



Sociedad de Biología de Córdoba

Abstracts from the

XXI Annual Scientific Meeting

August 2017

LA FALDA - CÓRDOBA- ARGENTINA

Abstracts were revised by the Scientific Committee of the Sociedad de Biología de Córdoba

Members of the SBC board 2016-2017

PRESIDENTE	Dra. Noemí Gardenal. IDEA-CONICET-UNC
VICEPRESIDENTE	Dra. Graciela Panzetta-Dutari. CIBICI-CONICET-UNC. FCQ-UNC
SECRETARIA	Dra. Beatriz García. INICSA-CONICET-UNC. FCM-UNC
SECRETARIO DE ACTAS	Dr. Alejandro Guidobaldi. IIBYT-CONICET-UNC. FCEFyN-UNC
TESORERA	Dra. Cecilia Conde. INIMEC-CONICET-UNC
PRO-TESORERA	Dra. Graciela Racagni. FCEFQyN-UNRC
VOCALES TITULARES	Dra Margarita Chiaraviglio. IDEA-CONICET-UNC. FCEFyN-UNC Dra. Susana Genti-Raimondi. CIBICI-CONICET-UNC. FCQ-UNC Dra. Nora Bensi. FCEFQyN-UNRC Dra. Paola Boeris. FCEFQyN-UNRC
VOCALES SUPLENTE	Dra. Claudia Rodríguez. FCEFyN-UNC Dra. Marta Dardanelli. FCEFQyN-UNRC
COMISIÓN REVISORA DE CUENTAS	
TITULARES	Dra. Lilian Canavoso. CIBICI-CONICET-UNC. FCQ-UNC Dr. Luis Conci. CIAP - INTA
SUPLENTE	Dra. María G. Álvarez. FCEFQyN-UNRC

Organizing and Scientific Committee

Dra. Noemí Gardenal
Dra. Graciela Panzetta-Dutari
Dra. Beatriz García
Dr. Alejandro Guidobaldi
Dra. Cecilia Conde
Dra Margarita Chiaraviglio
Dra. Susana Genti-Raimondi
Dra. Marta Dardanelli
Dra. Lilian Canavoso
Dr. Luis Conci

LECTURES

A1

LINKING ECOSYSTEM COMPONENTS TO HUMAN WELLBEING FOR SUSTAINABLE DEVELOPMENT

Perez Harguindeguy N

Instituto Multidisciplinario de Biología Vegetal (IMBIV- CONICET- UNC), Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Córdoba. Argentina. E-mail: natalia.perez.h@unc.edu.ar

Each time it is more frequent that biologists face the challenge of linking our disciplinary work in forums that are not disciplinary but are inter- or even trans-disciplinary. This is particularly relevant in the coordination of solutions, proposed by science in interaction with society, to the problems posed by global change. It is required to strengthen our capacity of interaction, in particular with other disciplines, but also to sectors of society different from science and technology to take part in those forums. In this interaction and integration, the concept of ecosystem services (e.g. the value that different ecosystem properties and products have for different social actors) can constitute a fundamental tool to help linking several disciplinary areas. The concept of ecosystem services can be also a useful tool in the co-construction, with other social actors, of more holistic conceptual frameworks. Finally, this concept can also be a key component on the development of programs that put development in the way of sustainability in its broader meaning. Vegetation sciences are one example of the transformation of conceptual frameworks and, in the context of global change, functional ecology had a relevant role on that transformation. The construction of more diverse scientific (and not only scientific) communities is still a challenge. To confront this challenge, we need to develop strategies to improve the impact of the new communities in the transformations required to achieve a more sustainable and equitable development.

A2

MYOREGULATORY NEUROPEPTIDES AS ANCESTRAL COMMUNICATION SYSTEMS: FROM THE HYDRA TO INSECTS AND THE VERTEBRATES

Alzugaray ME, Villalobos-Sambucaro MJ, Ronderos JR

Cátedra de Histología y Embriología Animal Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata (FCNyM-UNLP). La Plata. Argentina. E-mail: jrondero@fcnym.unlp.edu.ar

Cell-cell interaction is a fundamental process in nature, allowing tissues and organ integration in Metazoa. Neuropeptides and their receptors are widely distributed in nature, being their presence predicted even in the genome of the ancestral species *Trichoplax adhaerens*. Allatotropin (AT) and Allatostatin-C (AST-C) originally characterized in insects based on their function as Juvenile Hormone synthesis regulators, are pleiotropic, and secreted not only by the nervous system but also by epithelial cells. We have shown that both peptides act as myo and cardioregulators during post-prandial diuresis in Chagas disease vectors, regulating the frequency of contractions of the dorsal vessel and the peristaltic waves of the crop modulating the circulation of haemolymph to facilitate diuresis. Whilst AT acts synergizing the action of serotonin to increase the frequency, AST-C acts as an antagonist, preventing the increment of cytosolic calcium, counteracting the effect of AT. AT and AST-C receptors are homologues of the orexin (Ox) and somatostatin (SST) families in vertebrates. Both kind of receptors are G protein-coupled receptors, characterized by the presence of seven transmembrane domains and the E/DR motif in the second intracellular loop. Particularly, AT/Ox GPCRs are characterized by the DRWY motif. Looking for the evolutionary origin of these systems, we have found that the expression of both families of receptors is predicted by the genome of members of the phylum Cnidaria. Using peptides conjugated with QDots we showed the existence of different cell populations in *Hydra sp.* that specifically recognize AT and AST-C suggesting a physiological role. In fact, while AST-C induces changes in the gastrovascular cavity, generating peristaltic waves, AT induces the extrusion of the hypostome, mimicking the behavior in the presence of food. Treatment with AST-C prevented the activity of the hypostome induced by AT, suggesting as in insects, an antagonistic effect. The use of calcium modulators, showed that the activity of the peptides depends on the cytosolic levels of this ion. Finally, our studies suggest that allatoregulatory peptides arose early in evolution acting as myoregulators during feeding.

A3

S-ACYLATION: INFLUENCE ON INTRACELLULAR DYNAMIC AND FUNCTION OF PROTEINS

Daniotti JL

Centro de Investigaciones en Química Biológica de Córdoba (CIQUIBIC-CONICET-UNC). Dpto. de Química Biológica, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, Argentina. E-mail: daniotti@fcq.unc.edu.ar

A wide variety of peripheral proteins are modified by the covalent attachment to fatty acids and/or prenyl groups, which confers them the ability to interact reversibly with cell membranes. In addition, diverse types of acyl groups provide specific molecular information that has a notable influence on the spatial organization and biological function of the modified proteins. S-acylation, unlike other lipid protein modifications, such as N-myristoylation and prenylation, is the only one that is reversible and is characterized by the fatty acid binding to cysteine residues through a thioester bond. Despite the progress that has been made in identifying and characterizing the acyltransferases involved in S-acylation of proteins, little is known about the thioesterase enzymes involved in reverse process, deacylation. The recent identification in our laboratory of the thioesterase II enzyme allowed a better understanding of the acylation/deacylation process and its role in the spatial distribution of peripheral proteins. Our most recent research is focused on the study of the consequences of S-acylation on the intracellular distribution and signal transduction of members of the Ras GTPase family of proteins. The findings illustrate how lipid modification of these proteins plays a significant role in dictating precise intracellular movements within the cells by regulating membrane-cytosol exchanges and/or by modifying the flux of the proteins through vesicular transport systems.

A4

CLIMATE CHANGE IMPACT ON THE WHITE CONTINENT, THE IDEAL CONTEXT FOR INTERNATIONAL COOPERATION

Torre L

*Instituto de Diversidad y Ecología Animal (IDEA-CONICET-UNC). Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. Córdoba- Argentina. Alfred Wegener Institute, Bremerhaven, Alemania. IMECC-UNICAMP Campinas, Brasil.
E-mail: torreluciana@gmail.com*

Approximately 20 years of studies in the marine ecosystem of Potter Cove (South Shetland Islands - Antarctica) showed hydrographic changes related to increasing atmospheric temperatures in the region. As a major consequence of glacier retreat, there has been an increase in sediment discharge from melting streams during summer months. During the same period, there were important changes in the distribution pattern of benthic species. Major species of solitary ascidians that dominated the bottom of the cove were the most affected. This group, which are generally filter-feeder organisms, can be affected by the increase of particulate suspended matter (PSM), either by a dilution of food to be filtered or in extreme cases by the blocking of its filter-respiratory structures. In this context, our aim was to evaluate the possible response of a coastal polar ecosystem to the global temperature increase and its consequences. In the first place, the effect of increasing concentration of PSM on the different species was studied experimentally in collaboration with researchers of the Alfred Wegener Institute (Germany). The results show that the degree of sensitivity of each species was coincident with the degree to which each population has declined in recent years. Subsequently, in collaboration with researchers from the Campina's University (Brazil), a spatial simulation model was developed to study the impact of sedimentation on Antarctic benthic systems at an interspecific level. The simulations showed for the first time that sedimentation is a possible structuring factor of Antarctic benthic communities and also indicated that an increase in the sedimentation rate would produce changes in the distribution patterns of each species, quite similar to those observed in recent years.

A5

A SINGLE NUCLEOTIDE POLYMORPHISM IN THE DEVELOPMENT OF NEUROPSYCHIATRIC DISORDERS

Anastasia A

*Instituto de Investigación Médica Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC). Córdoba. Argentina.
E-mail: aanastasia@immf.uncor.edu*

A single nucleotide polymorphism (SNP) in the BDNF (brain-derived neurotrophic factor) gene induces the substitution of a valine for a methionine (Val66Met) in 25% of the world population. This SNP is associated with certain cognitive deficits and with psychiatric and neurodegenerative diseases. The Val66Met substitution occurs in the BDNF prodomain sequence. We found, for the first time, that the BDNF prodomain is present in high levels in the adult brain, is secreted by neurons in a regulated manner, and is enriched in the cerebrospinal fluid. Using nuclear magnetic resonance, we found that the substitution Val66Met induces significant structural changes in the prodomain that are reflected in functional differences. Surprisingly, the administration of the Met prodomain induces alterations in the neuronal cytoarchitecture. Moreover, the stereotactic injection of the Met prodomain into the hippocampus of mice causes the loss of certain connections that leads to behavioral alterations. These results suggest that the BDNF prodomain is a novel ligand that modulates neuronal morphology in vitro and in vivo, and propose a role for this protein in the etiology of neuropsychiatric and neurodegenerative diseases associated with the polymorphism.

SYMPOSIA

A6

VITELLOGENESIS AND FOLLICULAR ATRESIA: THEIR IMPACT IN THE REPRODUCTIVE PHYSIOLOGY OF THE CHAGAS' DISEASE VECTORS

Leyria J

Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET-UNC). Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Córdoba, Argentina. E-mail: jleyria@fcq.unc.edu.ar

In triatomines, adult females need the ingestion of a blood meal to trigger vitellogenesis, allowing the growth of oocytes due to the uptake and storage of yolk proteins precursors (YPP), lipids and other molecules. However, if the blood intake is insufficient to promote the vitellogenic process, the ovarian tissue undergoes remarkable histo-morphological changes and some follicles degenerate to an atretic stage. During this process, oocytes undergo resorption (oosorption) instead of being laid as eggs. From a physiological point of view, an adequate compromise between the factors that regulate vitellogenesis and follicular atresia allows a successful ovogenesis. In this work, we have analyzed the biochemical, cellular and molecular events that characterize vitellogenesis and follicular atresia in vectors of Chagas' disease (Hemiptera: Reduviidae), using the female *Dipetalogaster maxima* as a model. We determined that the oocytes recruit lipids by different pathways according to the stage of the reproductive cycle. On the other hand, we reported that an aspartic peptidase, cathepsin D (DmCatD), is synthesized by the fat body and the ovary as YPP. In addition, we presented for the first time evidences that support the function of lipophorin, the main insect lipoprotein, as a carrier for DmCatD. This novel pathway would facilitate the internalization of DmCatD by the oocytes. Altogether, our results allow a better understanding of the reproductive biology of Chagas' disease vectors, which in turn is necessary in the search of new tools for insect vector control.

A7

HANTAVIRUS DIVERSIFICATION IN SOUTH AMERICA: THE ROLE OF RESERVOIR RODENTS

Rivera PC, González-Ittig RE, Gardenal CN

Instituto de Diversidad y Ecología Animal (IDEA, CONICET-UNC). Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. (FCEFYN-UNC). Córdoba - Argentina. E-mail: paularivera1@gmail.com

In recent years, the notion of co-speciation between *Hantavirus* species and their hosts was discarded, since it was demonstrated that both groups have different mutation rates. Then, the hypothesis of preferential host switching emerge, that is, the transmission of the pathogen to a new host closely related to the original one, followed by pathogen speciation. We evaluated the role of this process in the diversification of *Hantavirus* in South America. This region presents the highest *Hantavirus* diversity in the world, with more than 20 genotypes detected. Several of them act as aetiological agents of the hantavirus pulmonary syndrome (HPS). Given that hantaviruses are transmitted directly between hosts, the switching of a virus onto a novel host with different ecological requirements and geographical distribution could lead to the emergence of new outbreaks. In this context, the understanding of the diversity of hantaviruses and of the processes underlying host switching is critical to analyse rodent-virus relationships. We performed a co-phylogenetic analysis of the viruses using cDNA sequences of the N protein gene obtained by reverse PCR (RT-PCR) and of their primary hosts, using sequences of the cytochrome *b* gene. The result of the phylogenetic reconciliation analysis shows discordances in most comparisons between *Hantavirus* and host phylogenies, indicating that preferential host switching would not be the main process driving virus diversification. The phylogenetic reconstruction shows that the basal lineages in the South American hantavirus group are found in the north of the region. A north-south expansion is proposed, following a similar colonization pattern to that postulated for South American rodents (subfamily Sigmodontinae), which have experienced a sudden and explosive diversification since the arrival of their ancestors from North America, about six million years ago. The availability of new niches (new rodent species) could have favoured the diversification of the genus *Hantavirus* in the region, explaining the pattern observed. The historical geographic proximity among rodent hosts emerges as an alternative hypothesis to be tested.

A8

ADVANCES IN THE ECOLOGY OF FLAVIVIRUSES ST. LOUIS ENCEPHALITIS AND WEST NILE IN ARGENTINA

Diaz LA

Laboratorio de Arbovirus - Instituto de Virología "Dr. J. M. Vanella" - Facultad de Ciencias Médicas - Universidad Nacional de Córdoba. Instituto de Investigaciones Biológicas y Tecnológicas (IIByT-CONICET-UNC). Córdoba, Argentina. E-mail: adrian.diaz@conicet.gov.ar

Several anthropogenic factors have promoted the emergence and re-emergence of many arthropod borne viruses (i.e. Dengue, Chikungunya, St. Louis encephalitis, Zika, West Nile). Ecological studies aimed to characterize their maintenance and amplification cycles give us basic and essential information needed to understand the viral behaviour. Since 2002, St. Louis encephalitis virus emerged as a human pathogen in the central area of Argentina, causing encephalitis outbreak in Córdoba, Buenos Aires, San Juan and Pergamino. By 2006 the West Nile virus, a new neurologic arbovirus, was documented for the first time in our country. Our laboratory has been carrying out ecological studies that allowed to identify the urban mosquito *Culex quinquefasciatus* as a vector, and the Eared Dove (*Zenaida auriculata*) as the main urban host of St. Louis encephalitis virus. Preliminary host competence assays indicate that the Picui Ground-Dove (*Columbina picui*) could act as a host for West Nile virus. Moreover, we are evaluating the amplification capacity of ecosystems (urban systems, bushes, thorned-shrublands, agroecosystems) that belong to the central region of Argentina. This information will be useful to understand how these viruses are emerging in our country and how their epidemiological pattern can be modified by environmental changes.

A9

STAR D7: BEYOND THE ROLE OF LIPID TRANSFER PROTEIN

Flores Martin J

Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET-UNC), Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, Argentina. E-mail: jflores@fcq.unc.edu.ar

Alterations in the quantity, quality and distribution of intracellular lipids lead to different pathologies such as cardiovascular and neural diseases, metabolic defects, and cancer, among others. The StarD7 protein, identified in our laboratory, belongs to the START domain superfamily of proteins, which participate in transport, metabolism and intracellular lipid signaling. This study was performed to address on the effect of StarD7 siRNA in different epithelial cell lines. StarD7 knockdown in trophoblast cells produced a reduction in ABCG2 lipid/xenobiotic carrier protein and phospholipid synthesis, as well as in cell proliferation and migration. In contrast, morphological and biochemical differentiation markers were increased. In addition, StarD7 silencing in HepG2 cells produced alterations in endoplasmic reticulum (ER) and mitochondria morphology. Furthermore, ER stress, increased reactive oxygen species and antioxidant enzymes was observed. Also, a degradation of p53 protein through the proteasome was detected. These results suggest that beyond its role in lipid transport, StarD7 contributes to modulate cellular redox homeostasis.

A10

ERYTHROCYTE TUBULIN: STRUCTURE, FUNCTION AND IMPACT IN METABOLIC DISEASES

Santander VS, Amaiden MR, Nigra A, Monesterolo NE, Campetelli AN, Rivelli JF, Casale CH

Dpto. Biología Molecular. Facultad Ciencias Exactas, Físico-Químicas y Naturales, Universidad Nacional de Río Cuarto (FCEFQUN-UNRC). Córdoba, Argentina. E-mail: vsantander@exa.unrc.edu.ar

During many years erythrocytes were considered as cellular fragments unable to respond to stimuli. However, it is now known that they are extremely sensitive to their environment and that their anomalies are the cause of numerous diseases. In this sense, our work group demonstrated for the first time the presence of tubulin in mammalian erythrocytes. In addition, it was demonstrated that during the process of erythropoiesis there is a remodeling of the tubulin skeleton of the erythropoietic precursors and finally after the enucleation process, a significant amount of tubulin remains in the formed reticulocyte. After reticulocyte maturation to erythrocyte, tubulin is distributed into three fractions: cytosol, a membrane-associated tubulin fraction able to interact with different enzymes, and a fraction called "tubulin sedimentary fraction" with biochemical characteristics similar to microtubules. Distribution of tubulin in these fractions is dynamic and may be affected by different stimuli. We demonstrated that tubulin distribution is altered in pathologies such as hypertension and diabetes. Our results indicate that tubulin balance in the different fractions, as well as the adequate proportion of each of its isospecies, is essential for the normal functioning of the cell. Alteration of some of these parameters leads to changes in biochemical and hemorheological properties of erythrocytes such as deformability and resistance to osmotic stress, important parameters involved in arterial hypertension development.

A11

ALLERGIC RESPONSE MODULATION BY INNATE IMMUNITY BY ACTIVATION OF EPITHELIAL INNATE IMMUNITY IN AIRWAYS

Maldonado CA

Centro de Microscopía Electrónica. Instituto de Investigaciones en Ciencia de la Salud. (INICSA-CONICET-UNC). Facultad de Ciencias Médicas, Universidad Nacional de Córdoba, Córdoba, Argentina. E-mail: cmaldon@cmefcm.uncor.edu

Airways epithelium expresses defensive molecules of the innate immunity (I.I.), and anti-inflammatory molecules that maintain lung homeostasis. In Balb/c mice we demonstrated that Clara cells (CC), which are clue cells for bronchiolar epithelium defense, express Toll like receptor 4 for Gram negative bacteria, and respond to stimulus with lipopolysaccharide (LPS) by producing proinflammatory cytokines (TNF α , IL6) and anti-inflammatory molecules as CCSP and SP-D, which are able to prevent and modulate allergic inflammation. However, under allergic microenvironment, CC suffers mucous transdifferentiation, diminution of defensive molecules, as well as an increase of TSLP (an epithelial cytokine pro-Th2) and Th2 cytokines. When innate immunity was activated by LPS previous to asthma induction, mucous metaplasia and anti-allergic factors (CCSP and SP-D) decrease was lower; furthermore, TSLP expression diminished in CC and, in correlation, the Th1/Th2 balance local microenvironment increased. IgE level and hyperreactivity of airways also diminished. When LPS pre-exposition was performed in neonates, allergic inflammation was still lower than in adults, resulting in a more intense CC defensive phenotype. In this key life time for the establishment of immunity, bacterial stimulus prevented pro-Th2 TSLP cytokine increment. Results indicate that the activation of allergic mechanisms can be avoided triggering CC innate immune response that privileges defensive mechanisms against pathogen over the potential to activate allergic inflammation.

A12

ACTIVATION OF THE IMMUNE RESPONSE IN THE MODEL INSECT *RHODNIUS PROLIXUS* (HEMIPTERA: REDUVIIDAE) INDUCED BY PLANT UREASE-DERIVED PEPTIDES

Fruttero LL

Instituto do Cérebro-INSKER, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brasil.

E-mail: leonardofruttero@gmail.com

The development of resistance to insecticides and the need to use more rational and environment-friendly strategies have driven the research for new compounds of natural origin with entomotoxic properties. In this context, it has been reported that Jaburetox (Jbtx), a recombinant peptide generated from a urease of the leguminous *Canavalia ensiformis*, is toxic and lethal for insect species of several orders; the mechanism of action is little understood, thus limiting its biotechnological application. In this work, we studied the effect of Jbtx on the immune response of *Rhodnius prolixus*, an insect vector of Chagas' disease widely used as a model for physiological, genetic and biochemical research. The findings demonstrated that Jbtx triggers a humoral and cellular immune response, inducing hemocyte aggregation, apoptosis and increasing the activity of phenoloxidase, a key enzyme in melanization and defense processes. Jbtx also affected the nitric oxide synthase pathway, involved in immunity and signaling, modulating the mRNA and protein expression of the enzyme as well as its enzymatic activity and the production of nitric oxide. Finally, the Jbtx-induced activation of the immune response did not protect the insects against subsequent infections by entomopathogenic bacteria, suggesting an immunosuppressive effect caused by the peptide.

A13

TMV SYSTEMIC MOVEMENT REQUIRES NEGATIVE MODULATION OF THE IMMUNE SYSTEM

Venturuzzi A, Conti G, Zavallo D, Asurmendi S

Instituto de Biotecnología. Centro de Investigación en Ciencias Veterinarias y Agronómicas (CICVyA INTA-CONICET). Hurlingham, Buenos Aires, Argentina. E-mail: asurmendi.sebastian@inta.gov.ar

An important aspect of plant-virus interaction, which remains insufficiently understood, is the way viruses dynamically modulate host immunity to achieve a successful infection. The plants have developed different mechanisms of immunity against the attack of pathogens. A well-characterized mechanism involves salicylic acid (SA), a hormone that has the ability to induce nuclear translocation of NPR1 (NON-EXPRESSOR OF PR GENES 1) and stimulate the transcription of a genes network involved in the immune response. Some pathogens have co-evolved developing strategies that allow them to silence the natural defense systems of plants. In Tobamoviruses, emerging evidences suggest that viral encoded proteins display a great variety of functions beyond the canonical roles required for virus structure and replication. Among them, the modulation of host immunity is arising as a relevant aspect required for the infection progression. We have shown that the Tobacco Mosaic Virus (TMV) capsid protein (CP) negatively modulates the SA-mediated defense pathway. We determined the role of DELLAs proteins in the modulation of signaling events during TMV infection. We demonstrated that during TMV infection, CP stabilizes DELLAs proteins and this stabilization results in the modulation of defense signaling pathway resulting in turn in a de-regulation of the gene network induced by SA-mediated immunity. Lastly and most importantly, we have demonstrated that this function of TMV CP, negative modulation of the plant immune system, is required for the systemic movement of the virus; therefore, it is very important for the success of the infection.

A14

ECOTOXICOLOGICAL EVALUATION OF NATURAL AND XENOBIOTIC POLLUTANTS IN FRESHWATERS

Bertrand L, Monferrán MV, Marino DJ, Valdés ME, Amé MV

Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET-UNC), Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Córdoba-Argentina. E-mail: vame@fcq.unc.edu.ar

Aquatic organisms may be exposed to multiple environmental pollutants. Consequently, they can be used as bioindicators of water quality. The aim of this study was to evaluate the capability of two native species, the freshwater shrimp *Palaemonetes argentines* and the aquatic macrophyte *Potamogeton pusillus* to be used as bioindicators. Seven sites were selected along the Citalamochita River (Córdoba) considering different land use along the basin. Water and sediment samples were taken to measure of physico-chemical parameters, metals (water and sediments), pesticides (water) and pharmaceuticals (water). Individuals of the two species were exposed in cages for 96 h and maintained at -80 °C until measurement of exposure, response, and damage biomarkers (Bm). A spatial variation of the pollutants was observed in the water along the river. An integrated biomarker response index (IBR) was calculated with the Bm measured in both organisms. The shrimps showed the highest IBRs downstream of Río Tercero in association with higher concentrations of metals and pesticides, while the macrophytes presented the highest IBRs before and after Villa María, responding to pharmaceuticals and metals in water. A generalized procrustes analysis indicated 86% consensus between the biotic and abiotic matrix, demonstrating the usefulness of both species as bioindicators of water pollution.

A15

EFFECT OF GLYPHOSATE ON CULTURABLE SOIL MYCOBIOTA

Magnoli CE

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Facultad de Ciencias Exactas Físico Químicas y Naturales, Universidad Nacional de Río Cuarto. (FCEFQN-UNRC). Córdoba-Argentina. E-mail: cmagnoli@exa.unrc.edu.ar

Currently, agriculture became in a profitable business due to the use of new technologies. In the province of Córdoba large extensions are destined to cereal production, where pesticides formulated with glyphosate (N-phosphonomethylglycine) (GP) are applied for weed control. Significant amounts of GP (among other pesticides) are applied annually. However, it is widely believed that only a small fraction of these products effectively reaches the target organisms, and that the surpluses are being introduced inadvertently into the soil, contaminating non-target organisms while moving into the atmosphere and the water. The widespread incorporation of herbicides into soils every year has a significant impact on their quality, and on both decomposition and nutrient cycling. This fact has generated great concern for the potential threat that herbicides represent for environment, animal and human health. Despite the extensive use, methodologies to reduce environmental levels of herbicides have not been developed yet. Microbial metabolism is probably one of the most important processes involved in pesticides degradation in soil, reducing the impact of pollutants on natural ecosystems. GP degradation in the soil environment is a co-metabolic process and the decomposition rate would depend on the general activity of microbial populations, soil type and environmental conditions. Filamentous fungi constitute a powerful biotechnological tool in soil bioremediation due to the ability to colonize various substrates and oxidize organic compounds under adverse environmental conditions. In agricultural soils of Córdoba province, exposed for more than 10 years to pesticides, GP tolerant soil fungal species were isolated. The prevalent genus was *Aspergillus* (sections *Flavi* and *Nigri*). *In vitro* studies showed that non-toxicogenic strains present good growth parameters in the presence of GP under different water potentials conditions. They also developed in media with GP as the only carbon, nitrogen or phosphorus source. In fact, in GP supplemented media as phosphorus source, these strains were able to degrade more than 50% of GP under optimal environmental conditions. Determination of permanence in the environment of a potential bioremediation agent is one of the main characteristic that must be evaluated. Microcosm's assays showed that *Aspergillusoryzae* AM1 strain isolated from agricultural soils is tolerant to the GP concentrations tested at 70 and 30 water holding capacity. In addition, this strain remained viable and its count was not affected by the presence of the native mycobiota. These facts suggest that *A. oryzae* AM1 has the capacity to efficiently compete in this ecological niche. The survival trials of these strains in GP microcosms indicate their potential capacity to degrade the herbicide in soil.

A16

IMPACT OF CHLORPYRIFOS ON HUMAN PLACENTA

Ridano ME

Departamento de Bioquímica Clínica, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET-UNC). Córdoba-Argentina. E-mail: mridano@fcq.unc.edu.ar

The placental barrier regulates maternal-fetal exchange, protecting the baby from possible damage caused by toxins. Organophosphate (OP) pesticides are used in intensive agriculture for pest protection. Although many studies have reported an increased risk of pregnancy alterations in OP-exposed women, few have analyzed the effects on the placenta. In addition, population studies need to be complemented by *in vitro* studies to individualize the effects of a toxin on the cells and structure of the human placenta. Herein, we evaluated the effects of chlorpyrifos (CPF), one of the most widely used OP insecticides, on human placenta using *in vitro* and *ex vivo* exposure models. Cell lines and cultures of villous trophoblast cells isolated from normal human term placentas maintained their viability, migratory capacity, and differentiated into syncytiotrophoblast-like structures in the presence of CPF at concentrations of 10 to 100 μ M. However, exposure to CPF modified the expression of β -hCG, ABCG2, and P-gp. In addition, it caused marked changes in chorionic villi samples. Indeed, CPF exposure increased stroma cell apoptosis, altered villi matrix composition, basement membrane thickness, and trophoblastic layer integrity. Histomorphological and ultrastructural alterations were similar to those found in placentas of pathological pregnancies or exposed to other contaminants. Our study shows that *in vitro* treatments of trophoblast cells with CPF alter the expression of genes important for placental function. Moreover, *ex vivo* exposure produces tissue alterations and suggests that the human placenta is a potential target of CPF toxicity. In addition, it highlights the importance of using different models to evaluate the effect of a contaminant or toxic on the human placenta.

ORAL PRESENTATIONS

A17

TOXIC EFFECTS OF THE UREASE-DERIVED PEPTIDE JABURETOX IN THE HEMOCYTES OF *RHODNIUS PROLIXUS* (HEMIPTERA: REDUVIIDAE)

Moyetta NR^a, Broll V^b, Perin APA^b, Uberti AF^a, Coste Grahl MV^a, Staniscuaski F^b, Carlini CR^{a,b}, Fruttero LL^a

^aPontificia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brasil, ^bUniversidade Federal do Rio Grande do Sul, Porto Alegre, Brasil. E-mail: nmoyetta@fcq.unc.edu.ar

Jaburetox (JBTX) is a recombinant peptide derived from a *Canavalia ensiformis* urease that presents toxic effects upon several species of insects, fungi and yeasts. Although the toxicity of this compound has been reported more than 20 years ago, its mechanism of action is not fully understood. In the present work, we characterized the effects of JBTX in hemolymphatic cells of the insect model and Chagas' disease vector, *Rhodnius prolixus*. *In vivo* and *in vitro* experiments indicated that JBTX interacts with a subset of hemocytes and that it can be found in various subcellular compartments. The injection with the peptide increased the gene expression of the mRNA of the enzymes UDP-N-acetylglucosamine pyrophosphorylase (UAP) and chitin synthase. Nevertheless, the treatment did not modify the enzymatic activities of UAP and acid phosphatase (a possible UAP regulator). In addition, it did not induce changes in the phosphorylation state of proteins. Finally, JBTX activated the hemocytes without increasing their phagocytic behavior. Taken together, these findings contribute to our understanding of the toxic effects of JBTX, a peptide with biotechnological applications and a prospective tool for rational insect control.

A18

DESIGN AND CHARACTERIZATION OF A BACTERIAL BIOFILTER FOR THE REMOVAL OF ALUMINIUM

Boeris PS, Meringer A, Lucchesi GI

Dpto Biología Molecular, Facultad de Ciencias Exactas, Físico-Químicas y Naturales, UNRC. Río Cuarto. Córdoba.

E-mail: pboeris@exa.unrc.edu.ar

Aluminium (Al^{3+}) is a pollutant of soils and water and the biosorption process is a potential alternative for its removal. Non-living biomass of *Pseudomonas putida* immobilized in agar-agar beads is efficient at adsorbing Al^{3+} at pH 4.3. In this study, a biofilter was designed (25 cm length and 2 cm inner diameter) with 60 gr of agar-agar bead containing non-living biomass of *P. putida* and the removal efficiency (RE) of 180 mg Al^{3+} /l from aqueous solutions was analyzed. The dynamic behavior of the biofilter was examined by the breakthrough curves ($[Al^{3+} \text{ effluent}]/[Al^{3+} \text{ influent}]$ vs time), from which the breakthrough time (T_r) and exhausting time (T_s) are obtained. T_r is defined as the time at which the $[Al^{3+} \text{ effluent}]$ reached 5% of the $[Al^{3+} \text{ influent}]$. T_s is the time at which the $[Al^{3+} \text{ effluent}]$ reached 95% of the $[Al^{3+} \text{ influent}]$. When the flow rate was 0.5 and 1 ml/min, the T_r were 60 and 35 min, and the T_s were 155 and 130 min respectively. The RE decreased 30% at flow rate of 1 ml/min, indicating an inadequate residence time for Al^{3+} ions to capture the available binding sites around the biosorbent. The total elution of the adsorbed aluminum was achieved with HCl 0.01 N at a flow rate of 0.5 ml/min. The biofilter was able to operate with a stable RE, at least, until 12 cycles of adsorption/desorption. When the biofilter was used to remove 180 mg/l of Al^{3+} from an industrial effluent sample, total removal of the metal was achieved. These results confirm the high efficiency of the biofilter to remove Al^{3+} and support the possible use of this adsorption system for the elimination of metals from contaminated sites.

A19

ALGINATE-PERLITE ENCAPSULATED *PSEUDOMONAS PUTIDA* CELLS: PREPARATION, CHARACTERIZATION AND POTENTIAL USE AS PLANT INOCULANTS

Liffourrena AS, Lucchesi GI

Departamento de Biología Molecular, Facultad de Ciencias Exactas, Físico-Químicas y Naturales, Universidad Nacional de Río Cuarto, Río Cuarto, Córdoba, Argentina. E mail: aliffourrena@exa.unrc.edu.ar

Pseudomonas putida cells were immobilized in Ca-alginate-perlite microbeads. The microbeads were prepared by dropwise addition of a $CaCl_2$ -paraffin emulsion mixture to an emulsion containing alginate 2% w/v, perlite 0.1-0.4% w/v and bacterial suspension in 0.9% NaCl (10^{10} CFU mL⁻¹). For all perlite concentrations used, microbead size ranged from 90 to 120 μ m; trapped population size was 10^9 CFU g⁻¹. Microbeads containing 0.2% and 0.4% perlite were able to release bacteria into the medium, while microbeads without or with 0.1% perlite did not release significant numbers of bacteria even after 30 days of incubation. When the treatment was performed with Ca-alginate-perlite (0.4% w/v) microbeads, rhizosphere colonization was at its highest and we obtained the best results concerning the ability of *P. putida* to promote the growth of *Arabidopsis thaliana*. This result suggests that these microbeads could be used to produce encapsulated inoculants.

A20

GLYPHOSATE TOLERANCE OF FUNGAL STRAINS ISOLATED FROM AGRICULTURAL SOILS

Aluffi M, Magnoli K, Regnicoli J, Benito N, Carranza C, Chiacchiera S, Barberis C, Magnoli C

Facultad de Ciencias Exactas Físico-Químicas y Naturales, Universidad Nacional de Río Cuarto, Río Cuarto, Córdoba-Argentina

E-mail: maluffi@exa.unrc.edu.ar

The use of agricultural pesticides for insect, pest and diseases control has increased during the past years in Argentina. The organophosphonates as glyphosate are biogenic and xenobiotic compounds characterized by the presence of a stable carbon to phosphorus (C-P) bond. The C-P bond imparts upon these molecules a relative resistance to degradation and concern has been expressed over their environmental impact and possible ecotoxicity. Therefore, it is required to develop bioremediation methods capable of degrading GP. The aim of this study was to evaluate the effect of several doses of GP on the growth parameters of different fungal strains isolated from agricultural soils. Twenty fungal strains were isolated from soil through an enrichment method. Growth parameters were evaluated at different GP concentrations (0, 5, 20, 50 and 100 mM) at 0.98 of water activity on Czapek-Dox medium. In general, it was observed that the lag phase of all strains tested increased when GP concentration increased. The strains with the highest growth rate on treatment with 100 mM of GP were: C166 (*Mucor* spp.), C2 (*Aspergillus* spp.) C140 and C311 (*Trichoderma* spp.). Growth rates and lag phases were: 4.13; 4.15; 5.01 and 6.39 mm / day and 9.65 ± 9.77 ; 20.06 ± 5.92 ; 46.2 ± 2.4 and 32.69 ± 3.2 h, respectively. These results show that these strains could integrate a microbial consortium capable to tolerate and degrade glyphosate on soil.

A21

FOLLICULAR ATRESIA IN THE OVARY *COLUMBINA PICUI* (AVES: COLUMBIDAE)

Barrionuevo V, Bulfon M

Anatomía comparada. Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. (FCEFyN- UNC). Córdoba, Argentina. E-mail: vickbarrionuevo@gmail.com

In the ovary of the birds, numerous follicles initiate their growth and differentiation during the phase of gonadal activity, however, only few mature since most involute in different stages of development. In this work a morphological, quantitative, and histochemical analysis of *C. picui* ovary has been carried out, in order to contribute to the knowledge of the process of follicular atresia in this bird. Sixty adult females were captured in Córdoba (Argentina) during 2014 and 2015. The gonads were fixed in formol buffered at pH=7.0, processed according to the paraffin inclusion technique, and colored. Complex carbohydrates were revealed employing histochemical techniques. The difference between medians were determined using the Kruskal-Wallis test. According to the size and structural changes of the ovarian follicles, two types of atresia were identified: 1) non-bursting, where follicular walls remained intact, including lipoidal and lipoglandular atresia and 2) bursting, with rupture of follicular walls and release of the ovoplasmic content. The basement membrane and granulosa cells of all atresic follicles revealed affinity for PAS and AB pH=2.5. Non-bursting atresia is described throughout the cycle, the maximum value of lipoidal (24.78%) at rest and that of lipoglandular (70.33%) in gonadal activity. Bursting atresia was only observed in regressive ovaries (4.89%). The atresia model of *C. picui* exhibits a pattern similar to that analyzed in other birds and its main function is the removal of supernumerary ovarian follicles.

POSTER PRESENTATIONS

A22

BOVINE FETAL FIBROBLASTS GROWTH INSIDE 3D SCAFFOLDS BASED ON MACROPOROUS PNIPAM HYDROGELS

Rivero R^{1,2}, Capella V^{1,2}, Bosch P², Rodríguez N², Barbero CA¹, Rivarola CR¹

¹Dpto.de Química, ²Dpto.de Biología Molecular, Facultad de Ciencias Exactas, Físico - Químicas y Naturales, UNRC-CONICET

E-mail: vcapella@exa.unrc.edu.ar

Biomaterials are being used in cell culture techniques as scaffolds to create tissue-like structures that simulate the mechanical and physiological features of *in-vivo* tissues. Biomaterials based on hydrogels have great potential for tissue reconstruction due to they could emulate extracellular membrane (ECM) providing sites for adhesion, proliferation and even more cell differentiation. In this work, we propose to study bovine fetal fibroblast cell growth inside 3D scaffolds based on macroporous PNIPAM hydrogels. The hydrogels were polymerized by cryogelation (at -18 °C). The porous morphology was observed by scanning electron microscopy (SEM). Histological assays were carried out by simple hematoxylin and eosin staining. Bovine fetal fibroblasts (BFF) were seeded onto hydrogel cylinders and then the cells were cultured for 30 days. Cell viability was qualitatively studied using trypan blue assay and cell morphology was observed by SEM. The obtained results indicate that BFFs can grow inside macroporous PNIPAM hydrogels mainly adsorbed on macropores-fluid biologic interphase. BFF adopt spheroid morphology in contrast to slape morphology adopted on PNIPAM surface. High cell viability inside hydrogel indicates that these materials could be used as scaffolds for cell culture with potential applications in tissue engineering field.

A23

EFFECT OF A POLYMORPHIC ALLELE IN THE BDNF GENE ON THE NEURONAL STRUCTURE

Gazal NG, Anastasia A

Instituto Ferreyra (INIMEC – CONICET – Universidad Nacional de Córdoba). Córdoba, Argentina.

E-mail: nahirguadalupegazal@gmail.com

There is a single nucleotide polymorphism (SNP) in the BDNF gene (rs6265) which is associated with increased susceptibility to develop neuropsychiatric disorders in human carriers. This SNP is present in approximately 25% of the world population, with a distribution of 20% in heterozygosity and 5% in homozygosity. This SNP induces a substitution of a valine for a methionine within the prodomain of BDNF, an abundant peptide in the central nervous system. The prodomain of BDNF variant Met elicits morphological changes in immature and mature neurons in culture, but it remains yet unknown the effects of both prodomains Val and Met together as a model for the expression in the heterozygote carriers. To begin to answer this question we studied the effects of polymorphic variants simultaneously on hippocampal neurons in culture at different DIVs. We measured diverse parameters in the establishment of polarity, in the development of dendrites and axons, and in the establishment of synapses of these neurons in the presence of both peptides. These experiments will allow unmasking whether there is competition between the two variants of the BDNF prodomain, and the consequences that can have on neuronal development. Additionally, the results obtained could provide a molecular explanation for the increased incidence of neuropsychiatric diseases in the human carriers of the rs6265 SNP.

A24

HEK293 CELL LINE BEHAVIOR IN CONTACT WITH HYDROGELS BASED ON PNIPAM

Capella V^{1,2}, Rivero R^{1,2}, Liaudat AC¹, Ibarra L¹, Barbero CA², Bosch P¹, Rivarola CR², Rodríguez N¹

¹Dpto.de Biol.Mol., ²Dpto.de Qca., Facultad de Ciencias Exactas, Físico - Químicas y Naturales, UNRC.

E-mail: vcapella@exa.unrc.edu.ar

Tissue engineering is based on the combined use of cells, biomaterials and soluble factors in order to repair damaged tissues. In the last decades, the design of materials that serve as scaffold for the growth and development of cells, obtained from different tissues and organs, has taken relevance. Biocompatible hydrogels are a kind of material that has great potential in biomedicine because its structure and properties are similar to the extracellular matrix. In the present work, the cell viability of human embryonic kidney (HEK293) cell line exposed to different hydrogels, based on poly-N-isopropylacrylamide (PNIPAM), was evaluated. HEK293 cells have been widely used in cell biology research for many years because of their reliable growth and propensity for transfection. Cell adhesion on hydrogel surfaces was also analyzed. The cytotoxicity of the cells exposed for 48 and 96 h was evaluated through the MTT and neutral red tests. The cells were seeded onto hydrogels and their growth on the surface was observed during 6 days through staining with Hoechst and toluidine blue. The results indicated that all evaluated hydrogels did not produce toxicity on the cell line. Cell growth on PNIPAM surfaces was observed. These results suggest that the studied hydrogels are good candidates to use as scaffolds for HEK293 cell growth for applications in the field of regenerative medicine.

A25

ATTACHMENT OF PIG SPERMATOZOA TO POLYMERIC HYDROGELS

Morilla G¹, Liaudat AC¹, Blois D¹, Capella V^{1,2}, Funes R³, Rivarola CR², Barbero C², Bosch P¹, Rodríguez N¹
¹Dpto de Biología Molecular, ²Dpto de Qca, Facultad de Ciencias Exactas, Físico - Químicas y Naturales, UNRC. ³CIP Centro de Inseminación Porcina Veterinaria Rivoira. E-mail: gmorilla@ayv.unrc.edu.ar.

Reproductive efficiency of pig farms is highly correlated with the fertility of males. Therefore, it is very important to develop techniques for spermatic separation with the purpose of selecting high quality cells for assisted reproduction techniques. In the last years, the use of hydrogels in biology is receiving great attention due to their potential applications in medicine and biotechnology. The objective of this work was to develop new polymeric materials that can be used as a platform to select a subpopulation of spermatozoa with better fertility capacity. To this end, we synthesized polymeric hydrogels with different net charges (positive CAT, negative or neutral HMA). We observed interaction between spermatozoa and polymeric surfaces by light microscopy. Morphological aspects and motility of attached sperm were recorded. The results indicate that pig spermatozoa attach mostly to neutral or positively charged hydrogels. Microscopic observation showed that the attachment of the spermatic cells to hydrogels occurred mostly through the apical zone of the head. Attached spermatozoa kept actively motile for several hours. These preliminary results indicate that hydrogels can be used to select pig spermatozoa with high motility for use in assisted reproduction techniques.

A26

IMPACT OF THE VAL66MET HUMAN POLYMORPHISM ON THE BDNF GENE ON THE STRUCTURE AND FUNCTION OF DOPAMINERGIC NEURONS

Jandar Paz CM, Anastasia A
Instituto Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba). E-mail: cjandarpaz@immf.uncor.edu

A common single nucleotide polymorphism (SNP) in the BDNF gene is observed in more than 25% of the human population, and it results in a Valine (Val) for methionine (Met) substitution at position 66 of the BDNF prodomain (Val66Met). This SNP is highly associated with enhanced risk to develop psychiatric and neurodegenerative disorders and, in some populations, it is associated with increased susceptibility to develop Parkinson's disease (PD) and PD-related cognitive impairment. PD occurs when the connection between the dopaminergic neurons of substantia nigra (SN) and its projections in the striatum decrease dramatically. Therefore, we hypothesize that the dopaminergic neurons from patients with the Met prodomain could be more susceptible to degenerate. We performed mesencephalic cultures (enriched in dopaminergic neurons) from BDNF Val/Val and BDNF Met/Met knock-in mice, and we observed that neurons from the latter genotype developed shorter processes than the controls. These results suggest that the Met prodomain is an active ligand which modulates the morphology of dopaminergic neurons. In the future, we will determine if these alterations make the nigrostriatal system more susceptible, facilitating the development of PD.

A27

BDNF PRODOMAIN GENETIC VARIANT (VAL66MET): EFFECT ON TRANSPORT AND CELL ENERGY

Ovejero M, Zamponi E, Bisbal M, Anastasia A
Instituto Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba). E-mail: milagros.ovejero@hotmail.com.ar

Brain-derived neurotrophic factor (BDNF) is produced as a pro-protein called proBDNF. ProBDNF is cleaved to release mature BDNF (mBDNF) and its prodomain. It was believed that BDNF pro-peptide is degraded following its cleavage from proBDNF, but it was recently found to be present in different brain regions and in the cerebrospinal fluid. More than 25% of the world population carries a single nucleotide polymorphism (SNP) that induces a substitution of a valine for a methionine in the prodomain (Val66Met). This SNP is related to different pathologies of the central nervous system, such as neurodegenerative diseases and behavior disorders. Our group has demonstrated that the Met variant of the prodomain affects the neuronal structure, although the underlying mechanisms are unknown. Therefore, we studied the effects of the Met prodomain on (1) the intracellular protein sorting to identify if it affects neuronal development by a transport deficit, and (2) the effects of this variant on the structure of the neuronal mitochondrial network to unmask whether this SNP affects cellular energetics and/or mitochondrial signaling. These studies will allow to elucidate the mechanisms by which this SNP alters neuronal structure and function to understand its pathogenic mechanisms.

A28

GROWTH FACTOR RICH PLASMA (GFRP) IN THE HEALING OF SURGICAL SKIN FLAPS IN RABBITS

Bertone PA¹, Ruíz FO^{2,3}, Boaglio CM¹, Diaz T¹, Cots D¹, Romanini MC¹, Wheeler JT¹

¹ Facultad de Agronomía y Veterinaria, ² Facultad de Ciencias Exactas, Físico - Químicas y Naturales, ³ CONICET. Universidad Nacional de Río Cuarto. Río Cuarto. Córdoba. Argentina. E-mail: fruíz@exa.unrc.edu.ar

The GFRP is an autologous plasma volume with a high concentration of platelets and growth factors useful in tissue regeneration. The objective of the study was to determine the immunolocalization of vascular endothelial growth factor (VEGF) in the healing of rabbit skin flaps. To obtain GFRP, blood samples were drawn from healthy rabbits (n=12) and then they were centrifuged at 1800 rpm during 8 min. Two skin flaps, right and left, were surgically made per rabbit. A volume of the GFRP was applied in the right flap and NaCl 0.9% in the left flap (control). Different biopsies were taken at 3, 5, 7, 15, and 30 days. These samples were dyed by H/E staining and VEGF expression was determined by immunohistochemistry. The effects of GFRP on healing were estimated by histological changes and labeling in epithelium and dermis tissues. In the treated flaps, a rapid and dense vascularization was observed from day 5, with mean values higher than the controls (p<0.05). A major thickness of the epidermis was found after 15 days. These results coincided with Chung *et al.* (2013) and Schmidt *et al.* (2017) who observed a similar effect. In conclusion, GFRP stimulates neovascularization and epidermal regeneration in rabbit flaps, demonstrating its biotherapeutic potential.

A29

DETERMINATION OF THE VASCULAR AREA THROUGH CD31 BY IMMUNOHISTOCHEMISTRY IN THE SWINE PLACENTA. A PRELIMINARY STUDY

Fiorimanti MR, Cristofolini AL, Díaz T, Merkis CI

Área de Microscopía Electrónica, Dpto. de Patología Animal, Fac. de Agronomía y Veterinaria, UNRC- CONICET. Córdoba-Argentina. E-mail: mfiorimanti@ayv.unrc.edu.ar

In porcine gestation, increased blood flow is the primary mechanism to augment transplacental exchange, which is directly correlated with fetal growth, survival, and birth weight of the newborn. CD31 is widely recognized as an endothelial cell marker and has been established as the most effective immunohistochemical marker for cell proliferation processes. This study aimed to determine the vascular area through CD31 immunohistochemistry detection in the porcine placenta of early (± 30 days), mid (± 60 days) and at term (± 114 days) gestation. Images were acquired and analyzed using the AxioVision software (v. 4.6.3, Carl Zeiss). The identification of the vessels endothelium by CD31 staining allowed to delimit more exactly the perimeter of the blood vessels and thus the vascular area. The smaller areas were presented at day 60 of gestation ($25.58 \mu^2$), while the major ones were found at day 114 ($54382.02 \mu^2$). A significant increase in the total vascular area was detected at term (p ≤ 0.05). The increase in the vascular area towards the end of gestation would be due to an increase in the diameter of the vessels and would allow a greater blood flow to satisfy the demands of fetal growth.

A30

HIGH GLUCOSE INDUCES STARD7 EXPRESSION IN JEG-3 TROPHOBLAST CELLS THROUGH THE HEXOSAMINE BIOSYNTHETIC PATHWAY (HBP)

Flores Martín J, Reyna L, Rojas ML, Cruz Del Puerto MM, Panzetta-Dutari GM, Genti-Raimondi S

Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET-UNC), Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Córdoba. E-mail: jflores@fcq.unc.edu.ar

It is well-known that changes in the glucose concentration, lipid metabolism and oxidative stress modulate the main cellular processes. Gestational diabetes leads to a lipotoxic placental environment associated with increased inflammation and oxidative stress markers. Even though the majority of glucose enters glycolysis, ~ 2–5% of glucose can be metabolized by the hexosamine biosynthetic pathway (HBP), which in turn leads to modification of various intracellular proteins with O-linked GlcNAc. StarD7 belongs to START protein superfamily involved in lipid transport, metabolism and signaling. Here, we explored the influence of elevated glucose levels (5.5 and 25 mM, previous starvation) on the StarD7 expression in JEG-3 cells. Results showed an increase in StarD7 as well as in β -catenin expression following high-glucose treatment, and these effects were abolished by the HBP inhibitors azaserine and 6-Diazo-5-oxo-L-norleucine. In addition, the levels of the main markers of unfolded protein response (UPR) were assessed. When cells were moved to 5.5 or 25 mM glucose an induction in the Ire1 α (2 and 24 h) and GRP78 (2 h) proteins was observed. However, the phosphorylation of eIF2 α at Ser 51 decreased suggesting that O-GlcNAc may regulate eIF2 α phosphorylation. In starvation conditions (0.5 mM glucose, without serum, during 16 h) GRP78 and Ire1 α levels were significantly elevated, whereas StarD7 decreased. Collectively, these results indicate that glucose induction of StarD7 levels is mediated by the HBP and, also, that changes in glucose concentration induce activation of the UPR, providing evidence for a link between UPR and HBP.

A31

AZOSPIRILLUM BRASILENSE AUXIN MODULATES PHOSPHOLIPASE D AND PROLINE SIGNALING DURING WATER STRESS IN BARLEY PLANTS

Meringer MV, Lara AL, Dardanelli MS, Racagni G, Villasuso AL

Dpto. Biol. Molecular. Facultad de Ciencias Exactas, Físico-Químicas y Naturales. UNRC. Río Cuarto. Córdoba. Argentina.

E-mail: vmeringer@exa.unrc.edu.ar

The associative rhizobacterium *Azospirillum* has extensively been investigated in the last decades. Besides its well-known abilities of promoting root growth mainly by indol acetic acid (IAA) production, *Azospirillum* (Az) also mitigates salt, water and osmotic stresses in different plant species. In this work, we evaluated the effect of inoculation with Az39 and IAA on growth and signaling mechanisms in control barley roots and subjected to water stress. Phospholipase D activity (PLD), proline content, and levels of reactive oxygen species (ROS) were determined in roots of seedlings grown under control conditions and water stress (without irrigation), inoculated with Az39 and / or IAA. Five days after water stress, a decrease in the biomass, length, and water content of the plants was observed, as well as a modification in the root architecture with changes in the number of lateral roots, radical hairs, and ROS levels. Az39 inoculation and IAA treatments mitigate the effects of hydric stress on barley seedling. This was reflected in changes in physiological and biochemical level. We observed an opposite regulation of PLD activity and proline levels in response to hydric deficit, which in turn was dependent on auxin. Our results suggest that barley seedlings inoculated with Az39 may be better shaped to thrive under water stress conditions

A32

CATHEPSIN D EXPRESSION IN HEMOCYTES AND ITS POTENTIAL ROLE IN THE IMMUNE SYSTEM OF *DIPETALOGASTER MAXIMA* (HEMIPTERA: REDUVIIDAE)

Moyetta NR, Leyria J, Ramos FO, Canavoso LE

Centro de Investigaciones en Bioquímica Clínica e Inmunología CIBICI-CONICET, FCQ-UNC. Córdoba, Argentina.

E-mail: nmoyetta@fcq.unc.edu.ar

Insects lack adaptive immunity and develop an efficient innate immune response against microorganisms and other aggressive agents. Insect immunity can be broadly divided in humoral and cellular, being the latter mediated by hemocytes. It has been recently reported that Jaburetox (JBTX), a recombinant peptide derived from a plant urease, induces an immunosuppressive effect in the triatomine *Rhodnius prolixus*, promoting the expression and activation of certain enzymes in the hemocytes. Although there is evidence associating cathepsin D (CatD), an aspartic peptidase, with the innate immune response, more studies are needed to establish its precise role. Moreover, the presence of CatD in insect hemocytes has not been reported yet. In this work, the expression of CatD in the hemocytes of *Dipetalogaster maxima*, a vector of Chagas' disease, was evaluated in order to elucidate the potential targets of JBTX in the immune system. Hemocytes from nymphs of the fifth instar (6-8 days post-feeding) were used. Expression of CatD was analyzed by RT-PCR and Western blot. CatD exhibited a molecular weight compatible with a pro-peptidase. Immunofluorescence assays indicated that CatD was localized in the cytoplasm and nucleus of at least two populations of hemocytes. These results will allow us to understand the role of CatD in the immunity of insects and to expand our knowledge of the entomotoxic mechanisms displayed by plant ureases.

A33

PHOSPHOLIPASE D/PHOSPHATIDIC ACID MODULATES PROLINE METABOLISM DURING COLD RECOVERY IN BARLEY

Peppino Margutti M, Vilchez AC, Racagni G, Villasuso AL

Dpto. de Biol. Molecular. UNRC. Río Cuarto. Córdoba. Argentina. E-mail: mpeppino@exa.unrc.edu.ar

Phospholipase D (PLD) hydrolyses phospholipids to yield phosphatidic acid (PA) and a head group, and is involved in responses to a variety of environmental stresses, including chilling, and freezing stress. Some results from our laboratory would indicate that PLD/PA modulate proline (Pro) levels in barley during cold stress. Pro is involved in adaptation, signaling, and recovery of plants during the processes of biotic and abiotic stress. The aim of this study was to determine PLD activity and the activities of enzymes involved in Pro metabolism as pyrroline-5-carboxylate synthetase (P5CS) and proline dehydrogenase (ProDH) during cold recovery. Barley seedling exposed at 4° C for 36 h were transferred at 25°C for 1-5 h. Cold seedling exposition by 36 h evoked an increase of 200 % Pro levels. In contrast, the Pro accumulation did not show significant changes in seedling by recovery treatment. Also, ProDH activity was hyper stimulated during 1 h on cold recovery. Under this condition, PLD activity increased. Finally, pre-treatment seedling with 1-butanol (inhibitor PLD activity) and exogenous PA application changed Pro levels and ProDH activity. The results obtained allow to suggest that PLD/PA regulates the proline metabolism in barley on cold recovery.

A34

LIPOPHORIN AND VITELLOGENIN RECEPTORS IN THE REGULATION OF OOGENESIS AND FOLLICULAR ATRESIA IN *DIPETALOGASTER MAXIMA*, A VECTOR OF CHAGAS' DISEASE

Ramos FO, Leyria J, Canavoso LE

Centro de Investigaciones en Bioquímica Clínica e Inmunología CIBICI-CONICET, FCQ-UNC. Córdoba, Argentina.

E-mail: f Ramos@fcq.unc.edu.ar

Vitellogenesis is a central event in the reproduction of the insects. It is regulated by nutritional and endocrine factors, including the juvenile hormone (JH). During vitellogenesis, vitellogenin (Vg) and lipophorin (Lp) are synthesized in the fat body, secreted into the hemolymph and further internalized by the oocytes throughout the endocytic receptors RVg and RLp, respectively. However, under deficient nutritional conditions, the ovarian tissue degenerates to an atretic stage and the oocytes are resorbed. In this work, we have studied the relevance of RVg, RLp, and Met, the JH receptor, in the regulation of vitellogenesis and follicular atresia of *Dipetalogaster maxima*, a vector of Chagas' disease. The experimental approaches included Western blot and ELISA assays to quantify Vg and Lp in the hemolymph and RT-qPCR to evaluate the expression of the RVg, RLp, and Met in ovarian tissue. Vg and Lp levels were significantly high at the beginning of the vitellogenic stage. This pattern correlated with the expression of RVg and RLp in the ovaries. Interestingly, the expression of Met in the ovarian tissue presented a similar profile to that of RVg and RLp, with low levels of the transcript during follicular atresia. The results suggested that RVg and RLp, besides being molecular markers of the follicles to complete their development, participate in the process of atresia. In addition, our findings suggest for the first time that Met may be involved in the regulation of RVg and RLp expression during oogenesis.

A35

LIPID SIGNALING DURING THE INTERACTION *FUSARIUM GRAMINEARUM*-*HORDEUM VULGARE*

Reyna M, Peppino Margutti M, Torres AM, Dardanelli MS Racagni G, Stenglein SA, Villasuso AL

Dpto. de Biol. Molecular. UNRC. Río Cuarto. Córdoba. Argentina. E-mail: mreyna@exa.unrc.edu.ar

Phospholipase A2 (PLA2) activity is one of the signaling mechanisms involved in the response to biotic stress. Its products, free fatty acids and lysophospholipids, are very important in plant-pathogen interaction. Species within the *Fusarium graminearum* complex produce fusariosis and mycotoxin contamination, reducing the amount and quality of grains in cereals. The objective of this work was to evaluate the lipid signaling involved in the interaction between *Fusarium graminearum* and barley roots. Initially, PLA2 activity using NBD-PC as the substrate and total free fatty acids (FFA) by GC / ME were evaluated. The interaction of barley seedlings with macroconidia of *F. graminearum* increased the activity of PLA2 rapidly and transiently (between 15 and 30 minutes of exposure to the pathogen). A similar response, although shifted in time, was observed on the content of FFA 18:2 - 18:3, which increased only after 30 min. This fact modified the unsaturated/saturated FFA ratio at all the times evaluated. Our results suggest that the interaction of *F. graminearum*, with barley roots modulates PLA2 activity and that the resulting unsaturated FFAs, especially 18:3, are targeted to the biosynthesis of phytohormones as JA.

A36

ADSORPTION, DESORPTION AND BIODEGRADATION OF CATIONIC SURFACTANTS IN ACTIVATED SLUDGE OF INDUSTRIAL WASTEWATER

Bergero MF, Correa A, Lucchesi GI

Dpto. Biología Molecular. Facultad de Ciencias Exactas, Físico - Químicas y Naturales. UNRC. Río Cuarto. Córdoba.

E-mail: mbergero@exa.unrc.edu.ar

Cationic surfactants are widely used as industrial disinfectants. Discharged at the treatment plants, they can adsorb to the sludge and reach the environment with them, where biodegradability is limited. In this work, we evaluated the adsorption of 50-300 mg/l of tetradecyltrimethylammonium bromide (TTAB), tetradecyl-benzyltrimethylammonium chloride (C₁₄BDMA), and hexadecyl-benzyltrimethylammonium chloride (C₁₆BDMA) to 1 g/l of activated sludge contained in wastewater of a poultry industry from Río Cuarto. The adsorption equilibrium was reached after 2-3 h of contact of 200 mg/l of TTAB, C₁₄BDMA or C₁₆BDMA, when 81, 90 and 98% were adsorbed, respectively. The adsorption capacity determined according to the Freundlich isotherms followed the order C₁₆BDMA > C₁₄BDMA > TTAB. After six successive cycles of desorption, 21% of TTAB and 12.7% of C₁₄BDMA were desorbed from the sludges using aqueous solution of pH 7, while 30% of C₁₄BDMA was desorbed at pH 9. The results indicate that the surfactants are rapidly adsorbed to industrial sludge and that they are desorbed, to a greater or lesser degree, according to their structure and pH of the medium. The addition of cationic surfactants-degrading bacteria immobilized on Ca-alginate to the wastewater containing 1 g/l of sludge, reduced the amount of TTAB adsorbed from the liquid phase to the sludge from 81% to 5%. These results show the advantages of using immobilized bacteria to achieve the complete elimination of surfactants in wastewater systems, thus preventing them from reaching the environment.

A37

TOLERANCE AND REMOVAL OF CR (VI) BY *BRASSICA NAPUS* HAIRY ROOTS

Perotti R, Paisio CE, Fernandez I, Agostini E, González PS

Dpto Biología Molecular, Facultad de Ciencias Exactas, Físico - Químicas y Naturales. UNRC. Córdoba, Argentina

E-mail: romina_perotti@hotmail.com

Chromium (Cr) is one of the highly toxic inorganic pollutants used in industrial activities, such as leather tanning. Currently, there is increased concern to reduce environmental levels of this heavy metal. Phytoremediation has several advantages and public acceptance to be employed for this purpose. In this work, tolerance and remediation of Cr (VI) by hairy roots (HR), as well as the mechanisms involved in the process were evaluated. The final localization of Cr after removal was also analyzed. Results showed that HR were able to tolerate up to 10 mg/L Cr(VI) and to remove up to 90% of this concentration. Cr (VI) internalization and, to a lesser extent, adsorption were the mechanisms involved in the removal. Part of Cr(VI) was reduced intracellularly to Cr(III), suggesting the participation of reductases. Regarding to the enzymes belonging to the antioxidant system, superoxide dismutase activity showed no differences respect to control and peroxidase activity showed a significant decrease. Additionally, two bioassays were performed after the removal process to evaluate toxicity. Moderate phytotoxicity was detected in *Lactuca sativa* L. test, which would be attributable to compounds produced in the removal process, whereas AMPHITOX test showed that post removal solutions did not present toxicity. In conclusion, HR would be an efficient tool to treat contaminated water with Cr(VI) concentrations below 10 mg/L.

A38

ANALYSIS OF HYDROGEL SURFACES SEMI-INTERPENETRATED WITH HYALURONIC ACID FOR BOVINE SPERM SELECTION

Blois D¹, Liaudat AC¹, Morilla G¹, Bonino R¹, Capella V^{1,2}, Alessio A¹, Rivero R², Rivarola CR², Barbero C², Rodríguez N¹, Bosch P¹

¹Dpto de Biol Mol y ²Dpto de Qca, Facultad de Ciencias Exactas, Físico - Químicas y Naturales. UNRC.

E-mail: rodrix.nr@gmail.com

Most strategies to separate bovine sperm from seminal fluid and select subpopulations with high fertilization capacity are based on sperm motility and vitality. In addition, there are emerging methods of separation that are based on sperm membrane integrity and cellular ultra-morphology. Hyaluronic acid (HA) sperm selection technique focus on HA receptors found in mature spermatozoa with normal morphological and motile characteristics. The aim of this work was to develop new polymeric biomaterials with HA units that work as support and binding substrate for bovine spermatozoa with high fertilization capacity. Hydrogels polymers were synthesized with HA and the degree of sperm / surface binding was analyzed by phase contrast microscopy. Motility, morphology and viability aspects of attached sperm population were studied. The results indicate that 30% of the spermatozoa exposed to the hydrogels was attached to the surfaces and after hyaluronidase treatment, 50% of them were released to the medium. Released sperm cells had good linear movement and viability. These results indicate that polymeric surfaces semi-interpenetrated with HA could be used to select high quality spermatozoa in assisted fertilization techniques.

A39

NICHE MODELLING AND POTENTIAL DISTRIBUTION OF *CALOMYS BOLIVIAE* AND *CALOMYS VENUSTUS* (RODENTIA, CRICETIDAE)

Pinotti JD¹, Andreo V², Calderón G³, Martín ML³, Chiappero MB¹, González-Ittig RE¹

¹Instituto de Diversidad y Ecología Animal (IDEA), CONICET-UNC, Argentina; ²Earth Observation Sciences Department, University of Twente, Enschede, Netherlands; ³Instituto Nacional de Enfermedades Virales Humanas, Pergamino, Argentina

E-mail: raulgonzalezittig@yahoo.com.ar

In the last decades, Argentina has experienced the occurrence of several viral zoonosis transmitted by rodents. The genus *Calomys* is responsible of some of these diseases, for example, it has been reported that *C. boliviae* is associated to Laguna Negra Hantavirus (causative of Hantavirus Pulmonary Syndrome) and *C. venustus* to the mammarenavirus Latino-like (not associated to human disease). Delimiting the maximum circulation area of a virus is crucial for restraining a zoonotic disease. To accomplish that, the knowledge about reservoirs ecology and geographic distribution is necessary. In this study, we modelled the climatic niche and potential distribution of *C. boliviae* and *C. venustus*. Species occurrence points were obtained from our own field captures and databases (Global Biodiversity Information Facility, bibliography and museum collections). Captured rodents were identified utilizing sequences of the *cytochrome b* gene. For each species, a geographic polygon was made to link the coordinates of the sequenced individuals. Every point of the databases which were included in any polygon was considered as a presence for that species. Environmental variables were extracted from CHELSA, whereas those of land cover and habitat heterogeneity from EarthEnv.org. Data were analyzed with the maximum entropy algorithm (MaxEnt). Results predict that *C. boliviae* is restricted mainly to the Yungas and to the Chaco-Yungas transition, while *C. venustus* is distributed mainly in the Espinal region. We postulate that salt flats like the Salinas Grandes and Ambargasta are acting as biogeographic barriers between the considered species.

A40

**FUNGICIDE EFFECT OF VOLATILE ORGANIC COMPOUNDS ON *IN VITRO*
FUSARIUM VERTICILLIOIDES GROWTH**

Brito VD, Pizzolitto RP, Jacquat AG, Achimon F, Zygadlo JA

Facultad de Ciencias Exactas, Físicas y Naturales (FCEFYN). Instituto Multidisciplinario de Biología Vegetal (IMBIV-CONICET-UNC)

E-mail: vanebrito08@gmail.com

While new technologies have led to a significant increase in grain production, pests attack reduces it, leading to food and economic losses. Nowadays, the emphasis is on studying alternatives to grain conservation, such as the use of biopesticides, organic compounds derived from natural sources, considered as a green technology of minimum risk. The aim of this study was to evaluate the antifungal capacity of volatile organic compounds (VOCs) against a corn grain pest fungus: *Fusarium verticillioides*. For this purpose, fumigant toxicity tests were carried out *in vitro* employing: isovaleraldehyde, isobutyraldehyde, cis-2-hexenol, cis-3-hexenol and nerol. Eight concentrations were tested between 4.24 and 0.033 μM . Although, all the compounds used showed an effect on *F. verticillioides* growth, at the tested doses the nerol and isovaleraldehyde were the most active compounds, resulting in a total inhibition of mycelial growth at a minimum concentration of 0.27 μM and 0.31 μM , respectively. The minimum inhibitory concentration for the other compounds was found to be higher than for nerol and isovaleraldehyde, thus, 1.42 μM for cis-2-hexenol, 4.66 μM for isobutyraldehyde and 16.27 μM for cis-3-hexenol. The use of biocompounds has advantages over other pesticides, because they present a reduced toxicity in mammals and restricted persistence in the environment. Thus, nerol and isovaleraldehyde could constitute an alternative tool for the protection of the stored corn kernels.

A41

**DIAPHANIZATION AND STAINING OF OSSEOUS AND CARTILAGINOUS TISSUE
IN DIFFERENT VERTEBRATES**

Bulfon M, Bravo G, Gallardo D

Anatomía Comparada. Facultad de Ciencias Exactas, Físicas y Naturales (FCEFYN)- UNC. Córdoba. Argentina.

E-mail: mbulfon@efn.unc.edu.ar

This work was carried in the framework of a workshop of Applied Biology for the students of Biological Sciences. In order to visualize bone and cartilage *in situ*, soft tissue diaphanization was used to analyze the bone development of embryos, neonates and adult vertebrates. We used an adult specimen of angel fish (*Perophyllum scalare*), a juvenile of viper of maizal (*Pantherophus guttata*), a southern lapwing squab (*Vanellus chilensis*), two common frog tadpoles (*Rhinella arenarum*) and three embryos of domestic mouse (*Mus musculus*). Protocol applied: Fixing. Identification. Removal of tegument, brain, eyes and viscera. Cartilage staining with alcian blue. Diaphanization in KHO solution (2.75%). Staining of the bone tissue with alizarin red. Glycerinated. In the angel fish and in the viper of maizal all skeletal structures were revealed with alizarin red. The alcian blue used in the other specimens evidenced the cartilaginous tissue, being marked in the tadpoles not so in the southern lapwing squab and in the domestic mouse embryos, where the cartilage was limited to the epiphysis and metaphysis of the long bones, metacarpals, metatarsals, distal phalanges, and costal cartilage. Ossification centers stained with alizarin red were partially observed in the frontoparietal area and in the diaphysis of the long bones, vertebral bodies and waists of tadpoles, whereas in the other vertebrates these centers were notorious. Excellent results were obtained with the technique used and its application constitutes a valuable tool for the study of embryology, comparative anatomy, and phylogeny of vertebrates.

A42

***IN VIVO* ANTIGENOTOXIC EFFECT FROM *BACCHARIS ARTICULATA* AQUEOUS HOT
EXTRACT**

Argüello C², Escobar FM¹, Torres CV¹

¹Dpto. de Microbiología e Inmunología, Facultad de Ciencias Exactas Físico- Químicas y Naturales. ²Facultad de Agronomía y Veterinaria. UNRC. Río Cuarto. Córdoba. Argentina. E-mail: ctorres@exa.unrc.edu.ar

Baccharis articulata ("carqueja", Asteraceae) is a widely spread herb of Córdoba mountains, used in the preparation of highly consumed beverages (also called "bitter") and in folk medicine for the treatment of digestive, respiratory and urinary affections and skin diseases. In previous studies we have demonstrated the antiviral, virucidal, and non-cytogenotoxic action of the hot aqueous extract of this herb (EAC-Ba). The aim of this work was to assess in BALB/c mice the antigenotoxic action of EAC-Ba (1-2 g/kg) administered orally (O) or intra peritoneally (IP). The micronucleus test with cyclophosphamide (CF) was used as genotoxic agent. Data were analyzed using ANOVA Tukey test. The incidence of micronuclei in polychromatic erythrocytes of mice treated with EAC-Ba was 25 to 40% lower than the incidence determined in mice treated with CF only, regardless of the administration route of the extract used. The toxicity index evaluated in mice treated with EAC-Ba was not different from control group. These results demonstrate that EAC-Ba administered orally (O) or intra peritoneally (IP) decreases the genotoxic action of CF. In conclusion, this work demonstrates that the hot aqueous extract of *Baccharis articulata* exerts an antigenotoxic action against cyclophosphamide in BALB/c mice.

A43

EFFECTS OF THE FLAXSEED IN THE OXIDATIVE BALANCE AND LIPID PROFILE

Cecchini ME, Magnago F, Roma D, Varea C, Torretta ME, Aiassa D, Mañas F

Facultad de Agronomía y Veterinaria, Universidad Nacional de Río Cuarto, Córdoba, Argentina. E-mail: mececchinib@gmail.com

Flaxseed is known as a rich source of alpha-linolenic acid (ALA) and lignans. The beneficial effects on cardiovascular health due to ALA may be the result of modifications on the lipid profile, while the lignans might produce antioxidant effects. We used thirteen adult male Anglo-Nubian goats, split in two groups; one of them was fed on a conventional diet of alfalfa and ground corn and the other group was fed on the same diet supplemented with 5% of flaxseed. Blood samples were collected every 7 days to quantify the thiobarbituric acid-reactive substances (TBARs) and to measure total cholesterol, HDL, LDL and triglycerides. Levels of lipoperoxidation in animals fed on a diet supplemented with flaxseed showed a statistically significant decrease ($p \leq 0,01$, Dunnett's Test) from week 7 onwards (from 3.83 ± 0.25 at the beginning to 1.83 ± 0.25 nmol/g protein at the end of treatment). Statistically significant differences were also found in cholesterol levels and LDL/HDL ratio between both groups ($p \leq 0,01$, Student's Test). Flaxseed supplementation produces a remarkable antioxidant effect in plasma, reducing lipoperoxidation levels about 50% in a three-month period. This effect combined with a decrease of LDL/HDL ratio and cholesterol levels could represent a reduction in the risk of suffering cardiovascular diseases.

A44

MODIFICATION OF BDNF RECEPTORS IN ANIMALS EXPOSED TO ENRICHED ENVIRONMENT AFTER A NEONATAL STRESSFUL EVENT

Cordier M, Aguggia J, Danelon V, Rivarola A, Mascó D

Facultad de Ciencias Exactas Físicas y Naturales, UNC - CONICET-Córdoba, Argentina. E-mail: arivarola@unc.edu.ar

Early life stressful events, such as early maternal separation lead to decreased neuronal plasticity, increased depression, and decreased cognitive abilities. On the other hand, environmental enrichment is a condition that increases sensory, social and physical stimulation and improves cognitive abilities, favoring neuronal plasticity. The aim of this study was to address the interaction of both events, maternal separation and environmental enrichment, from the ethological, behavioral and neurochemical aspects. For this purpose, an early maternal separation stress protocol of 4.5 h / day was applied to male Wistar rats until weaning and after that a post-weaning enriched environment until day 60. In the four experimental groups: NMS / NEE (without maternal separation + without enriched environment), MS/NEE (maternal separation/without enriched environment), NMS/EE (with no maternal separation + enriched environment), SM / EE (maternal separation + enriched environment), the following behavioral tests were applied: forced swimming (to assess depression-like behaviors) and the Barnes test (to assess learning and memory). Besides, immunodetection (Western Blot) of relative levels of BDNF-associated proteins was performed. It was observed that maternal separation has deleterious effects on learning capacity, which is reversed by environmental enrichment. Both environmental stimuli, separation and / or enrichment, had the capacity to increase memory levels regarding control animals (without maternal separation + without environmental enrichment). Finally, it was found that there are variations in TrkB full length and truncated levels, which would be associated with a neuroprotective effect against stress. Modifications in the Erk / pErk signaling cascade were also observed

A45

PARASITISM OF *STEINERNEMA RARUM* (OLI) (NEMATODA: STEINERNEMATIDAE) OF CÓRDOBA PROVINCE IN ADULTS OF *PERIPLANETA AMERICANA* (INSECTA: BLATTODEA)

Aguirre Varela AD, Bertolotti MA, Cagnolo SR

Cátedra de Parasitología, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. Córdoba-Argentina. E-mail: ailinav@hotmail.com

Entomopathogenic nematodes are lethal organisms for their hosts; therefore, they are an alternative for the biological management of harmful insects. *Periplaneta americana*, the american cockroach, is an urban pest of medical, veterinary, and economic interest. In the current research, it was evaluated the infection efficiency of *Steinernema rarum* (OLI) in adults of *P. americana* in laboratory. Individual infections ($n = 38$) were carried out in Petri dishes using two doses (D): 3200 and 6400 infective juveniles (JIs) of the nematode/host and one control group. Insects were maintained at 25 ± 1 °C recording insect mortality every 24 hours for 10 days. The results obtained were: 66.9% and 84.8% of mortality with the low and high doses, respectively. Emergence of JIs was observed in 100% of the dead insects with D 3200, and in 88.2%, with D 6400. It is concluded that the adults of *P. americana* are susceptible to *S. rarum* (OLI) and that the nematode can complete its life cycle in this insect. It is the first time that parasitism of a native isolate of the family Steinernematidae in *P. americana* is evaluated in Córdoba. These data expand the host range of *S. rarum* (OLI), the most virulent isolate among those known to date in the province.

A46

**SURVEY OF ARANEIDAE CLERCK, 1757 (ARACHNIDA: ARANEAE) FROM GREEN SPACES
IN CÓRDOBA CITY, ARGENTINA**

Ruiz AD¹, Argañaraz CI¹, Rubio GD², Gleiser RM¹

¹CREAN-IMBIV, CONICET-UNC, Córdoba. ²CONICET-INTA Cerro Azul, Misiones- Argentina. E-mail: raquel.gleiser@unc.edu.ar

Araneidae is known for building orbicular webs. Their association with vegetation may render them sensitive to environment disturbances such as urbanization. We report the Araneidae fauna in 24 green spaces of the city of Córdoba, in spring and summer. We collected samples with G-VAC (vacuum cleaner) and tapping on the vegetation over entomological umbrella. Eighty five percent of the collected specimens were immature and subadults. The proportion of immature was higher at sites far from the city center. Adults were determined at a specific level. Eight genera, 8 species and 4 morphospecies were identified. In Argentina, 202 species of Araneidae have been reported from 35 genera. For the province of Córdoba, 31 species belonging to 12 genera have been recorded, of which *Alpaida versicolor*, *Argiope argentata*, *Larinia tucuman*, *Metepeira gressa* and *Ocrepeira lurida* were detected. To our best knowledge, *Araneus aurantiifemuris*, *Araneus omnicolor*, *Ocrepeira holmbergi* and *Mecynogea* genus had not been yet described for the province of Córdoba. Although the number of species found is relatively low in relation to the total reported for Argentina, the species accumulation curves and coverage analysis indicated that these samples adequately represent the araneid fauna that can be obtained by the chosen sampling methods.

A47

**DEAD TADPOLES AND POSTMETAMORPHIC *ODONTOPHRYNUS OCCIDENTALIS* IN THE
RESERVA LOS QUEBRACHITOS, UNQUILLO, ARGENTINA**

Carezzano FJ¹, Dorflinger K¹, Urquiza SP¹, Ghirardi R²

¹Cátedra de Morfología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. Córdoba, Argentina. ²Instituto Nacional de Limnología (INALI; CONICET-UNL), Santa Fe, Argentina. E-mail: fercarezza@yahoo.com

Amphibians are declining and are at low risk of extinction worldwide. Such decline would be due, among other factors, to the destruction and fragmentation of habitat, water and soil pollution and emerging diseases caused by various pathogens such as fungi, bacteria and viruses. Among the bacteria, several species of the genus *Aeromonas* cause septicemia or "red-leg" disease that causes a significant mass mortality. On 9 November 2016, in a distance of no more than 100 m along the Cabana stream (31° 11 'S, 64° 22' W), in Los Quebrachitos Municipal Reserve, in the town of Unquillo, Córdoba, a significant mortality of *Odontophrynus occidentalis* tadpoles was detected, with 49 dead individuals and 14 in agony. Eleven newly metamorphosed individuals were also observed. Although it is not possible to assert that this mortality is due to the nosological entity known as "red leg" disease because it was not possible to analyze the water of the stream, all the symptomatology observed in the specimens seems to suggest it. Erythema on the skin and significant inflammation of the hind limbs were observed. It is important to note that the bacteria of the genus *Aeromonas* spp., are Gram negative bacilli, common in streams and rivers of the province of Córdoba.

A48

**SUSCEPTIBILITY OF *BOTANOCHARA OCTOPLAGIATA* (SPAETH, 1909) (COLEOPTERA:
CHRYSOMELIDAE) TO THE ENTOMOPATHOGENIC NEMATODE
HETERORHABDITIS BACTERIOPHORA POINAR, 1976**

Echevarría D, Cagnolo SR, Bertolotti MA

Cátedra de Parasitología, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. Córdoba, Argentina. E-mail: echevarriadani@gmail.com

Heterorhabditis bacteriophora presents a wide range of hosts, which includes numerous orders and families of harmful insects. Their safety for the environment makes of this nematode an excellent biological control agent. The mortality of adults of *Botanochara octoplagiata* caused by a native isolate (N842) was evaluated, in laboratory. Individual infections were performed in multiwell plates, with 0.2 g of sterilized soil and two doses: 50 and 500 infective juveniles (IJs) per host. Twenty four individuals were considered. Insect mortality was recorded every 24 hours for 10 days. At the highest dose, the nematode killed 100% the hosts. With 50 IJs/ insect, mortality was 16.7 %. There was no emergence of IJs from dead insects at any doses at the end of the parasitic cycle, and dissections were performed. With both doses, the nematodes that entered died, killing the insect by pathogenic action of the bacterium, except in 4% of the insects treated with doses of 500 IJs, in which, alive nematodes were found inside. It was shown that *B. octoplagiata* is susceptible to *H. bacteriophora* although the nematode failed to complete their evolutionary cycle within the insect.

A49

MORPHOMETRIC ANALYSIS OF *RHINELLA ARENARUM* (ANURA) POPULATIONS IN ENVIRONMENTS WITH DIFFERENT LEVELS OF DISTURBANCE IN CHACO SECO, ARGENTINA

Flores Mariscal SA¹, Chiapero F¹, Mossello J¹, Elías DH², Urquiza SP¹

¹Cátedra de Morfología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba. Córdoba. ²Cátedra de Bioestadística, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Córdoba.
E-mail: sergiopablo1966@gmail.com

Morphometric analyzes serve as a support to explain certain ecological phenomena. In this work, we compared the external morphometry of two adult populations of *Rhinella arenarum* from the Chaco Seco biogeographic province. A sample was obtained from a forest (low level of disturbance) and another from the edge of a crop (high level of disturbance). Ten morphometric variables were taken using a digital caliper (0.01 mm) (snout-vent length, mouth width, ocular diameter, intraocular distance, eye-nostril distance, tympanic diameter, arm length, femoral length, length of the tibia and length of the foot). The data obtained were analyzed using the statistical software R version 3.2.2. First, we applied the ANOVA test at one factor and then normality and homogeneity assumptions were verified. In the cases where the statistical requirements were not met, the Kruskal Wallis test was used ($p < 0.05$). Contrary to what was expected, the results indicate that there are no significant differences between the two populations, which could be due to the fact that the agricultural area is recently exploited and that this collection point is close to undisturbed areas. We should compare other more differentiated populations in the future.

A50

EMERGENCE OF THE CROP AND PHYSIOLOGICAL QUALITY IN PEANUT

Fernandez EM, Capiello G, Ledesma CR, Ledesma MM

Facultad de Agronomía y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba. Argentina. E-mail: efernandez@ayv.unrc.edu.ar

The non-uniform emergence of peanut (*Arachis hypogaea*) crop can generate differences in the moment of occurrence of the growth and development of the seeds. Considering the high degree of indeterminacy and the relatively long growing cycle of the available peanut genotypes, environmental conditions found in the producing region of Córdoba such as high and low temperature as well as water deficit at the end of the cycle, could differentially affect the physiological quality of their seeds. The objective of the study was to evaluate the influence of the emergence time of the mother plants on the physiological quality of their seeds. Two seed lots identified with the Electrical Conductivity Test (EC $\mu\text{S}\cdot\text{cm}^{-1}\cdot\text{g}^{-1}$) as high quality (AC: 28) and low quality (BC: 57) were seeded in the field (FAV-UNRC, 26/10/15). The emergency was registered every day (19-29 days after sowing). Yield, physical and physiological qualities were estimated at the time of harvest. No significant difference was found in the weight of the seeds coming from both lots. However, plants emerging from the high-quality seeds showed higher emergence index (higher rate of emergency speed and emergency rate, and lower average time of emergency) and resulted in a higher proportion of large seeds, greater yields and better physiological quality, supporting the production of high-quality seeds.

A51

COMPARED MORPHOMETRIC STUDY OF *PHYSALAEMUS BILIGONIGERUS* (ANURA) IN TWO SITES WITH DIFFERENT ANTHROPIC DISTURBANCE IN CÓRDOBA, ARGENTINA

Mossello J¹, Flores Mariscal S¹, Chiapero F¹, Elías DH², Carezzano FJ¹

¹Cátedra de Morfología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba.

²Cátedra de Bioestadística, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba.

E-mail: fercarezza@yahoo.com

The advance of the agricultural frontier over natural ecosystems conditions the ecology of organisms in general and of amphibians in particular, a group very sensitive to the loss and fragmentation of the habitat and to pollution, being reflected, among other aspects, in its external morphometry. Nine morphometric variables (snout-vent length, mouth width, ocular diameter, intraocular distance, eye-nostril distance, humerus length, femur length, tibia length, and foot length) were taken in adult individuals of *Physalaemus biligonigerus* deposited in the herpetological collection of the Museum of Zoology of the National University of Córdoba from two environments with different degrees of anthropic disturbance, such as the agroecosystems of the south of Córdoba and the forests of the northwest of said province. The objective is to see if there are differences between the two populations at the morphometric level. The data were analyzed using software R. The ANOVA test was applied and the assumptions of normality and homogeneity were verified, and in those cases where the statistical requirements were not met, the Kruskal Wallis test ($p < 0.05$) was used. Significant differences were found in more than half of the studied variables, which are attributed to the high degree of anthropic disturbance presented by agroecosystems.

A52

THERMAL REQUIREMENTS FOR GERMINATION OF SORGHUM SEEDS

Lazzari CF, Ledesma CR, Ledesma MM, Fernandez EM

Departamentos de Producción Vegetal y Ciencias Básicas y Agropecuarias. Facultad de Agronomía y Veterinaria. Universidad Nacional de Río Cuarto. Río Cuarto, Argentina. E-mail: cesarflazzari@hotmail.com

Knowledge of the thermal requirements for germination allows sorghum (*Sorghum bicolor*) genotypes to be sown at different moments, considering the environmental conditions at the time of sowing, and the conditions during the crop cycle. The objective of this study was to evaluate the germination response of five sorghum genotypes at constant temperatures during the process. The germinative power and vigor of the seeds of each genotype were analyzed. The germination test was conducted in growth chambers with constant temperatures every 2 °C in a range between 8 and 40 °C, and evaluated daily. The seed that developed a seedling with a 3 cm radicle and 2 cm coleoptile was considered germinated. There were genotypic differences in the response to the parameters evaluated. The percentage of germination was not significantly modified over a wide temperature range, although there were differences between the genotypes. The mean time of germination was inversely affected by temperature; there was a turning point at 16°C, increasing significantly below this value. The germination rate decreased with low temperatures (10-14 °C), causing staggered germination. The base temperature varied between 9.4 and 11.1 °C, the optimum temperature, between 30.7 and 36.1 °C and the maximum temperature, between 38.2 and 41.1 °C, according to the genotype. Thermal germination time varied between 28.7 and 48.0 °Cd, according to the genotype.

A53

ANTIPARASITIC EFFECT AND BEHAVIORAL REESTABLISHMENT IN MICE TREATED WITH CLOMIPRAMINE

Strauss M, Carlini V, Rivarola HW, Lo Presti MS

Instituto de Investigaciones en Ciencias de la Salud (INICSA-CONICET-UNC) Facultad de Ciencias Médicas. Universidad Nacional de Córdoba. E-mail: marianastr86@gmail.com

The research for new therapeutic agents was proposed due to the limitations of the current treatment for the American trypanosomiasis, caused by *Trypanosoma cruzi*. Clomipramine (Clo) is a tricyclic antidepressant that has shown efficacy in experimental models as antiparasitic, but could modify some behavioral patterns. In addition, behavioral changes due to infection have been observed in experimental models and, less significant, in humans. For this reason, we proposed to evaluate the effect of Clo upon anxiety-related behaviors. Male Swiss Albino mice were grouped as follow: uninfected mice (NI): NI+Vehicle, NI+Clo5mg/kg/day, and NI+Clo1.25mg/kg/day (n=10), and mice infected with 50 trypomastigotes of *T. cruzi* Y strain (INF): INF+Vehicle, INF+Clo5mg/kg/day, and INF+Clo1.25mg/kg/day (n=15). The treatment was administered orally for 30 days and anxiety-like behavior was evaluated in Plus Maze test. The efficacy of the treatment was measured through parasitemia (qPCR) and survival. The results were analyzed using ANOVA and multiple comparisons by Fisher's test. In relation to survival and parasitemia, the INF+Clo5mg/kg/day and INF+Clo1.25mg/kg/day groups presented significant differences with the INF+Vehicle group (p<0.05). Based on the evaluation of Plus Maze test, we found that infected mice had an anxiolytic behavior. The INF+Clo1.25mg/kg/day group did not present significant differences with the NI+Vehicle group. Finally, the concentration of Clo1.25mg/kg/day could be considered suitable for the treatment of this infection due to its anti-*T. cruzi* effectiveness and its ability to reestablish the behavioral pattern studied in the present work.

A54

INSECTICIDAL AND REPELLENT ACTIVITIES OF ESSENTIAL OILS FROM *ALOYSIA CITRIODORA* AND *MINTHSTACHYS VERTICILLATA* AGAINST *SITOPHILUS ZEAMAI* (COLEOPTERA: CURCULIONIDAE)

Arena JS, Peschiutta ML, Calvimonte H, Areco VA, Herrera JM, Defagó MT, Zygodlo JA

Instituto Multidisciplinario de Biología Vegetal (IMBIV-CONICET), Facultad de Ciencias Exactas, Físicas y Naturales, UNC. Córdoba – Argentina. E-mail: jzygodlo@unc.edu.ar

The maize weevil *Sitophilus zeamais* Motschulsky is a worldwide primary pest of stored maize. Essential oils (EO) constitute an important source of natural bioactive compounds and are considered interesting alternatives to conventional insecticides against stored-product pests. The aim of the current study was to evaluate the insecticidal and repellent activities of EO from lemon verbena (*Aloysia citriodora* Palau) and peperina (*Minthostachys verticillata* Griseb. Epling) and of their combination, against *S. zeamais*. The insecticidal effect was evaluated through fumigant assays. *Minthostachys verticillata* EO showed the strongest fumigant activity (LC₅₀=28.2 µL/L) followed by the combination of *A. citriodora* and *M. verticillata* EO, (CL₅₀=77.6 µL/L), while *A. citriodora* EO was not toxic at 600 µL/L. The repellent effect was evaluated using a two-choice olfactometer. The EO of *A. citriodora* and *M. verticillata* had repellent activity against the maize weevil; however, the combination of both EO had a higher effect suggesting a possible synergism between EO components. The EO studied, alone or in combination, had interesting insecticidal and/or repellent properties and could be suggested for use in management plans against *S. zeamais*.

A55

EVALUATION OF INSECTICIDAL ACTIVITY OF VOLATILE COMPOUNDS AGAINST THE VINE MEALYBUG

Peschiutta ML, Brito VD, Usseglio, VL, Zunino MP, Ordano MA, Zygodlo JA
Instituto Multidisciplinario de Biología Vegetal (IMBIV-CONICET), Facultad de Ciencias Exactas, Físicas y Naturales, UNC. Córdoba – Argentina. E-mail: jzygodlo@unc.edu.ar

Planococcus ficus Signoret, the vine mealybug, is a principal pest of vineyards worldwide. The objective of this study was to evaluate the insecticidal properties of volatile compounds on *P. ficus* and their phytotoxicity in the grapevine. The susceptibility of *P. ficus* adults to 2-decanone, 3-decanone, 3-octanone, cinnamaldehyde, cinnamyl chloride, α -methyl cinnamaldehyde, 1-octen-3-ol and 3-octanol was evaluated using a fumigant toxicity assay. The electrolyte leakage method (electrical conductivity measurement) was used to assess the leaf tissue damage produced by volatile compounds. Cinnamaldehyde, 2-decanone, 3-decanone, and α -methylcinnamaldehyde produced the highest adult mortality (54, 60, 71 and 77%, respectively) at a dose of 300 μ L/L, which was significantly different from the control group ($p < 0.01$, DGC). Cinnamaldehyde and cinnamyl chloride were the only non-phytotoxic compounds for grapevine leaves at the dose of 300 μ L/L. We concluded that cinnamaldehyde would be an effective volatile compound for *P. ficus* control due to its insecticidal activity and low phytotoxicity. This work contributes to the search of potential novel active compounds for organic control of mealybugs in vineyards.

A56

RELATIONSHIP BETWEEN DIVERSITY AND BIOMASS IN A NATURAL GRASSLAND OF THE SOUTH OF CÓRDOBA (ARGENTINA)

Mónaco N, Rosa MJ, Santa V, Barbero I
Ecología Vegetal, Facultad de Agronomía y Veterinaria, Universidad Nacional de Río Cuarto. Córdoba, Argentina.
E-mail: nmonaco@ayv.unrc.edu.ar

The relationships among diversity, biomass, and net primary productivity (NPP) of grassland systems are indicators of the functioning of these ecosystems; their knowledge provides management tools for its sustainable use and conservation. This work aims to establish correlations between diversity (H) with aerial biomass and NPP. Floristic composition and vegetation coverage (C) were surveyed monthly, from September 2014 to August 2015, in a natural grassland on the banks of the Chocancharava River. Aerial biomass was harvested and separated in green, dry, and mulch. Then they were dried in a stove to constant weight. Green biomass (Bv), aerial biomass (Ba), total biomass (Bt), and NPP were determined. The diversity indices (HC and HBa) were calculated with C and Ba, respectively. Correlations between HC and HBa, with biomass and NPP were established. The Infostat package was used for the statistical analyses. The wealth of flora yielded a result of 47 species. Regarding the diversity index, we found a statistically significant difference ($p < 0.05$) between HC and HBa, so that the importance value, C or Ba, used would influence its determination. The correlations values were: HC vs Bv 0.0953; HC vs Ba 0.0786; HC vs Bt 0.0165; HC vs NPP 0.11911 and HBa vs Bv 0.416; HBa vs Ba 0.2292; HBa vs Bt 0.3242 and HBa vs NPP 0.5037. A better fit was observed in the HBa vs biomass (Bv, Ba, and Bt) correlation than in HC vs biomass (Bv, Ba and Bt). Approximately 23% of the diversity would be explained by aerial biomass, and 50% by NPP.

A57

METHODS EMPLOYED IN THE MORPHOLOGICAL STUDY OF THE ANTARCTIC LIMPET NACELLA CONCINNA: DOES A NEW TECHNIQUE SHOW BETTER RESULTS?

Castillo S¹, de Aranzamendi MC¹, Martínez JJ²
¹IDEA, CONICET-UNC, Córdoba, Argentina; ²INECOA, CONICET-UNJu, Jujuy, Argentina. E-mail: santiagocastillo55@gmail.com

Nacella concinna is one of the most abundant macro-invertebrates of the Antarctic Peninsula, where it can be found from the coast to 100 m deep. Two morphotypes have been described based on the shell morphology and the platform zone in which they inhabit. The tidal morphotype has a tall and globose shell, while the subtidal morphotype shell is flatter. Traditionally, linear measurements were used to differentiate between individuals of both morphotypes. However, Elliptic Fourier Analysis (EFA) based on the contour of shells has shown interesting results in this and other species. In this work, we evaluated the differences between these two usually used morphometric methodologies. The maximum high, maximum length and maximum width were measured in tidal and subtidal individuals; EFA was performed in lateral and dorsal views. The results obtained were similar between traditional morphometry and lateral EFA, even though the latter presents a better resolution. Dorsal EFA does not provide much useful information to differentiate between morphotypes. Although the use of traditional morphometry proved to be a reliable tool to differentiate the morphs of this species, the lateral EFA would be the most appropriate methodology for the study of morphological variation and the distinction of morphotypes. This is because lateral EFA evaluates the plane formed by the maximum axes of variation between morphs, allowing a better characterization of the shape changes.

A58

DOES THE VEGETATION OF RURAL ROAD BORDERS CONTRIBUTE TO THE SUSTAINABILITY OF AGRICULTURAL PRODUCTION?

Nuñez CO, Zorza E, Amuchástegui MA, Alcorta JI, Mulko JA, Lucero A
Facultad de Agronomía y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba, Argentina.
E-mail: aamuchastegui@ayv.unrc.edu.ar

Plant diversity along rural road borders constitutes a source of species diversity that contributes to the sustainability of agricultural production; they also function as habitats or corridors to benefit small mammals, arthropods as pollinators, predators or parasitoids that could potentially regulate pest populations. The objective of this work was to determine the floristic composition and the properties of the vegetation associated with rural road borders in the area of La Carlota, Córdoba province. Two hundred censuses covering a total length of 10 km of road borders were carried out. The censuses were performed every 50 m, involving an area of 1 m² each one, where the abundance-coverage of all vascular species was determined. A total of 79 species distributed in 29 families were registered. The families that contributed most in number of species were Asteraceae and Poaceae. There were 46 native and 33 exotic species, for medicinal use (49), edible (39), pollinating and nectar producing (34), potentially invasive (29), toxic (32) with allelopathic properties (9). We verified from literature that 45 of those species are source of food to insects. We concluded that roadsides are an important source of plant diversity and play a key role in contributing to the sustainability of productive systems. It is essential to advance in their study to define the patterns of conservation and management.

A59

ARE CO-CULTURED RHIZOSPHERIC STRAINS UNDER ARSENIC STRESS MORE VIABLE?

Olmos Nicotra MF¹, Breser L², Porporatto C², Agostini E¹, Talano MA¹
¹Departamento de Biología Molecular, Facultad de Ciencias Exactas Físico-Químicas y Naturales, UNRC. ²CIT Villa María, CONICET-UNVM. Córdoba, Argentina. E-mail: folmos@exa.unrc.edu.ar

Co-inoculation of plants with rhizobacteria allows to complement different growth promoting properties, offering interesting results even under adverse environmental conditions such as high metals/metalloids concentration. The aim of this study was to evaluate the viability of two rhizospheric strains (*Bradyrhizobium japonicum* E109 and *Azospirillum brasilense* Az39) under AsV and AsIII exposure, and the effect of a phytohormone produced by Az39, indole-3-acetic acid (IAA), on E109 survival. Flow cytometry analysis revealed that As exposure led to a reduction of E109 cell size (FSC) but not Az39. Cell granularity (SSC) of both strains was not modified. Regarding to metalloid toxicity, both strains showed significant increase of mortality under AsIII treatment, whereas AsV did not produce a significant effect compared to bacteria grown under control conditions. It is noteworthy that when the bacteria were co-cultured their survival was improved, either under control or As conditions. However, IAA was not responsible for the major survival of E109. Thus, compounds exuded by Az39 should be studied to find the compound producing the protective effect on E109, the strain more sensitive to metalloid. Nevertheless, these findings indicate that there is a positive interaction between both strains when they are co-cultured in control condition or As stress. Therefore, co-inoculation would give several advantages to As-stressed plants.

A60

**GENETIC AND EVOLUTIONARY STUDIES IN *STREPTOCOCCUS MUTANS*
(BACTERIA: STREPTOCOCCACEAE)**

González-Ittig RE¹, Vera NS¹, Jiménez MG², Martínez J², Carletto Körber FP³
¹Instituto de Diversidad y Ecología Animal (IDEA), CONICET-UNC, Argentina; ²Hospital Universitario de Maternidad y Neonatología, UNC, Argentina; ³Cátedra de Integral Niños y Adolescentes, Facultad de Odontología, UNC, Argentina.
E-mail: raulgonzalezittig@yahoo.com.ar

Streptococcus mutans is one of the most widely distributed bacteria in the world associated with human dental caries. The acquisition of a diet rich in carbohydrates since the establishment of agriculture, would have increased the prevalence of caries and favoured the demographic expansion of *S. mutans*. In this study, we estimated the current levels of gene flow, the type of ancestry of the strains and inferred the time at which the expansion of *S. mutans* occurred. We obtained 40 strains of *S. mutans* from dental caries of children of Córdoba and sequenced the *aroE*, *gltA*, *gyrA* and *lepC* genes. The sequences were aligned with those of strains from Japan (n=89), Thailand (n=52) and Finland (n=12). We detected three genetic clusters with different frequencies in the four countries. The number of strains with pure or admixed genetic ancestry also varied among countries; the proportions of strains with admixed ancestry were: Argentina, 50%; Thailand, 13.5%; Japan, 19.1% and Finland, 8.3%. This result could be associated with the important human migration to Argentina, favoring recombination among strains of *S. mutans* of different geographical origins. The Extended Bayesian Skyline Plot analysis showed an important demographic growth approximately 5000 years ago, coincident with the change to a diet rich in carbohydrates.

A61

MOLECULAR ANALYSIS OF RecA-INDEPENDENT GENETIC RECOMBINATION IN *PSEUDOMONSAERUGINOSA*

Moro C, Borgogno MV, Monti MR, Argaraña CE

Departamento de Química Biológica Ranwel Caputto, CIQUIBIC-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba - Argentina. E-mail: camimoro17@gmail.com

Genetic recombination is involved in diverse physiological pathways that are essential for genome maintenance and diversification. At present, multiple mechanisms are known to mediate this process, both dependent and independent of the recombinase RecA. In order to study the recombination process in *P. aeruginosa* and *Escherichia coli*, we used a plasmid-based system which allows us to determine both homologous and homeologous recombination. Moreover, the recombination process generates Gentamicin resistance (Gm^r) and a functional copy of the *LacZ* gene and thus, the recombinant clones can be detected both by Gm^r and X-gal hydrolysis *in situ*. We found that in *E. coli*, the majority of the recombination events occur in a RecA dependent fashion and all the clones showed β -galactosidase activity. In *P. aeruginosa* however, an important fraction of recombination events occurred in a RecA-independent pathway. Furthermore, 10-20% of these clones showed no β -galactosidase activity, and contained numerous small-scale mutations in the recombined coding region of *LacZ*. These results suggest the existence, in *P. aeruginosa*, of a recombination mechanism independent of RecA, and unlike *E. coli*, significantly mutagenic.

A62

IMPORTANCE OF BIOLOGICAL NITROGEN FIXATION AND DENITRIFICATION IN *BRADYRHIZOBIUM*-SOYBEAN SYMBIOSIS IN THE PRESENCE OF NITRATE

¹Bruno CV, ¹Thuar AM, ²Castro SM

¹Facultad de Agronomía y Veterinaria. ²Facultad de Ciencias Exactas, Físico-Químicas y Naturales. Universidad Nacional de Río Cuarto. Río Cuarto. Argentina. E-mail: cbruno@ayv.unrc.edu.ar

In the symbiosis *Bradyrhizobium*-soybean, the biological nitrogen fixation (BFN) is a very useful tool to maintain a sustainable agriculture, although it is limited by different environmental conditions, among them, high nitrate concentrations in the soil. The objective of the present work was to analyze if nitrate addition affected the different indicators of BFN in soybean plants inoculated with denitrifying strains of bradyrhizobia. A completely randomized design was used and 5 mM KNO₃ was supplied in the growth medium. Plants were harvested at R2 (full flowering) and treatments were: control (non-inoculated) and inoculated with *Bradyrhizobium diazoefficiens* USDA110 and native strains (*Bradyrhizobium* sp, Per 3.61 and Per 3.64), respectively. The results showed that the nitrate addition did not affect carbon:nitrogen relation of plants inoculated with the different strains of bradyrhizobia. In contrast to *B. diazoefficiens*, the native strains showed increased amount of nitrogen derivative atmospheric and carbon isotopic composition enrichment ($\delta^{13}C$) in both growing conditions (0 and 5 mM nitrate). These results evidence the capacity of native strains (*Bradyrhizobium* sp. Per 3.61 y Per 3.64) of keeping an optimal BFN in presence of high nitrate concentration.

A63

SUSTAINABLE STRATEGY TO LIMIT THE TRANSLOCATION OF ARSENIC IN MAIZE

Peralta JM, Bianucci EC, Travaglia CN, Furlan AL, Castro SM

Facultad de Ciencias Exactas, Físico-Químicas y Naturales. Universidad Nacional de Río Cuarto. Río Cuarto, Córdoba. Argentina. E-mail: jperalta@axa.unrc.edu.ar

Arsenic (As) constitutes a global environmental problem. Some areas of Córdoba's groundwater presents As concentrations that exceed the maximum allowed for drinking water (0.1 μ M); this water can be absorbed by plants or be used for artificial irrigation. It is well-documented that maize interacts with strains belonging to the genus *Azospirillum*, which are able to promote plant growth. The aim of this research was to elucidate the differential response of the interaction established with bacterial strains and maize exposed to a realistic dose of As (3 μ M). The reference strains, *A. brasilense* AZ39 and *A. brasilense* CD, were able to grow at As concentrations almost 500-fold higher than that found in the plant. Regardless of the inoculated strain, a significant reduction of growth was observed, accompanied by oxidative damage. Metalloid distribution pattern was similar between tested strains; remarkably, maize inoculation with *A. brasilense* AZ39 revealed a significant lower translocation factor than *A. brasilense* CD, promoting As phytostabilization. In conclusion, *A. brasilense* AZ39 is presented as the best inoculant for limiting metalloid translocation and accumulation to edible parts of the cereal, avoiding fruit contamination.

A64

PHYLOGENETIC ANALYSIS OF BOVINE PARAINFLUENZA VIRUS TYPE 3 CIRCULATING IN REARING CALVES IN THE CENTRAL SOUTH REGION OF CÓRDOBA (ARGENTINA)

Raviolo JM¹, Lovera HJ², Sambuceti NG¹, Orías F¹, Pagliaricci MA¹, Trotti N², Navarro F², Spilki FR³

¹Departamento de Producción Animal, ²Departamento de Patología Animal FAV-UNRC. Río Cuarto, Córdoba. ³Laboratorio de Microbiología Molecular, Instituto de Ciências da Saúde, Universidade de Feevale, Brasil. E-mail: jraviolo@ayv.unrc.edu.ar

Studies based on different genes of Bovine Parainfluenza Virus type 3 (BPIV-3) have determined the existence of three different genetic subgroups. The objective of the work was to sequence partially and to perform a phylogenetic analysis of the hemagglutinin-neuraminidase (HN) gene of BPIV-3 strains circulating in rearing calves. Six amplimers (1009 bp) of the BPIV-3 HN gene from clinical samples of calves from three artificial rearings from the central south region of Córdoba were purified and then sequenced at the INTA Castelar laboratory. Nucleotide sequence alignment was performed by Clustal W, and the phylogenetic analysis was performed by the method of Neighbor-Joining using the MEGA5 software. The sequences obtained were compared with other homologous international isolates. Six samples were sequenced, but only five were analyzed, being isolated from three different rearing centers (1, 2, and 2). Nucleotide alignments and the phylogenetic analysis allowed classifying the five samples as BPIV-3 genotype A. This finding confirms that the same genetic pattern is circulating in different rearing centers of the central south region of Córdoba, coinciding with previous reports from other provinces of Argentina.

A65

MINIMUM INHIBITORY CONCENTRATION OF BACTERIOCINS L23 AND L60 ON ENTEROHEMORRHAGIC *ESCHERICHIA COLI* STRAINS

Zavala C¹, García M^{1,2}, Ruiz F^{1,2}, Asurmendi P^{1,2}, Camilletti A^{1,2}, Pascual L¹, Barberis L¹

¹Departamento de Microbiología e Inmunología, Facultad de Ciencias Exactas Físico- Químicas y Naturales, UNRC. Río Cuarto, Córdoba. Argentina. ²CONICET. E-mail: fruz@exa.unrc.edu.ar

Bacteriocins are natural metabolites with antimicrobial activity produced by bacteria. Its potential use in human and animal medicine, as well as in the food industry, has a growing scientific interest. The aim of this study was to determine the minimum inhibitory concentration (MIC) of the bacteriocins produced by *Lactobacillus fermentum* L23 and *L. rhamnosus* L60 on enterohemorrhagic *Escherichia coli* (EHEC) O157:H7 and non-O157:H7 strains. Neutralized cell free supernatants (NCFS) were obtained from both lactobacilli cultures, which contained their bacteriocins (640 AU/mL). To determine the MICs of these metabolites, the well-diffusion method was performed. Two-fold serial dilutions of each NCFS were tested on different EHEC strains (n=10). Bacteriocin L23 had MIC values between 40 and 80 AU/mL, whereas those of bacteriocin L60 ranged between 40 and 160 AU/mL for all EHEC strains. The findings of this study demonstrate that bacteriocins L23 and L60, even when very diluted, were able to inhibit the growth of EHEC at very low concentrations. These results differ from those reported by Pattanayaiying et al. (2014) and Ghrairi and Hani (2015), who testing other bacteriocins, did not find inhibitory activity on EHEC growth. In conclusion, bacteriocins L23 and L60 could represent a valuable strategy for the biological control of EHEC.

A66

PROTECTION OF LUTEOLIN AND CHLOROGENIC ACID ON THE DAMAGE CAUSED BY AFLATOXIN B1 IN RATS TREATED FOR 30 DAYS: BIOCHEMICAL PARAMETERS AND WEIGHT GAIN

Sabini C, Escobar F, Menis Candela F, Magnoli A, Cariddi N, Oliva M

Departamento de Microbiología e Inmunología, Facultad de Ciencias Exactas Físico- Químicas y Naturales, UNRC, Río Cuarto, Córdoba. E-mail: csabini@exa.unrc.edu.ar

Fungal toxins have negative effects on the production parameters causing economic losses. Aflatoxin B1 (AFB1), produced by strains of *Aspergillus flavus* and *A. parasiticus*, is carcinogenic, teratogenic, hepatotoxic, immunotoxic, and at high doses can be lethal. Natural products have shown to possess capacity for detoxifying mycotoxins. The objective of this study was to evaluate the ability of luteolin (L) and chlorogenic acid (CHLA) to protect from AFB1-induced damage in rats treated for 30 days. Groups of 4 Wistar rats were submitted to different treatments for 30 days. G1: L (0.5mg/kg bw), G2: L (0.5mg/kg bw) + AFB1 (40µg/kg bw), G3: CHLA (5mg/kg bw), G4: CHLA (5mg/kg) + AFB1 (40µg/kg), G5: AFB1 (40µg/kg), and G6: CN (0.1M NaHCO₃, pH 7.4 + 0.05% DMSO). The animals consumed food and water *ad libitum*. The following biochemical parameters were analyzed from serum samples: glucose, urea, albumin, proteins, aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase. The weight gain of the rats was also determined. Glucose, urea, albumin, proteins, and AST showed normal values for all treatments. In contrast, alkaline phosphatase and ALT showed elevated values in the treatment with AFB1, indicating liver damage. These parameters were improved by CHLA treatment. The evaluation of the weight gain indicated that the rats of the groups receiving CHLA and CHLA + AFB1 weighed 36% and 28% more than the AFB1 group.

A67

**PRELIMINARY STUDIES OF PHYTOTOXICITY OF COLD AQUEOUS EXTRACT OF
ACHYROCLINE SATUREIODES IN SOYBEAN, AS A POTENTIAL ANTIVIRAL**

Accotto E¹, Carezzano E¹, Reyna P², Rodríguez Pardina P², Sabini MC¹

¹Departamentode Microbiología e Inmunología. Facultad de Ciencias Exactas Físico- Químicas y Naturales, UNRC, Río Cuarto, Córdoba.²IPAVE-INTA, Córdoba. E-mail: csabini@exa.unrc.edu.ar

Achyrocline satureioides (Asteraceae), known as “marcela del campo”, has numerous beneficial properties; among them, its antiviral activity. Argentina is the third largest producer of soybeans in the world. There are species of microorganisms that affect and decrease the productivity of this important crop. In our country, the most widespread and important one is the *Soybean mosaic virus* (SMV) which produces a seed spot that can affect grain marketing. The aim of this work was to evaluate the phytotoxicity of cold aqueous extract of *A. satureioides* on soybean plants. The cold aqueous extract (CAE) was prepared from aerial parts of the plant by extraction with distilled water at room temperature for 48 h. On the other hand, Don Mario 4800 soybeans were germinated. Three groups of 10 individuals were assayed: negative control: sterile water; Treatment 1: 0.5 mg/ml of CAE; Treatment 2: 1 mg/ml of CAE. The plants were treated at 0, 7 and 14 days. At day 21, the following parameters were recorded: changes in leaf morphology and color, leaf fall, seedling length and fresh weight of the plant. The treatments with CAE at both concentrations tested did not show differences with respect to the negative control; suggesting they do not have phytotoxic effects on soybean. These studies are promising and encourage the continuity of this research through the evaluation of CAE antiviral capacity against SMV.

A68

**EFFECT OF OZONE ON BACTERIAL CONTAMINATION OF FRUITS
DURING POSTHARVEST HANDLING**

Guevara E, Viale S, Tamiozzo L, Will I, Gesumaria C, Llanos Viale A, Maero J

Área de Fruticultura, Dpto. de Producción Vegetal, Facultad de Agricultura y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba, Argentina. E-mail: anallviale@gmail.com

Cleaning is said to be one of the most important stages during postharvest handling due to its relationship with shelf life and food safety. At this stage, chlorine is usually added to water bringing about consequent negative environmental effects. The aim of this study was to evaluate the effect of ozone, as an alternative to chlorine, on bacterial contamination of fruits during postharvest handling. The ozone equipment from IMEB (Institute of Evolutionary and Biological Medicine) Río Cuarto was used, incorporating a flow rate of 8.15 g/h⁻¹ in water. *Escherichia coli* ATCC 25922 was exposed to ionized water at different times, 0; 5; 10; and 20 minutes. Subsequently, the number of cells surviving ozone exposure was evaluated. To this end, after the dilutions were made, samples from three consecutive dilutions were plated in triplicate on each agar plate. They were incubated at 37°C for 48 hours and eventually the surviving colonies were counted. The dilution used was the one in which the number of colonies were from 30 to 300, determining the average of such dilution. It was found that the surviving cells were significantly different (p<0.05) 100; 62.5; 39 and 17% at 0, 5, 10, and 20 minutes of exposure to ozonated water, respectively. The results indicate an important ozone bactericidal effect on *E. coli*. However, it is necessary to focus on further studies that reduce the time exposure of fruits to package cleaning.

A69

**BIOACTIVITY OF NATURAL PHENOLIC COMPOUNDS AGAINST STRAINS
OF *PSEUDOMONAS SYRINGAE* ISOLATED FROM SOYBEAN**

Merlo C, Archilla M, Oliva M de las M, Madariaga LG, Dambolena JS, Zaio Y, Zygadlo JA

Instituto Multidisciplinario de Biología Vegetal (IMBIV-CONICET). Facultad de Ciencias Agropecuarias-UNC. Facultad de Ciencias Exactas, Físico-Químicas y Naturales-UNRC. Córdoba, Argentina. E-mail: cmerlo@agro.unc.edu.ar

Pseudomonas syringae is one of the main causal agent of plant bacterial diseases. The objective was to evaluate the antibacterial activity of natural phenolic compounds against *Pseudomonas syringae* strains isolated from soybean. Four phytopathogenic strains (Q, LS3, EM1 and LSC13) isolated from soybean plants of Córdoba province and provided by the Department of Microbiología e Inmunología of the Facultad de Ciencias Exactas, Físico-Químicas y Naturales (UNRC) were used. The minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) of 11 phenolic compounds (carvacrol, thymol, isoeugenol, eugenol, vanillin, o-cresol, p-cresol, m-cresol, estragole, guaiacol and phenol) were evaluated. Carvacrol and thymol showed the highest bioactivity against the 4 strains evaluated. The thymol and carvacrol MICs were 0.23 mM and 0.13 mM, respectively, while the MBC value for thymol was 0.27mM and for carvacrol, 0.22mM. The compounds with the lowest antibacterial activity were phenol, guaiacol, and vanillin. All strains presented similar sensitivity to the evaluated compounds, which indicate their potential use as alternative to protect crops from bacterial infections.

A70

IN VITRO EFFECT OF FRUITS EDIBLE COATINGS ON THE GROWTH OF BOTRYTIS CINEREA COLONIES

Tamiozzo L, Viale S, Thuar A

Área de Fruticultura, Dpto. de Producción Vegetal, Facultad de Agricultura y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba, Argentina. E-mail: ltamiozzo@ayv.unrc.edu.ar

Strawberries are non-climacteric fruits that exhibit high respiratory activity and high perishability. They have a very short postharvest life of 7 to 10 days if stored at 2°C and 90% humidity. This characteristic is due to their respiratory rate, their susceptibility to mechanical damage, and the invasion of some pathogenic fungi. During the postharvest treatment of strawberries, *Botrytis cinerea* is the most common organism causing significant fruit losses. To reduce these losses, different compounds are used as edible coatings (EC). They constitute a continuous and thin matrix that is structured around the fruits. The objective of the study was to determine the *in vitro* effect of EC on the growth of *Botrytis* colonies. The strawberries used were a variety of Albion that presented colonies of fungi identified as *Botrytis*. Portions from the area of fungal growth were extracted and placed in Petri dishes with agar. Samples were treated with one of the following EC: aloe vera, stevia, or calendula. A control without coating was included. Each treatment was performed with 2.5 ml per box with 9 replicates incubated at 30°C for 48 hours. The results showed significant differences ($p < 0,05$) among the treatments, with lower colony counts in stevia and calendula treatments (0 and 0.22 average colonies) than in aloe and control (1 to 1.1 colonies average per plate). This demonstrates the positive effect of ECs based on stevia and calendula for the control of *Botrytis* during postharvest storage.

A71

EFFECT OF OZONE ON FUNGAL CONTAMINATION OF FRUITS DURING POSTHARVEST HANDLING

Viale S, Guevara E, Tamiozzo L, Thuar A, Llanos Viale A, Maero J, Torres J

Área de Fruticultura, Dpto. de Producción Vegetal, Facultad de Agricultura y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba, Argentina. E-mail: sviale@ayv.unrc.edu.ar

To obtain a good quality fruit, the conditioning stage requires a cleaning process. The water used for washing commonly has disinfectants, which can generate adverse effects on the environment and health. Ozone can be a sustainable alternative to the packing of fruits. The objective of this study was to evaluate the *in vitro* effect of ozonated water on fungi contaminating fruits. An ozone generation equipment from IMEB (Institute of Evolutionary and Biological Medicine) of Río Cuarto was used, incorporating a flow rate of 8.15 grO₃.h⁻¹ in water. All the peaches used contained fungi and from them the material corresponding to *Penicillium sp.* was isolated. These samples were diluted in sterile water, exposed to the ozonated water, and maintained in constant agitation to maintain a homogeneous solution. Samples were extracted at: 1, 5, and 15 minutes; a control without ozone treatment was included. Three replicas were plated on Agar plates and were incubated at 30°C during 48 hours. Afterward, the sum of the diameters of the *Penicillium* colonies was recorded on each plate. The average diameter of colonies was 7.4, 4.3, 1.9, and 1.7 cm for the control (1, 5, and 15 minutes, respectively). Although there were no statistically significant differences, the reduction in the diameter of fungus colonies with regards to the control was 42, 74, and 77.3%. These preliminary results could indicate an effect of ozonated water on *Penicillium sp.*

A72

IN VITRO EFFECT OF FRUITS EDIBLE COATINGS ON THE GROWTH OF PENICILLIUM COLONIES

Tamiozzo L, Viale S, Thuar A

Área de Fruticultura, Dpto. de Producción Vegetal, Facultad de Agricultura y Veterinaria. Universidad Nacional de Río Cuarto. Córdoba, Argentina. E-mail: ltamiozzo@ayv.unrc.edu.ar

Peaches are climacteric fruits that have a post-harvest life ranging from 1 to 5 weeks if kept in proper storage. One of the main factors of post-harvest loss is rot caused by fungi, such as *Penicillium sp.* In order to reduce these post-harvest losses, different compounds are used as edible coatings (EC). They constitute a continuous and thin matrix, which is structured around the fruits. The objective of the study was to determine the *in vitro* effect of three edible coatings on the growth of fungal colonies responsible for post-harvest rot of fruits. Elegant Lady peaches presenting fungal colonies identified as *Penicillium* were used. Portions were extracted from the area of fungal growth and they were eventually placed in Petri dishes with Agar, adding each treatment at the rate of 2.5 ml per box with 9 replicates. They were then incubated at 30°C during 48 hours. The treatments consisted of three EC: aloe vera, stevia, and calendula, as well as their control without coating. The results showed significant differences ($p < 0,05$) among the EC and the control. The average number of colonies was of 1, 1.1, 2, and 19.1 for stevia, calendula, aloe vera, and control, respectively. There were no differences among coatings. However, the treatments with better impact were stevia and calendula, while aloe presented twice as many colonies. This demonstrates the positive effect of EC on post-harvest control of *Penicillium*.

A73

MOLECULAR DETECTION OF BOVINE PARAINFLUENZA VIRUS TYPE 3 IN REARING CALVES FROM SOUTHERN CÓRDOBA (ARGENTINA)

Raviolo JM¹, Lovera HJ², Sambuceti NG¹, Orías F¹, Pagliaricci MA¹, Trotti N², Navarro F², Paez J¹, Spilki FR³

¹Departamento de Producción Animal, ²Departamento de Patología Animal FAV-UNRC. Río Cuarto, Córdoba. ³Laboratorio de Microbiología Molecular, Instituto de Ciências da Saúde, Universidade de Feevale, Brasil. E-mail: jraviolo@ayv.unrc.edu.ar

Bovine Parainfluenza virus type 3 (BPIV-3) is recognized as a pathogen responsible for acute respiratory disease in calves, resulting in significant economic losses. The aim of this study was the detection of BPIV-3 by RT-PCR from nasal secretions. Fifteen nasal swabs were collected of calves with clinical symptoms compatible with BPIV-3 infection in three rearing centers of Holstein calves located in San Basilio (Córdoba Province). RNA was extracted with TRIzol®. cDNA synthesis was carried out with Super ScriptIII® with random primers. RT-PCR allowed to amplify a fragment of 1009 bp of the hemagglutinin neuraminidase (HN) gene in seven clinical samples; one of them corresponded to one rearing center and three, to each of the remaining rearing centers. We conclude that RT-PCR was adequate and reliable for the detection of BPIV-3 from clinical samples and would allow us to study the molecular epidemiology of BPIV-3 strains circulating in the region. The climatic conditions prevailing in the region, the lack of comfort and animal welfare, and the poor management of the rearing calves favor the outbreaks of bovine respiratory disease caused by this virus.

A74

EFFECT OF BIOFORMULATION BASED ON *AZOSPIRILLUM SPP.* AND / OR *PSEUDOMONAS SPP.* ON *FUSARIUM SP.* ISOLATED FROM A NATURAL PATHOSYSTEM IN CHICKPEA

Sosa D M, Rosas S B

Departamento de Biología Molecular, Facultad de Ciencias Exactas, Físico-Químicas y Naturales. Universidad Nacional de Río Cuarto, Córdoba, Argentina. E-mail: srosas@exa.unrc.edu.ar

The chickpea (*Cicer arietinum* L.) is an expanding winter crop in our country, since it has zones of optimal agroecological conditions for its production. However, the time of implantation also provides the conditions for the development of fungal diseases. Among these, vascular fusariosis produced by *Fusarium* sp. is currently the most important. Rhizobacteria such as *Azospirillum spp.* and *Pseudomonas spp.* could be applied as bioinoculants and/or biopesticides. In this work, we studied a natural pathosystem developed in a field of chickpea in the locality of General Cabrera, Córdoba, Argentina. Plant samples presenting signs of vascular fusariosis were collected from which 32 isolates were characterized as *Fusarium sp.* After performing a pathogenicity test in growth chamber, 3 potentially pathogenic isolates were determined. The *in vitro* and growth chamber antibiosis assays performed with *Azospirillum spp.*, *Pseudomonas spp.*, and a mixture of both, showed that the bioformulation based on *Pseudomonas spp.* (applied individually or combined with *Azospirillum spp.*) has a greater inhibitory effect on fungal growth and mycelial development than the treatment based on *Azospirillum*.

Author index

A

Accotto, E A67
 Achimon, F A40
 Agostini, E A37, A59
 Aguggia, J A44
 Aguirre Varela, AD A45
 Aiassa, D A43
 Alcorta, JI A58
 Alessio, A A38
 Aluffi, M A20
 Alzugaray ME A2
 Amaiden MR A10
 Amé, MV A14
 Amuchástegui, MA A58
 Anastasia, A A5, A23, A26, A27,
 Andreo, V A39
 Archilla, M A69
 Areco, VA A54
 Arena, JS A54
 Argañaraz, CI A46
 Argaraña, CE A61
 Argüello, C A42
 Asurmendi, P A65
 Asurmendi, S A13

B

Barberis, C A20
 Barberis, L A65
 Barbero, CA A22, A24, A25, A38
 Barbero, I A56
 Barrionuevo, V A21
 Benito, N A20
 Bergero, MF A36
 Bertolotti, MA A45, A48
 Bertone, PA A28
 Bertrand L A14
 Bianucci, EC A63
 Bisbal, M A27
 Blois, D A25, A38
 Boaglio, CM A28
 Boeris, PS A18
 Bonino, R A38
 Borgogno, MV A61
 Bosch, P A22, A24, A25, A38
 Bravo, G A41
 Breser, L A59
 Brito, VD A40, A55
 Broll, V A17
 Bruno, CV A62
 Bulfon, M A21, A41,

C

Cagnolo, SR A45, A48
 Calderón, G A39
 Calvimonte, H A54
 Camilletti, A A65
 Campetelli AN A10
 Canavoso, LE A32, A34
 Carezzano, E A67
 Carezzano, F A51
 Carezzano, FJ A47

Cariddi, N A66
 Carletto Körber, FP A60
 Carlini, CR A17
 Carlini, V A53
 Carranza, C A20
 Casale CH A10
 Castillo, S A57
 Castro, SM A62, A63
 Cecchini, ME A43
 Chiacchiera, S A20
 Chiapero, F A49, A51
 Chiappero, MB A39
 Conti G A13
 Cordier, M A44
 Correa, A A36
 Coste Grahl, MV A17
 Cots, D A28
 Cristofolini, AL A29
 Cruz Del Puerto, MA A30

D

Dambolena, JS A69
 Danelon, V A44
 Daniotti, JL A3
 Dardanelli, MS A31, A35
 de Aranzamendi, MC A57
 Defagó, MT A54
 Diaz, LA A8
 Diaz, T A28, A29
 Dorflinger, K A47

E

Echevarría, D A48
 Elías, DH A49, A51
 Escobar, F A66
 Escobar, FM A42

F

Fernandez, EM A50, A52
 Fernandez, I A37
 Fiorimanti, MR A29
 Flores Mariscal, S A49, A51
 Flores Martín, J A9, A30
 Fruttero, LL A12, A17
 Furlan, AL A63

G

Gallardo, D A41
 García, M A65
 Gardenal CN A7
 Gazal, NG A23
 Genti-Raimondi, S A30
 Gesumaria, C A68
 Ghirardi, R A47
 Gleiser, RM A46
 González, PS A37
 González-Ittig, RE A7, A39, A60
 Guevara, E A68, A71

H

Herrera, JM A54

I

Ibarra, L A24

J

Jacquat, AG A40

Jandar Paz, CM A26

Jiménez, MG A60

L

Lara, AL A31

Lazzari, CF A52

Ledesma, CR A50, A52

Ledesma, MM A50, A52

Leyria, J A6, A32, A34

Liaudat, AC A24, A25, A38

Liffourrena, AS A19

Llanos Viale, A A68, A71

Lo Presti, MS A53

Lovera, HJ A64, A73

Lucchesi, GI A18, A19, A36

Lucero, A A58

M

Madariaga, LG A69

Maero, J A68, A71

Magnago, F A43

Magnoli, A A66

Magnoli, CE A15, A20

Magnoli, K A20

Maldonado, C A11

Mañas, F A43

Marino DJ A14

Martin, ML A39

Martínez, J A60

Martínez, JJ A57

Mascó, D A44

Menis Candela, F A66

Meringer, A A18

Meringer, MV A31

Merkis, CI A29

Merlo, C A69

Mónaco, N A56

Monesterolo NE A10

Monferrán MV A14

Monti MR A61

Morilla, G A25, A38

Moro, C A61

Mossello, J A49, A51

Moyetta, NR A17, A32

Mulko, JA A58

N

Navarro, F A64, A73

Nigra A A10

Nuñez, CO A58

O

Oliva, M de las M A69

Oliva, M A66

Olmos Nicotra, MFA59

Ordano, MA A55

Orías, F A64, A73

Ovejero, M A27

P

Paez, J A73

Paisio, CE A37

Panzetta-Dutari, GM A30

Pascual, L A65

Peppino Margutti, M A33, A35

Peralta, JM A63

Perez Harguindeguy N A1

Perin, APA A17

Perotti, R A37

Peschiutta, ML A54, A55

Pinotti, JD A39

Pizzolitto, RP A40

Porporatto, C A59

R

Racagni, G A31, A33, A35

Ramos, FO A32, A34

Raviolo, JM A64, A73

Regnicoli, J A20

Reyna, L A30

Reyna, M A35

Reyna, P A67

Ridano, M A16

Rivarola, A A44

Rivarola, CR A22, A24, A25, A38

Rivarola, HW A53

Rivelli JF A10

Rivera, PC A7

Rivero, R A22, A24, A38

Rodriguez Pardina, P A67

Rodríguez, N A22, A24, A25, A38

Rojas, ML A30

Roma, D A43

Romanini, MC A28

Ronderos, J A2

Rosa, MJ A56

Rosas, S.B A74

Rubio, GD A46

Ruiz, AD A46

Ruíz, F A65

Ruíz, FO A28

S

Sabini, C A66

Sabini, MC A67

Sambuceti, NG A64, A73

Santa, V A56

Santander, VS A10

Sosa, D.M A74

Spilki, FR A64, A73

Staniscuaski, F A17

Stenglein, SA A35

Strauss, M A53

T

Talano, MA	A59
Tamiozzo, L	A68, A70, A71, A72
Thuar, A	A62, A70, A71, A72
Torre, L	A4
Torres, AM	A35
Torres, CV	A42
Torres, J	A71
Torretta, ME	A43
Travaglia, CN	A63
Trotti, N	A64, A73

U

Uberti, AF	A17
Urquiza, SP	A47, A49
Usseglio, VL	A55

V

Valdés ME	A14
Varea, C	A43
Venturuzzi A	A13
Vera, NS	A60
Viale, S	A68, A70, A71, A72
Vilchez, AC	A33
Villalobos-Sambucaro MJ	A2
Villasuso, AL	A31, A33, A35

W

Wheeler, JT	A28
Will, I	A68

Z

Zaio, Y	A69
Zamponi, E	A27
Zavala, C	A65
Zavallo D	A13
Zorza, E	A58
Zunino, MP	A55
Zygodlo, JA	A40, A54, A55, A69