responses and discussions that led to semi-structured interviews were used for the assessment and analysis of interest groups and at a later stage for Power Influence Mapping Matrix

Interviews were conducted with representatives of local government, local environmental protection institutions, local business community, educational institutions, youth groups and representatives of women's associations, as well as representatives of civil society. The interviews were based on questionnaires who sought to highlight aspects of the power and influence of interest groups. Interest Group Analysis presents which groups are involved as

influential or influenced by decision-making in the protected area. It shows the link and cooperation between the regional, national actors, their interest, their influence and their strength in Llogara National Park.

The main findings of the analysis are the followings : local actors are not sufficiently involved in Park management processes, park values are not sufficiently recognized by the actors, public institutions have not followed all the necessary legal and institutional steps to incorporate of actors in Park management, local actors are ready and willing to create forums to influence the park management

Based on the results obtained, the paper provides recommendations on how further involvement of stakeholders in the Park management processes can be promoted, t how to properly enforce the implementation of legal and regulatory framework related to transparency and participatory principles related to decision making that impact the Park management

The effects of in vitro culture on the leaf structure of rootstock CAB 6P (Prunus cerasus)

AVDIRRAHMAN GASHI[1]*, KRISTAQ SINI[2], EDLIRA KUKALI[1]

[1]Faculty of Agricultural & Environment, Agricultural University of Tirana

[2]Faculty of Biotechnology, Agricultural University of Tirana

*Corresponding author E-mail: avdi-gashi773@hotmail.com

Stomatal apparatus are epidermal characters that are very important in characterizing the plant species and represent a large variability between in vivo plants growths, in vitro acclimatized.

In our study during 2018 year, epidermal characters are compared (stomata) of the in vivo P. Mahaleb (*Prunus cerasus L*) and acclimatized to CAB 6P (*Prunus cerasus L*) in vitro.

Epidermal characters which were observed were: distribution and stomatal type, stomatal number (stomatal density) for the whole microscopic field / for leaf surface units in the plantlets of two variants prunus cerasus rootstock CAB 6P studied during the acclimatization of in vitro cultivation and P. Mahaleb in vivo, the leaves are hystomatic with anomocytic stomatal apparatus.

Both variants of in vivo and in vitro cultivation, it turns out that stomata of the down epidermis have elliptical guard cells. Stomatal density is higher in "in vivo" plantlets compared to those of "in vitro" acclimated, due to high air humidity and increased intensity of lighting.

The values of the search indicators are presented with a variable for the respective variants in two rootstocks P. Mahaleb (in vivo) and CAB 6 P (in vitro), respectively: the number of

accompanying cells was 5-7 to 5; stomatal length 18.2 to 16.7; stomatal width (μm) 11.3 with 10.4 and average stomatal density (mm2) 39 with 36.

Key word: *in vivo, in vitro, stomata, acclimatization, Prunus cerasus L*

Index