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LECTURES

“Miguel Lillo” Lecture

A1

THE ANCIENT *TUCMA* UNDER THE TAWANTINSUYU AND THE SPANISH EMPIRES

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During the fourth or fifth century AD the so called Ancient States appeared in the American continent. These States, which lay in what is now Mexico, Guatemala and Belize, reached their highest point with the appearance of the Aztec and Mayan Empires. In South America, this phenomenon took place in the Andean section of Ecuador, Peru, Bolivia, Chile and Argentina and culminated with the expansion and conquest of the Inca Empire or Tawantinsuyu, starting in the 15th century. The Incas invaded and conquered the northern half of Chile, the Andean Northwest of Argentina and the Cuyo area, which became part of that State.

There is abundant archaeological evidence as well as documentary sources, assumptions and explanations about the Inka domain south of Lake Titicaca. This area is considered the southern quarter of the Empire: the Kollasuyu, a scenario of approximately 1 million km² currently shared by three countries: Argentina, Bolivia and Chile. In this territory there still are hundreds of technological and artistic artifacts as well as approximately 400 settlements with original architectural components that were built under the Tawantinsuyu between the late 15th century and the first third of the 16th century.

Within the Old Tawantinsuyu territory nearly 200 settlements with the classic Inca architecture were founded at Tucma. Within these remains archaeological evidence of Inka power can be found: towns (llajtas), garrisons (pukaras), agricultural and mining centers, dairies, roads (Qhapac Ñan), worship places in the high peaks and administrative centers. These centers, most of which served as regional capitals -wamanis-, treasured classic Inca architectural components such as squares -aukaipatas- with thrones called ushnos, sheds or kallankas, warehouses or collicas, and the famous Inka trail or Qhapac Ñan, which spread over 2000 kilometers in the Northern Andes.

However, this geopolitical situation lasted barely half a century, since a new conquest took place. From the second half of the sixteenth century in Northwest sections of Argentina, Cuyo, Central Range and part of the Gran Chaco, the Spanish Empire started colossal transformations.

Opening Lecture

A2

GLOBAL CHANGE: HOW DO WE REACH THE END OF THE CENTURY?

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A child born today will be 36 years old in 2050; living in a world with over 9 billion people, temperatures 1 to 3°C higher than today, with limited and costly access to fossil fuels, amongst a growing wave of extinctions rivaling the Cretaceous-Tertiary mega-extinction, and with a high proportion of poor and displaced people. Atmospheric and ocean sinks for greenhouse gases will be overwhelmed, while extraction of resources will exceed replacement capacity. Before 2100 the Earth will likely go through a major crisis, within the lifetime of children living today. How we emerge after this bottleneck (more or less resources, biodiversity, quality of life) depends on today's actions.

These forecasts raise three questions: are they true? Does it matter? If it matters, what do we do about it?

The first question requires answers based on probabilities and seeking alternative scenarios. However, a level of irreducible uncertainty always remains: no matter how much we care for the child, a car accident could mean s/he will not see 2050. Whatever we do, a 10 km diameter meteorite could radically alter the planetary trajectory of change.

Deciding whether it is important is a value judgment depending on how we perceive our material, cultural and spiritual interests. Pragmatically we are concerned with obtaining food, water and shelter every day; services which are provided by nature, but are not dependent on which species survive.

What we do about it depends on the answers to the first two questions. To do something we must know what we are aiming at, what world we want, with what level of biodiversity, equitability and happiness.

Many actions can be taken, but they can be grouped into coherent sets. Most discussion and initial implementation has involved techno-political actions. There are also campaigns to change thousands of behaviors at the individual level (changing to high-efficiency light bulbs or eating less meat, using renewable energy, recycling, buying local produce, etc). 'Green' products and marketing respond to this demand, with ongoing debates on the transparency of such efforts (greenwashing).

Since emissions are growing faster than expected and internationally agreed, it is necessary to adapt to inevitable changes. This may include migrating and acclimating productive systems, holistic landscape planning to increase resilience, ensure the supply of basic services to cities such as food and water, adapt cities and houses to increased temperatures, better water and energy use efficiency, etc.

Present paradigms are no longer adaptive once the Earth is saturated. As long as we remain on Earth, wellbeing depends on changing course: from colonizer to stress tolerant, acknowledging and constraining selfishness, redistributing resources, sustainability, intellectual development, happiness and altruism. Only a population which understands complex connections and limitations will be able to navigate the new world.

Luckily, this is not the first time humans have encountered limits forcing a change of strategies. Lessons from history should help us find possible paths through the coming bottleneck and beyond.

Other lectures

A3

DETERMINATION OF SPECIES OF WHITE GRUBS (COLEOPTERA: SCARABAEIDAE) PRESENT IN NATURAL PASTURELANDS, WEEPING LOVEGRASS PLOTS AND CULTIVATED LANDS IN THE PHYTOGEOGRAPHIC AREA I OF THE PROVINCE OF SAN LUIS

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Coleoptera: Scarabaeidae larvae are an integral part of the edaphic fauna. Their populations benefit from techniques such as no-till farming: population growth is associated with the increase in cover and absence of tillage, among other aspects. The large Scarabaeidae family, with more than 20,000 species, belongs to the “white grubs” group. Many of its members are phytophagous and harmful to agriculture. These larvae live in lands of The Pampas (Argentine lowlands) and belong to different species. These larvae are characterized by their “C” shape and they feed preferably on grass roots and stubble on the surface, but not all “white grubs” damage crops since one important group has specialized in the decomposition of the feces of vertebrate animals (dung beetles) and the adults present different eating habits (Frana J. et al., 1996). The “white grubs” group is one of the most closely related to an undisturbed habitat, which is why the growth rate of their populations was able to increase throughout the years. For this reason, before taking any control action, it is imperative to carry out samplings so as to quantify the population density of “white grubs” and to perform a correct identification of species (Imwinkelried et al., 2003).

The presence of stubble and soil stability makes physicochemical characteristics and several biological parameters favorable to the presence of insects, among which “white grubs” and others exist (Aragón J., 2003).

In the core of the Pampas, it has been reported that the most populous species in the group of “white grubs” are *Cyclocephala signaticolis*, *C. putrida*, *C. modesta*, *Anomala testaceipennis*, *Heterogeniata bonariensis* and *Diloboderus abderus*. Among them, the species which has a proved impact on the production of wheat and corn is *D. abderus* (Iannone, 2006). *D. abderus* and *A. testaceipennis* are two of the species cited for Argentina which show the greatest abundance in the soil. They are reported to have phytophagous habits (Frana, 2002; Gamundi et al., 2002; Iannone, 2004; Imwinkelried, 2003; Massaro, 2003, 2005). The lack of studies about diversity of “white grubs” (Coleoptera: Scarabaeidae) in the area of greatest agricultural and livestock production in the province of San Luis resulted in studies that provide a database for the integrated handling of the different systems of production in the area. In 2006, Bonivardo et al. determined for two different agro-ecological regions the species present in the area of Villa Mercedes in the province of San Luis and in the area of General Lavalle in the south of the province of Córdoba, finding the following species in common: *D. abderus*, *P. bonariensis*, *C. putrida*, *C. modesta* and *A. testaceipennis*; *Bothynus striatus* only in San Luis and *C. signaticolis* only in Córdoba. In 2008, Bonivardo et al. mentioned the genus *Gymnetis* for the first time (Scarabaeidae: Cetoniinae), with saprophagous habits, in the province of San Luis. In 2009, Bonivardo et al. determined the species present, their relative abundance and the influence of the soil cover in populations of different species of white grubs for the Central-East area of the province of San Luis. In 2013, Bonivardo et al. determined the specific richness and number of individuals of each species of white grubs in the phytogeographic area I of the province of San Luis, in different growing conditions, such as weeping lovegrass, natural pasturelands and annual crops. In each of the production situations in the plots, the species found were:

Natural Pastureland: 1) *Cyclocephala putrida*, 2) *Philochloenia bonariensis*, 3) *Anomala testaceipennis*, 4) *Liogenys* sp. and 5) *Diloboderus abderus*. Cultivated Lands: 1) *Cyclocephala putrida*, 2) *Anomala testaceipennis*, 3) *Liogenys* sp., 4) *Cyclocephala modesta* and 5) *Bothynus* sp. Weeping Lovegrass: 1) *Cyclocephala putrida*, 2) *Anomala testaceipennis* and 3) *Leucothyrus* sp.

These results show that: a) the weeping lovegrass plot has lower specific richness, probably due to the single food resource for many years, and less coverage of soil in comparison to the natural pastureland, which could produce changes in edaphic conditions; b) in the samplings of natural pastureland and cultivated lands, a greater diversity of species has been observed; c) in all three conditions the constant presence of *Cyclocephala putrida* was observed, which could be the result of a broad feeding regime.

The determination of species, in all cases, was carried out with: Code for the identification of Scarabaeidae larvae inhabiting the soil of the central region of Santa Fé, by Alvarado, L., modified by Frana (Frana, 2003) and Code for the identification of edaphic larvae of the genus of Melolonthidae in Argentina, Moron Rios, 2006.

A4

HERBICIDE RESISTANCE IN SUNFLOWER: ROLE OF AHAS GENE FAMILY AND DIAGNOSTIC TESTS DEVELOPMENT

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AHAS-inhibiting herbicides act by blocking the first step in the biosynthesis of branched-chain amino acids: valine, leucine and isoleucine. These herbicides include five chemical families and present low toxicity. Three genes (*ahas1*, *ahas2* and *ahas3*) code for the catalytic subunit of this enzyme. Four different alleles that confer herbicide resistance were reported for the *ahas1* locus. *Ahas11-1* and *Ahas11-3* (which harbour a mutation in Ala 205 and Ala 122, respectively) confer resistance to imidazolinone herbicides. Both alleles are being used for the production of sunflower resistant hybrids in Argentina. *Ahas11-1* and *Ahas11-2* (which harbour a mutation in Pro 197, conferring sulfonyleurea resistance) were found in weedy sunflower populations. Recently, a new allele called *Ahas11-4* (Trp 574) that endows a broad range resistance to different herbicide families was discovered. One of the objectives of our group was to study the expression pattern of *ahas* genes, both at transcriptional (through qRT-PCR) and enzymatic activity levels. The *Ahas1* transcript was the most abundant one in leaves. High AHAS activity was also observed in this tissue. Two genotypes carrying the *Ahas11-1* allele (HA425 and 1058-1 lines) showed a significantly higher *ahas1* transcript level than the wild-type susceptible genotype (HA89 line). However, AHAS activity did not differ among genotypes. The altered transcriptional regulation of *ahas1* due to the *Ahas11-1* allele may compensate a reduced functionality of this isoform, allowing full enzymatic activity in the resistant plants. Analysis of *ahas1* expression in different vegetative stages allowed a better understanding of the optimal herbicide application timing. On the other hand, we set up bioassays both at whole plant and at biochemical levels for the identification of genotypes with different degrees of herbicide resistance. The evaluated bioassays included *in vitro* and non-sterile germination tests and *in vivo* AHAS activity assays. The evaluation of the root architecture in 7-day plantlets in a soil-less bioassay was the most efficient and simple test for screening herbicide resistance. This diagnostic method could be useful to help breeding programs. Besides, it could be used in the evaluation of different sunflower germplasm and different herbicide families in order to establish cross patterns of resistance. Finally, this diagnostic test could be a useful tool when monitoring resistance genes in wild sunflower populations.

A5

ADVANCES IN THE KNOWLEDGE OF THE DAIRY COW UNDER GRAZING CONDITIONS DURING THE TRANSITION PERIOD

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The transition from the nonlactating pregnant to the nonpregnant lactating status is a period of dramatic changes for the cow, which has to adapt its metabolism to the strong requirements for milk production. The balance with which the cow resolves this period determines the animal's capacity to maximize milk production and quality, evade metabolic diseases and ensure subsequent pregnancy. Nutritional improvement, genetic selection and animal management have increased milk production in the last decades and this is associated with a decrease in reproductive performance. This review summarizes the studies performed during the last few years in Uruguay, with emphasis on nutritional management, endocrine and molecular mechanisms of nutrient partitioning and their relationship with fertility in dairy cows. Studies that investigate the effect of different nutritional managements before or after calving on milk production, metabolic and endocrine profiles and reinitiation of ovarian cyclicity were investigated in primiparous and multiparous cows. The productive efficiency of different dairy biotypes was characterized. Finally, a single nucleotide polymorphism of insulin-like growth factor I gene was associated with a shorter calving to first service period. In conclusion, metabolic and endocrine profiles are good diagnostic tools that integrate the metabolic memory and the recent nutritional status, and are basic to understand how the reproductive axis is informed with respect to the negative energy balance that occurs during the transition period.

A6

ANANDAMIDE ACTS AS A PHYSIOLOGICAL INDUCER OF SPERM RELEASE FROM BOVINE OVIDUCT

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The mammalian oviduct acts as a functional reservoir of spermatozoa. The binding of spermatozoa to the oviductal epithelium extends the sperm life span and delays capacitation until signals related to ovulation promote sperm release allowing fertilization occurrence. Once they reach the oviduct, spermatozoa contact epithelial cells and their secretions. Several studies have focused attention on understanding which components of oviductal and uterine fluid are involved in the regulation of sperm function. Some proteins or

glycosaminoglycans present in bovine oviductal fluid are involved in the regulation of sperm-oviduct interaction and in sperm capacitation. However, there is scarce information about the involvement of lipids in these processes.

Anandamide (AEA) is a lipid mediator that mimics the effects of cannabinoids and acts through cannabinoid receptors CB1 and CB2 and the transient receptor potential cation channel TRPV1. We previously demonstrated that AEA induces sperm release from oviductal epithelial cells (OEC) through the activation of CB1 and TRPV1 receptors. Furthermore, the enzymes that degrade and synthesize AEA (FAAH and NAPE-PLD, respectively) vary throughout the estrous cycle, suggesting a hormonal regulation of these enzymes.

Here we will focus on evaluating the regulation and mechanism of action of AEA in sperm selection in the oviduct. We characterized the main metabolic pathway of AEA during the estrous cycle in the bovine oviduct. Although the expression and localization of FAAH and NAPE-PLD did not differ between estrous stages, AEA concentrations measured in the oviductal fluid fluctuate in the nM range and the highest levels were found in post-ovulatory stage ($p < 0.05$). Our results also indicated that estradiol is involved in AEA-induced sperm release ($p < 0.05$).

We studied the mechanism of action of AEA as an inducer of sperm release from the oviductal reservoir. Considering that sperm capacitation is a cause of sperm release which is associated with increased sperm intracellular Ca^{2+} (Ca^{2+}) levels, we investigated whether AEA is involved in this event. Our results indicated that AEA induces sperm capacitation via CB1 and TRPV1 activation ($p < 0.05$) and that the endocannabinoid increases the rate of IVF in bovine oocytes ($p < 0.05$).

Moreover, we studied whether AEA induces changes in Ca^{2+} concentration in bovine spermatozoa co-cultured with OEC. We determined sperm Ca^{2+} levels in co-culture with OEC and we observed that AEA, capsaicin (TRPV1 agonist) or URB (FAAH inhibitor) increased sperm Ca^{2+} with respect to control ($p < 0.05$). This effect was reversed by CB1 and TRPV1 antagonists. Spermatozoa released by AEA showed percentages of capacitation, acrosome reaction and viability similar to the controls. However, the percentage of progressive motility was higher in the spermatozoa released by AEA.

These results suggest that in peri-ovulatory stages, stimuli such as estradiol may induce an increase in oviductal AEA concentration. Anandamide may participate in the regulation of sperm selection by increasing Ca^{2+} levels, promoting sperm capacitation with the consequent sperm release from the oviductal reservoir.

SYMPOSIA

SYMPOSIUM "BIOTECHNOLOGICAL ADVANCES IN REGIONAL CROPS"

A7

CITRUS SANITATION PROGRAMS: IMPORTANCE IN GRAFT-TRANSMISSIBLE DISEASE PREVENTION

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Most citrus diseases caused by viruses, viroids, systemic bacteria, spiroplasms and phytoplasms are graft transmissible and cannot be controlled with chemical methods. They can destroy or seriously damage the crop and produce very significant economic losses worldwide. Frequently these diseases are present in tolerant cultivars without symptoms so they are inadvertently dispersed by grafting. Furthermore, some of them are transmitted by vector and tools which makes their control even more difficult. Shoot tip grafting is the standard and most appropriate technique for the elimination of these diseases. The apical meristem and three leaf primordia, less than 0.2 mm, from the citrus tree to be cleaned is grafted on a seedling rootstock obtained *in vitro* and in the dark. This procedure is performed under aseptic conditions with the use of a stereoscopic microscope and adequate instruments. Micrografted plants are transplanted directly to pots with a suitable substrate to the greenhouse 4-6 weeks after grafting. Indexing by biological, serological and molecular methods is performed to confirm that graft-transmissible diseases have been effectively eliminated. Shoot tip grafting *in vitro* is the most modern, fast and efficient technique to remove those pathogens for which thermotherapy is not effective, plants with morphological characteristics identical to the source being obtained. Therefore, this is the most appropriate and worldwide applied technique in citrus sanitary improvement programs and is a valuable tool for the safe exchange of germplasm.

A8

VITROPLANTAS PROJECT: TECHNOLOGICAL DEVELOPMENT AND PUBLIC-PRIVATE PARTNERSHIP AIMED AT PRODUCING HIGH QUALITY SEEDCANE

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In 2000/2001, the Obispo Colombres Experimental Station (EEAOC) implemented the Vitroplantas Project, which aims at producing high quality seedcane. In the Vitroplantas Project, seedcane is produced by means of the micropropagation technique and later multiplied in fields that are part of a nursery network consisting of Basic, Registered and Certified nurseries. Plantlets are produced *in vitro* by biotechnology experts and acclimatized in greenhouses by breeding specialists. Subsequently, the seedlings are planted in the Basic nursery, which supplies seedcane for Registered nurseries. These in turn provide material for Certified nurseries, which produce seedcane for commercial fields. Sugarcane agronomic management specialists from the EEAOC are responsible for controlling and managing the Basic nursery, apart from serving as advisers for growers in charge of managing Registered and Certified nurseries. Phytopathologists are responsible for testing seedcane sanitary conditions by means of molecular and serological diagnostic techniques. Between 2008 and 2012, 350,000 seedlings produced *in vitro* were planted in the Basic nursery. During this period, 3623 tonnes of seedcane were distributed among sugarcane growers. Currently, there are 66 registered nurseries in the sugarcane area in Tucumán. The Vitroplantas Project constitutes a technological development which significantly links the EEAOC to the productive sector.

A9

RESEARCH AND TECHNOLOGICAL DEVELOPMENT FOR A SUSTAINABLE MANAGEMENT OF SOYBEAN CROPS IN NORTHWESTERN ARGENTINA

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Soybean [*Glycine max* (L.) Merr.] is considered a strategic crop in northwestern Argentina (NWA). In the 2010-11 growing season, 5.13×10^6 t were produced from 2.02×10^6 ha, although these figures decreased in 2011-12 and 2012-13 as a result of severe droughts that affected this part of the country. Various public institutions and private companies in NWA are engaged in research and development activities related to different aspects of soybean production and commercialization. The Estación Experimental Agroindustrial Obispo Colombres (EEAOC) has attained results that have had an impact beyond NWA, working actively on the development and commercialization of new soybean cultivars with disease resistance and high yield potential, adapted not only to agro-ecological conditions in northern Argentina, but also to those of other soybean growing regions in the world, in countries like Bolivia, Paraguay, Brazil and South Africa. Soybean breeding is currently supported at the EEAOC by biotechnological tools. One molecular marker associated with rust resistance has been identified, while other markers associated with QTLs for drought tolerance have been mapped. A technique developed to replicate drought stress under controlled conditions has been crucial to advance toward this objective. Molecular markers known to be associated with resistance to other pathogens are also being validated for their use in marker-assisted selection. Another activity developed by the EEAOC and highly regarded by growers and consultants in NWA is the regional evaluation of commercially available cultivars. This network of macro-plot field tests has been conducted continuously in the region since the 1997-98 season, providing valuable information about the behavior of newly released cultivars. Results from research on crop management (conservation systems, seed quality, planting dates and maturity groups, inoculants, fertilization and soil amendments, etc.) are also well appreciated by growers. Special consideration is given to integrated pest management, due to continuous problems caused by insects, diseases, and weeds. The competitiveness of the soybean activity in NWA has allowed the consolidation of productive systems characterized by low costs and high technological levels, although final economic results still rely on certain environmental and market factors.

ORAL COMMUNICATIONS

A10

LINK BETWEEN THE BIOLOGICAL CLOCK AND DIABETES: PRELIMINARY STUDIES IN JUJUY PROVINCE

Reader M.M.¹; Guanuco A.¹; Baffa-Trasci N.¹; Andrade A.J.¹; Rios J.J.²; Hernández de Borsetti N.¹; Alfaro E.¹; Borsetti H.M.¹

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Evening chronotype is associated with poor glycemic control in type 2 diabetic (DM2) patients in the northern hemisphere, but no reference was found for Argentina. The aim of this study was to test these findings in a different genetic background. A total of 270 DM2 subjects from Jujuy province, 193 women (24-82 years old) and 97 men (26-79 years old), were screened for diurnal preference (Horne-Östberg questionnaire). Glycated hemoglobin A1c (HbA1c), total cholesterol, HDL, LDL and triglycerides values were obtained from medical records collected during a 1-5 year period depending on the patient. ANOVA was performed and mean test (Scott & Knott, Tukey's and LSD) for a significance level of $p < 0.05$. In agreement with previous reports, we found elevated HbA1c in the Evening type (8.19% in females and 7.98% in males). Moreover, both HDL (50.92mg/dL) and LDL (165.06mg/dL) cholesterol were elevated in Evening type males. However, Evening type females had the lowest HDL cholesterol (43.47mg/dL).

Our results further support a link between the biological clock and DM2 independent of the genetic background, where chronotype and gender play an important role in modulating metabolism.

A11

AGREEMENT BETWEEN TWO STATISTICAL CRITERIA TO IDENTIFY THE METABOLIC SYNDROME

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The metabolic syndrome (MS), presented as a set of medical and metabolic disorders, plays an important role in the genesis of cardiovascular disease (CVD) and type 2 diabetes mellitus (DM2). To evaluate the statistical agreement between the World Health Organization (WHO) and the Adult Treatment Panel (ATP III) criteria to identify patients with MS, we studied 61 subjects, 84% of them females, between 17 and 76 years of age. Patients were classified into four groups: with and without MS according to the WHO and ATP III criteria. The cross-sectional design was descriptive. The statistical study analyzed concordance using the kappa index and sensitivity (S) and specificity (Sp) were calculated. According to the WHO, 43% of the patients presented MS while with ATP III 36% of them did. Both criteria showed 25% agreement in the diagnosis of MS. Discrepancy was observed in 29.5%. Kappa = 0.385 with $p = 0.002$, S = 0.68 and Sp = 0.72. Positive Predictive Value (PPV) = 0.58. Negative Predictive Value (NPV) = 0.80. We found a weak agreement between both criteria. WHO identifies more patients with MS with high NPV. It is possible to consider this criterion as MS screening. Metabolic evaluation is important to prevent or reduce the risk of CVD and DM2.

A12

β-LACTOGLOBULIN IN MILK OF TWO PLATYRRHINI MONKEY SPECIES

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The major whey proteins in most mammalian species are β-lactoglobulin (βLG), α-lactalbumin (αLA), lysozyme (LZ), lactoferrin (LF), and seroalbumin (SA). Exceptions to this are humans, guinea pigs, rabbits and rodents, where βLG is absent. Although human milk has been studied extensively, the milk of other primate species has received little attention. βLG is a member of the lipocalin protein family, whose members include retinol binding protein (RBP) and glycodelin (GD). All of the lipocalins are small proteins which bind hydrophobic ligands. To date βLG has been reported in three Catarrhini primate species of *Macaca* genus and in the baboon (*Papio hamadryas*). In humans, GD (the glycosylated homologue of βLG) is present in uterus with reproduction-related functions. The aim of this study was to examine the milk of two Platyrrhini species, *Alouatta caraya* and *Cebus paella*, for the presence of βLG. Milk was collected from REHM specimens. SDS-PAGE of milk samples and dot-blotting with bovine anti βLG were made. The presence of this protein was detected in the whey of both primates. This is the first report of βLG in milk from new world monkeys. Moreover, no information is available concerning GD in these species. This opens an interesting discussion about the evolutionary origin and function of these proteins in the primates group.

A13

INFESTATION WITH *Demodex folliculorum* (Df): 27 DIAGNOSED CASES - TUCUMÁN

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Introduction: *Df* is a mite that lives mainly in the hair follicles of the forehead, nose, cheeks and eyelids. The route of infection is unknown, although transmission by direct contact between people has been postulated. The presence of *Df* has been associated with acne, keratitis and dermatitis as well as with conjunctivitis and blepharitis. The aim of present study was to determine the prevalence of *Df* in patients of a laboratory in Tucumán from January 2010 to August 2013. Materials and Methods: we conducted a retrospective study of medical protocols of 94 patients (26 men and 68 women) aged between 5 and 70, with clinical impression of demodicosis. The samples were obtained by scraping of the lesions and then they were rinsed with 30% KOH for microscopic examination. Results: 27 patients were infected with *Df*, most of them showing lesions in cheeks. Greatest frequency was observed in the older patients and diagnosis coincided with the warmest months of the year. 85% of the patients reported symptoms lasting more than 5 months and had previous empirical treatment. Conclusions: based on the results obtained, we consider it important to suspect *Df* infestation in patients with acne, rosacea, seborrheic dermatitis or blepharitis so as to implement appropriate and timely treatment

A14

FIRST ISOLATION OF *Escherichia coli* O157 IN MEAT PRODUCTS IN THE TRANCAS DEPARTMENT, TUCUMÁN

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E. coli O157 is an emerging foodborne pathogen associated with hemolytic uremic syndrome (HUS). Cattle have generally been identified as the main reservoir of *E. coli* O157, and meat-based foods are the more frequent transmission vehicle. In Tucumán, the Trancas Department is the main dairy/livestock producer. Our aim was to isolate, identify and characterize *E. coli* O157:H7 in butcher shops. Samples were collected from 22 butcher shops in San Pedro de Colalao, Benjamin Paz, Choromoro and Trancas. We used the 2008 USDA-FSIS method for the isolation and characterization of *E. coli* O157:H7, including TSBm enrichment at 41°C, on 36 samples of meat and different sausage types. After 24 h of incubation immunochromatography was performed to determine the presence of the *E. coli* O157. Presumptive positive samples underwent immunomagnetic separation and were grown on selective and differential media (ID and CT-SMAC), Serology were performed on compatible colonies for confirmation. Isolated *E. coli* O157 were characterized by PCR for *stx1*, *stx2*, *rfbO157*, *eae*, *ehxA* and *fliC*. Two samples were presumptive positive but only one was isolated and characterized by PCR as non-toxicogenic *E. coli* O157: *rfbO157+*, *stx2-*, *eae-*, *ehxA-* and *fliC-*. This is the first study in the region of Trancas that determined the incidence of *E. coli* O157.

A15

PHYSICAL AND CHEMICAL CHARACTERISTICS OF HONEY PRODUCED BY STINGLESS BEES IN NORTHERN ARGENTINA

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Stingless bee honey is used as food and in the treatment of human disorders. It is not included in the Codex Alimentarius. We evaluated the physical and chemical characteristics of stingless bee honey produced in Northern Argentina. Thirty-four samples from provinces in northern Argentina were analyzed. Analysis of variance and comparison of means (DGC) were performed by Infostat.

The identified species were: *Tetragonisca fiebrigi*, *Nannotrigona testaceicornis*, *Mellipona obscurior*, *Scaptotrigona jujuyensis* and *Plebeia molesta*. The parameters were evaluated: moisture (21.5-31.0%), color (25-150mm Pfund), electrical conductivity (0.5-2.7mS/cm), pH (2.5-5.9), free acidity (19.9-131.4meq/kg), total phenols (0.4-2.1mg/g), fructose (22.7-37.5%), glucose (16.6-37.2%) and sucrose (0.3-5.2 %). Significant differences (p<0.05) for the values of moisture, color, pH, ACD and FT were found and differentiation by species and place of origin was made. The physical and chemical parameters of the honey were more closely associated with the province of origin than with the stingless bee that produced it. The physical and chemical characteristics provide information to establish standards that enable normalization and promote consumption and appreciation of stingless bee honey.

A16

MAXIMUM PHOTOSYNTHETIC ASSIMILATION RATE IN QUINOA VARIETIES OF DIFFERENT ORIGIN GROWN IN AMAICHA DEL VALLE (TUCUMAN-ARGENTINA)

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Chenopodium quinoa is a C₃ species with high photosynthetic assimilation (between 14.8 to 34.9 $\mu\text{mol m}^{-2} \text{s}^{-1}$). New field measurements are needed to know if those high assimilation rates are sustained in other varieties. Our experience was performed in Amaicha del Valle (Encalilla, 22°31'S and 65°59'W, 1995 m asl) (Tucumán, Argentina). Quinoa grain from the varieties Kancolla and Sayaña (from 3850 m asl), Quinoa Blanca (2750 m asl) and Quinoa Roja (3700 m asl) were used. We also used a Chilean low altitude variety (CO-407) and CICA obtained in Encalilla. P_{max}: maximum photosynthesis, g_s: stomatal conductance, T_l: leaf transpiration and C_i: CO₂ internal concentration were measured with a LICOR portable equipment, under light and CO₂ saturation conditions and at a constant temperature of 25°C. P_{max} varies between 17.9 to 30.6 $\mu\text{mol m}^{-2} \text{s}^{-1}$ with three well-differentiated groups: one group including CO-407 and Quinoa Blanca (18 and 20.1 $\mu\text{mol m}^{-2} \text{s}^{-1}$ respectively), a second group including Sayaña, Quinoa Roja and Kancolla (23.6; 25.7 and 26.6 $\mu\text{mol m}^{-2} \text{s}^{-1}$) and a third group including only CICA (30.6 $\mu\text{mol m}^{-2} \text{s}^{-1}$). Significant correlations were found for P_{max}-C_i (r= 0.647) and g_s-C_i (0.880).

A17

INCIDENCE OF PHYTOPHAGOUS INSECTS IN THE YIELDS OF A POLYCULTURE

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The aim of this work was to determine the incidence of phytophagous insects on the yields of a polyculture with two species: maize (*Zea mays*) and anquito (*Cucurbita moschata* L.) in the agroecological conditions of Santiago del Estero. Two lots of 70 mx 100 m were planted at the end of December 2012. The treatments were: T1=50% maize and 50% anquito; T2= Interspersed (2 lines maize+1 line anquito); T3=monoculture maize and T4=monoculture anquito. The experimental design was random blocks with four replications. Weekly inventories of insects and damaged plants were carried out in 2 m of consecutive rows. The yield of the treatments was determined and expressed in Kg/ha. Maize yields recorded were 4471 K/ha (T1), 4498 K/ha (T2) and 4416 k/ha (T3) and for anquito 7469 k/ha (T1), 6898 k/ha (T2) and 8314 k/ha (T4). No significant differences between treatments (p = 0.20) were found when comparing the yields of corn and anquito. Whitefly populations reached maximum densities of 100 individuals per plant in the vegetative growth stage. Aphids, with relatively low densities, presented peak values of 20-25 aphids per leaf, in the flowering stage of the crop. There was no significant damage due to insects. Considering the total production with each treatment in the two lots tested, polycultures, regardless of the design (in stripes or interleaved), exhibited more stable yields than those obtained in monocultures.

A18

SIGNS OF RECOVERY OF THE WEALTH OF BIRD SPECIES IN LA ANGOSTURA DAM, TAFÍ DEL VALLE, TUCUMÁN

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Birds are one of the groups identified as good biological bioindicators. La Angostura Dam, Tucumán, has undergone many changes in recent years that have had an impact on its bird community. The aim of this study was to describe the richness of species before, during and after the impact. From 2000 to present belt transect censuses were conducted in different seasons. The results were divided into three periods: 1) before (2000/2005), the wetland showed abundant aquatic vegetation and high water levels and the total wealth was 78 species, with four new distribution records, two new nestings and Nearctic-Neotropical migratory species; 2) during (2006/2010), aquatic vegetation decreased significantly and the water level had a remarkable variation, wealth decreased up to 13 species in 2010, no species were observed nesting and there were no Nearctic-Neotropical migratory species; 3) after (2011/2013), the aquatic vegetation has begun to recover, the water level is high again and the total species recorded today is 27. These results indicate that, despite the strong modifications introduced in the dam, when a resource as important as aquatic vegetation is again present the bird community begins to recover both species richness and reproduction.

POSTER PRESENTATIONS

A19

PREGERMINATION TREATMENTS IN *Tabebuia nodosa* (Griseb.) Griseb

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Tabebuia nodosa (Griseb.) Griseb is a native species with local applications because of its forest, ornamental and mellific value. Germination tests were conducted under controlled conditions to evaluate the incidence of pregermination treatments on seeds of *Tabebuia nodosa*. Four treatments were defined: a) control without scarifying; b) soaking in water at 60 °C; c) soaking in water at 40 °C; d) soaking in water at room temperature for 24 hours. Sowing was done in Petri dishes on filter paper in a germination chamber at constant temperature of 30 °C with a 12 h light/dark cycle. The experimental design was completely randomized with 4 replications of 25 seeds for each treatment. A seed was considered to have germinated when cotyledons emerged. We calculated germination percentage and mean germination time (MGT). Results were analyzed by ANOVA and Tukey's test.

The highest percentage of germination was recorded for the soaking in water for 24 hour treatment (97%), followed by soaking in water at 40 °C (95%), control (90%) and finally soaking in water at 60 °C (66%). MGT was 63.2 for soaking in water for 24 h, 41.6 for soaking in water at 40 °C and 52.3 for the control treatment, while the lowest MGT was for soaking in water at 60 °C. The results show that the best treatment corresponds to soaking in water for 24 hours. The information obtained will serve as a basis for productive experiences at the hatchery level.

A20

EVALUATION OF *Tabebuia nodosa* (Griseb.) Griseb GERMINATION IN THE NURSERY

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There is growing interest among forest managers in information, which is not always available or does not exist, on growing native species in the nursery. Germination tests were conducted in a greenhouse to evaluate the effect of pregerminative treatments on the obtainment of seedlings of *Tabebuia nodosa*.

The seeds were collected and kept in a chamber until planting. Four treatments were defined: 1- control without scarifying; 2- soaking in water at 60 °C; 3- soaking in water at 40 °C; 4- cutting off the wings of the seeds. Sowing was done in speedlings; the temperature varied between 28 and 30 °C during the test (54 days). The design was in blocks with 4 replicates per treatment, with 25 seeds each. Daily counts were made and we considered that a seed had germinated when cotyledons emerged. Seedlings were recorded as normal, abnormal and dead. MGT, speed of germination and emergence percentage were calculated and analyzed by ANOVA. The highest MGT was for treatment 3 (49.87), followed by the control (41.76), and the highest germination percentages corresponded to treatment 3 (73.96%). No significant differences were found in the rate of three treatments except for treatment 3. The percentage of normal seedlings was 66%. Soaking the seeds in water at 40 °C appears to be the treatment with the best effects on the rate and percentage of germination and MGT. These results represent an important contribution to tree growers.

A21

INFLUENCE OF HYDRATION-DEHYDRATION PRETREATMENTS ON THE QUALITY OF BEAN (*Phaseolus vulgaris* L.) SEEDS WITH VIGOUR DIFFERENCES

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This research was aimed at determining the incidence of prehydration on seed quality. The hypothesis was postulated that hydration-dehydration pretreatments would give new vigour to deteriorated bean seeds. Three levels of harm were used for Perla INTA (white) and NAG 12 (black): 0 no harm, two and four hits; and three periods of prehydration: a) without pretreatment; b) with 20 minutes imbibition and c) imbibition until the end of phase II of the triphasic pattern. Analysis of germination showed that both periods of imbibition significantly increased the dry weight of shoots in controls of white and black bean. With 20 minutes hydration, there were increases in the growth rate of seedlings in control and two hits, as well as an increase of root dry weight in seedlings from seeds of mean and low vigour for Perla INTA. In the case of NAG 12, this pretreatment increased the dry weight of shoots for two hits; but with a longer time of imbibition, the seeds of mean and low vigour improved the fresh weight of shoots. However, accumulation of dry weight in seedlings produced from seeds with greater harm decreased significantly.

A22

GERMINATION OF *Prosopis alba* G. SEEDS UNDER SALINE AND WATER STRESS CONDITIONS

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Prosopis alba G. is a tree species of forest importance native to Western Chaco. Although considered tolerant to saline and water stress, its hydric potential thresholds (Ψ_w) for germination remain unknown. The objective of this work was to determine such thresholds (Ψ_w) for the germination of *P. alba* under conditions of saline and water stress. Batches of 25 seeds were arranged on paper towels moistened with increasing concentrations of NaCl or polyethyleneglycol 6000 (PEG 6000). Germination percentage and mean germination time (MGT) were determined. The tests were carried out in a growth chamber at 28°C along 12 h photoperiods. An entirely randomized experimental design with 4 repetitions was used and the results were analyzed with ANOVA and Tukey's test. In the saline conditions the germination percentage started to decrease at $\Psi_w = -1.9$ MPa with a threshold of -2.2 MPa while MGT started to increase at $\Psi_w = -1.9$ MPa. The germination of the seeds incubated in PEG began to be inhibited at $\Psi_w = -1.5$ MPa and the threshold was reached at -1.9 MPa. MGT was quite responsive to water stress and started increasing at $\Psi_w = -0.8$ MPa. It is concluded that *P. alba* is more tolerant to saline stress than to water stress, presenting thresholds of -2.2 MPa and -1.9 MPa respectively.

A23

OSMOTIC ADJUSTMENT IN ALGARROBO BLANCO (*Prosopis alba* G.) UNDER SALINE STRESS CONDITIONS

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Algarrobo blanco (*Prosopis alba* G.) is a forest tree species native to Western Chaco and tolerant to saline stress, although the mechanisms involved in this behavior remain unknown. This work was aimed at determining whether *P. alba* seedlings subjected to saline stress with NaCl showed osmotic adjustment (OA). Two-week-old seedlings were cultured in a 25% Hoagland solution supplemented with 0, 100, 200, 300, 400 or 500 mM of NaCl. Seven days later, water relative content (WRC) as well as hydric (Ψ_w) and osmotic (Ψ_s) potential were determined and pressure potential (Ψ_p) and osmotic adjustment estimated. An entirely randomized experimental design with four repetitions was used and the results were analyzed with the Kuskal-Wallis non-parametric test. All the saline treatments caused a decrease in Ψ_w due to a reduction in Ψ_s values. As a result, both Ψ_p and WRC remained constant. All the estimates of OA were increased with all NaCl concentrations, with maximums close to 1.5 relative units in the seedlings incubated in 500 mM NaCl. It is concluded that algarrobo blanco uses osmotic adjusting mechanisms to tolerate saline stress.

A24

MINERAL COMPOSITION AND ORGANIC SOLUTES CONCENTRATION OF ALGARROBO BLANCO (*Prosopis alba* G.) UNDER NaCl SALINE STRESS

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Algarrobo blanco (*Prosopis alba* G.) is a forest tree species that can grow in saline soils but its mechanisms of tolerance have not been elucidated yet. This work was aimed at studying the mineral composition and organic solutes concentrations of *P. alba* seedlings subjected to NaCl saline stress. Two-week-old seedlings were cultured hydroponically by adding 0, 100, 200, 300, 400 or 500 mM of NaCl and their Na^+ , K^+ , Cl^- , proline, soluble sugars, and glycine-betaine (GB) concentration in leaves were determined. An entirely randomized experimental design with four repetitions was used and the results were analyzed with the Kuskal-Wallis test. *P. alba* excluded Na^+ from the aerial area and accumulated less of it than of Cl^- ; K^+ concentration decreased as salinity increased. NaCl had no effect upon proline and soluble sugars concentrations though it increased GB concentration (an osmo-compatible solute) from 11 mmol kg^{-1} of water in control to 103 mmol Kg^{-1} of water in the samples in 500 mM of NaCl. It is concluded that, under saline stress conditions, *P. alba* excludes Na^+ from the aerial area and accumulates GB as an osmo-compatible solute.

A25

COMPARATIVE DYNAMICS OF GROWTH AND DEVELOPMENT OF TWO SWEET SORGHUM HYBRIDS (*Sorghum bicolor* (L.) MOENCH).

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Sweet sorghum has become in an interesting crop because of its capacity to produce biomass with bioenergetic potential. The objective of this work is to make a comparative analysis of the dynamics of the growth, leaf development and sugar storage associated with the phenologic evolution of two sorghum hybrids, Padrillo (PA) and Argensil 165 Bio (AR), sown at a depth of 3 cm, 8-12 pl/m. Samplings were made every 7 days until full flowering. Stem height and green leaf number per plant were registered and a phenologic following was made. Total soluble solid measurements (Brix) were made from 70 days for PA and from 60 days for AR. Growth curves were adjusted and the respective variation rates were derived. Height and Brix were adjusted to a sigmoid equation and green leaf number to a Lorentzian model. Maximum growth rate in height was reached at 60-70 days for both hybrids. Maximum heights measured at 110 days differed 2 m in AR and 2.8 m in PA. Flag leaf apparition at 80 days in AR and 90 in PA determined growth stop initiation, with the greatest leaf production rate at 70 days for both hybrids. The maximum sugar accumulation rate coincided with the flag leaf apparition in both with greater increment of Brix in AR. There are important differences between hybrids, PA showing greater growth and AR greater sugar storage capacity.

A26

PRELIMINARY STUDIES IN *Salvia hispanica* L. CULTIVATED IN TUCUMÁN

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Salvia hispanica L. (v.n. chia) is a herbaceous species belonging to the Lamiaceae family. In pre-columbian times its seeds were used because of their high nutritional and medicinal value. At present there is a new revaluation of this crop due to its benefits for human health, because it contains Omega-3, antioxidants, and soluble fibers. The aim of this work is to verify chromosomal number and determine the germination power of chia seeds. There is little basic biological knowledge of the species, a chromosomal number of $2n=12$ having been reported. It is cited as autogamous but it has a variable percentage of alogamy. The chromosomal number observed in this study was $2n=12$, which agreed with Estilal and Hashemi (1990) and with Haque and Ghoshal (1980). The germination power test was made at 25 °C in constant darkness, using humid paper and sowing 3 repetitions of 30 seeds of each color. The count was made daily for 5 days. The percentage of germination was above 87% in the grey and white seeds, while in brown seeds it was below 3%. This result shows high non-viability for brown seeds. Significant differences were found between brown and grey or white samples. These results constitute preliminary studies to continue with the observation of the phenologic behavior of this species in Tucumán and with the selection of the best genotypes.

A27

CHROMOSOME NUMBER AND POLLEN VIABILITY IN CEDRON

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Cedron is an aromatic shrub that is highly appreciated in industry and for home consumption. In Argentina it grows in Catamarca, Salta, Jujuy and La Rioja. It has been classified under different names such as *Lippia citriodora* (lam.) Kunth and *Aloysia citriodora* Palau, this being the most often found in the literature. From a cytogenetic point of view for the genus a chromosome number $2n=36$ and an $x=8? 9?$ have been reported, no information about its karyotype being available. The objective of this work was to determine the chromosome number and ploidy level of three origins of *Aloysia citriodora* from Tucumán and to determine pollen viability in order to relate them to their reproduction mechanism. The material came from three Tucumán localities: Atahona, Tafi Viejo and Capital. For chromosome counting a pretreatment with p-dichlorobenzene, fixation, hydrolysis and coloration with acetic haematoxylin was made. Pollen viability was determined with blue cotton in lactophenol. Results: chromosome number $2n=36$, according to Navaneetham *et al.* (1982). Pollen viability: Atahona 87.5% of viable pollen out of 2271 analyzed grains, Tafi Viejo 69.3% out of 954 and Capital: 95.4% out of 1309. According to $x=9$, this is a tetraploid species with important pollen viability, with the exception of Tafi Viejo, where 30.7% of unviability justified the lack of seed production, so that clonal multiplication is an interesting alternative for dissemination.

A28

PLANT APHID SPECIES PRESENT IN PEPPER CROPS (*Capsicum annuum* L.) IN TUCUMÁN, ARGENTINA

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Pepper is a species native to Central America belonging to the Solanaceae family. There are numerous plague species that colonize it: trips, white flies, lepidoptera and plant aphids. Among aphid species in Argentina, *Myzus persicae* Sulzer as a key plague followed by *Aulacorthum solani* (Kaltenbach) and *Macrosiphum euphorbiae* (Thomas) can be mentioned. *Aphis gossypii* Glover, *Brevicoryne brassicae* L. and *Rhopalosiphum rufiabdominalis* (Sasaki) are also mentioned in Chile. The action of *M. persicae* and *M. euphorbiae* was highlighted because of their quality as vectors. The objective of this work was to determine the aphids of pepper crops in two Tucumán horticultural zones. Directed samplings in experimental fields of La Ramada (Burruyacú) and Lules were conducted. Adults were separated and kept in 70° ethyl alcohol and in semi-permanent microscopic preparations (Martin's method, 1983). Identifications were performed using taxonomical keys and morphological descriptions from different authors. Two species were identified: *Aulacorthum solani* (Kaltenbach) in both localities and *Myzus persicae* (Sulzer) only in Lules. It is important to know the main aphid species present in pepper crops because of the damage they cause and their virus transmission activity.

A29

PARASITOIDS AND HYPERPARASITOIDS OF APHIDS (HEMIPTERA: APHIDIDAE) ON SWEET PEPPERS CROPS

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The most important pests of sweet pepper crops in Argentina are aphids *Myzus persicae* (Sulzer) and *Aphis gossypii* Glover, which cause serious drawbacks by undermining the yield when extracting sap and when honeydew secretion and disease transmission are produced. This leads to numerous chemical treatments to control their population growth; however, the presence of naturally regulating entomophagous, including parasitoids, was determined. The objective of this work was to determine the hyperparasitoid-parasitoid complex on aphids to be found in sweet pepper crops. Fields in La Ramada (Burruyacú) and Lules, Tucumán, were sampled. Sweet pepper shoots and leaves containing aphids with and without symptoms of parasitism were collected. Adults of Hymenoptera parasitoids and aphids were preserved in semipermanent microscopic preparations. Parasitoids were identified as *Diaeretiella rapae* (M'Intoch), *Aphidius colemani* (Dalman), *Aphidius* sp. Nees and *Lysiphlebus* sp. Foerster (Braconidae) and hyperparasitoids *Pachycrepoides* sp. Ashmead (Pteromalidae) and *Aphidencyrthus aphidivorus* (Mayr) (Encyrtidae) on the aphid *Myzus persicae* (Sulzer) and *Aulacorthum solani* (Kaltenbach). The material identified is deposited at FAZ-UNT. It is essential to know the richness of natural enemies of the sweet pepper crop agroecosystem to implement environmentally friendly pest management strategies.

A30

BIOLOGICAL CHARACTERIZATION OF *Diatraea saccharalis* FABRICIUS (LEP. CRAMBIDAE) POPULATIONS COLLECTED FROM DIFFERENT HOST PLANTS AND REGIONS OF ARGENTINA

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Diatraea saccharalis, “the sugarcane borer”, is a pest widely distributed in tropical and subtropical regions. It is the most important pest in sugar cane in Tucumán and the main pest in corn and sorghum in the Pampa region. Adults have a short life cycle, which would limit their ability to disperse. This behavior could restrict the gene flow among *D. saccharalis* populations from different regions and crops and it would favor genetic divergence and development of strains. The objective of this study was to conduct a biological characterization of two populations collected from corn (Buenos Aires) and sugar cane (Tucumán). The parameters evaluated were: egg, larva and pupa duration, adult longevity, and sex ratio. Some significant differences were found between populations. The life cycle (egg to adult) of Tucumán and Buenos Aires populations was completed in 39 and 34 days respectively. This research is being complemented with a molecular and reproductive study to determine the genetic structure of *D. saccharalis* populations. This study will provide strategies to control this pest and to prevent the development of resistance to Bt crops.

A31

BIOLOGY OF THE SPECIES COMPLEX IN THE GENUS *SPODOPTERA* GUENÉE (LEP: NOCTUIDAE) AFFECTING THE SOYBEAN CROP IN TUCUMÁN

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The genus *Spodoptera* Guenée (Noctuidae: Xyleninae) has six species in Argentina, whose larvae are polyphagous and attack a wide variety of crops including soybean. According to planting and production, this crop is considered the most important in Argentina. In the past two years, larvae of *Spodoptera* species were detected, causing significant damage to soybean crops in Tucumán, so that knowledge of its biology is necessary to implement control measures. The aim of this study was to identify the species in the genus *Spodoptera* present in soybean crops in Tucumán through the comparative study of their life cycle and morphological characters. The species detected were: *S. frugiperda*, *S. albula*, *S. eridania* and *S. cosmiodes*. Given the duration of the life cycle, significant differences were detected between species. *S. albula* presented the longest cycle (approx. 45 days). In contrast, the life cycle of the other species was about 38 days. It should be noted that this research is being completed with the morphological study of each species in order to perform a comparative description of the immature stages and develop keys for field identification.

A32

FAUNISTIC COMPOSITION OF GRASSHOPPERS AND KATYDIDS (ORTHOPTERA) IN CORN CROPS IN TUCUMÁN, ARGENTINA

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Corn, one of the major summer crops in Argentina, is affected by phytophagous insects including Orthoptera. Grasshoppers and Tettigoniids include several species that damage different crops and can become pests. The aim of this study was to determine the faunistic composition of grasshoppers and katydids inhabiting cornfields in Tucumán. Surveys were done during the crop season (2011-12) in El Manantial (Lules, Tucumán). During the different growth stages of maize, we identified specimens belonging to the families Tettigoniidae (6 genera), Romaleidae (4) and Acrididae (2). Tettigoniidae were represented by three subfamilies: Conocephalinae, with *Conocephalus* sp. and *C. longipes*; Phaneropterinae with *Hyperophrona mayor*, *Burgilis curta* and *Grammadera clara*; Copiphorinae with *Neoconocephalus* sp., *N. punctipes*. The family Romaleidae, represented by *Coryacris angustipennis*, *Chromacris speciosa*, *Tropidacris collares* and *Zoniopoda* sp. Acrididae includes: Melanoplinae with *Dichroplus* sp, morphospecies 1 and 2, and Gomphocerinae with *Ramatocerus pictus*. Grasshoppers and Tettigoniids are considered potential pests in many agroecosystems, so it is necessary to continue studies in order to determine their population density and assess the real damage in corn crops in Tucumán province.

A33

COCCINELLIDS (COLEOPTERA: COCCINELLIDAE) ASSOCIATED WITH *Brassica rapa* (BRASSICACEAE) GROWING DURING WINTER AND SPRING IN TUCUMÁN, ARGENTINA

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The presence of spontaneous vegetation can improve natural pest control in crops, providing food and habitats for predators and parasitoids. The aim of this contribution was to determine the abundance in winter and spring of Coccinellidae taxocenosis associated with *B. rapa* L. (= *Brassica campestris* L.), a weed of spontaneous growth prior to the tillage of corn crops in Tucumán. Samples were collected in Manantial, Tucumán, from June (flowering stage) to December 2010 (end of spring). Identification of specimens was performed according to taxonomic keys and by comparison with voucher specimens hosted at the M. Lillo Foundation entomological collection. We collected a total of 710 adult coccinellids from seven species belonging to four subfamilies: Coccinellinae: *Cycloneda sanguinea*, *Hippodamia convergens*; Eriopinae: *Eriopis connexa*, *C. ancoralis*; Scymninae: *Scymnus loewii*; Hyperaspinae: *Hyperaspis festiva*, and Psyllborinae: *Psyllobora variegata*. The most abundant species was *H. convergens* (52.53%) followed by *E. connexa* (32.11%). This study indicates that populations of *B. rapa* that develop surrounding crops contribute to the conservation of these natural enemies, providing refuge and food. Therefore the control of this winter "weed" must be assessed rationally, considering its value for beneficial insects in fields.

A34

**AQUATIC MACROINVERTEBRATES AS PARATENIC HOSTS OF GORDIIDA
(NEMATOMORPHA) IN THE RIVER EL TALA**

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The objectives of this research were to determine the diversity of horsehair worms in the river El Tala and to identify aquatic macroinvertebrates which may be potential paratenic hosts. Sampling was carried out on the river El Tala (Capital, Catamarca) at 748 m asl and 28°27'34, 26" S 65°50' 28.11" W, on a stretch of 200 m. Worms were collected manually and identified by analyzing the rear ends of the specimens and their cuticles. The macroinvertebrates were collected combining hand collection with "D" (300 µm mesh size) net sampling. 164 worms were collected from 7 species: *Chordodes brasiliensis*, *Noteochordodes achosmosus*, *N. cymatium*, *N. desantisi*, *N. saltae*, *N. talensis* and *Pseudochordodes dugesi*. Eight paratenic hosts were identified: *Physa*, larvae: *Baetodes*, *Leptohyphes*, *Thraulodes*, *Lachlania*, *Anacroneuria*, *Nectopsyche* and Chironomidae. In Chironomidae, larvae and cysts were found and the other hosts only cysts were found with morphologies compatible with those described for the genus *Chordodes*. Parasitic occurrence ranged from 80% (Chironomidae) to 5% (*Anacroneuria* and *Nectopsyche*). Aquatic macroinvertebrates, in addition to their important ecological role in the river El Tala, play the role of paratenic hosts of horsehair worms, ensuring the life cycle of these organisms.

A35

**TERRESTRIAL INVERTEBRATES ASSOCIATED WITH THE MARGINS OF THE SIMBOLAR
STREAM**

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The objectives of this research were to conduct a survey of terrestrial invertebrates associated with the lower margins of the Simbolar stream bed and to obtain preliminary data of wealth and abundance. This stream is located in Concepcion, Catamarca. The river margin vegetation corresponds to the Chaco Serrano. In the sampling site (780 m asl, 28°40'37.6"S 66 ° 03'18"W) and in the dry season, on a stretch of 200 m on both banks of the stream, we placed 50 pit-fall traps, which were left for 8 hours and then checked; this was supplemented with manual sampling. The material was stored in 70% alcohol. In the laboratory, the material collected taxonomically determined based on the available keys. 113 organisms were collected. The following taxa were reported: Turbellaria, Limacidae, Scolopendridae, Sycaridae, Lycosidae, Theridiidae, Salticidae, Bothriuridae, Acrididae, Grylloidea, Gryllotalpidae, Gelastocoridae, Pentastomidae, Carabidae, Staphylinidae, Scarabaeidae and Formicidae. Araneae had the highest number of morphospecies and Formicidae the largest number of individuals. This research contributed to the knowledge of the invertebrate fauna of the bank, generating data which, analyzed and interpreted in conjunction with other information obtained in the project, will reveal the ecological status of the stream under study.

A36

**FIRST REPORT FROM ARGENTINA OF THE GENUS *MUNKOVALSARIA* (DACAMPIACEAE,
ASCOMYCOTA) WITH THE SPECIES *M. DONACINA***

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Munkovalsaria Aptroot is a genus of Ascomycetes which includes three morphospecies, distributed mainly in tropical areas. Knowledge of the genus is poor in South America, the only records belonging to Brazil and Paraguay. The genus was proposed to include some species excluded from *Didymosphaeria*, with the later addition of a new species. *Munkovalsaria* is characterized by immersed ascomata with a stromatic layer; asci clavate with a long pedicel; ascospores reddish brown, 1 septate. In order to extend the knowledge of the biodiversity of ascomycetes in the Yungas of northwestern Argentina, we examined fungal specimens collected in the province of Tucumán. The material was dried and deposited in the LIL mycological herbarium; the microscopic preparations were made with conventional methods. As a result we identified the morphospecies *M. donacina* (Niessl.) Aptroot and described and illustrated its macroscopic and microscopic characteristics. This is the first report from Argentina of the genus *Munkovalsaria* represented by the species *M. donacina*.

A37

MORPHOMETRIC CHARACTERIZATION OF THE *Chordodes brasiliensis* (NEMATOMORPHA) LARVAE IN THE TALA RIVER, CATAMARCA PROVINCE

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The Gordiida (Nematomorpha) are obligate parasites of insects. Adults inhabit permanent and temporary aquatic environments. After mating, the female expels egg strings in the substrate or aquatic vegetation. The aim of this work was the morphometric characterization of the *Chordodes brasiliensis* larvae from the Tala River, Catamarca province. During the autumn adults specimens were collected by hand. In the laboratory, they were placed in tanks waiting for copulation. Subsequently, females were isolated and positive results were obtained during oviposition. Out of a total of 90 larvae the following parameters were taken into account: preseptum length and width, postseptum length and width, pseudointestine length and width, stylet length and width. Preseptum length of this species was 21.45 μ , preseptum width 13.55 μ , postseptum length 21.27 μ , postseptum width 9.04 μ , pseudointestine length 10.47 μ , pseudointestine width 5.72 μ , stylet length 11.8 μ , stylet width 3.86 μ . This paper is the first contribution for *Chordodes brasiliensis* larvae based on morphometric data.

A38

DESCRIPTION OF LARVAE AND JUVENILE FISHES OF TWO SPECIES OF THE RINELORICARIDAE FAMILY FROM THE JURAMENTO RIVER MIDDLE BASIN

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Time and space settings with adequate prey density play a main role in larvae survival and development. Oviposition and rising sites are closely set in freshwater environments. Waterflow ensures egg and larvae dispersion, whose abundance distribution shows a recurrent pattern. Our aim was to report ontogenic stages, time-space distribution and population density of *Ixinandria steinbachi* and *Hypostomus cordovae* found in the middle basin of the Juramento River, Salta province. A total of 16 monthly samplings were performed between 2005 and 2007 in 2m x 50m sites. Sample collection was carried out with thin mesh nets (opening diameters: 1.29 mm; 3.35 mm and 60 μ m, dimensions: 0.30m x 0.20m mouth x 0.30m depth), preserved in CO₃Ca-buffered, 4% formaldehyde. Specimens were identified by regressive sequence analysis of developmental stages from known adult forms. *I. steinbachi* showed a limited distribution, found only in sites 1 and 2, defined as high altitude oviposition, feeding, and rising areas. *H. cordovae* had a wider distribution, found at low altitude (sites 2-4, and 6). We report low population density of early developmental stages for each species. Nearness among sites enabled population survival in this small to medium size species that performs local migrations, and that are under selective pressure due to human water management.

A39

SURVEY OF NEMATOCEROUS DIPTERA FAMILIES OF MEDICAL AND VETERINARY IMPORTANCE IN JUAN B. ALBERDI, TUCUMÁN, ARGENTINA: PRELIMINARY RESULTS

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The order Diptera (Nematocera) is of epidemiological importance worldwide because of the hematophagy of females of several families that act as pathogen vectors. In Argentina, Culicidae (seven genera), Psychodidae (four), Ceratopogonidae (four) are pathogen vectors. The main objective of this work was to conduct a survey of the families of medical and veterinary importance. The specific objective was to recognize the genera involved in the transmission of diseases present in the area. Ten houses were selected based on previous entomological studies. Catches were made for two consecutive days using CDC light minitraps. The most abundant family was Psychodidae (n=9840) [*Migonemyia* (48%), *Nyssomyia* (20%) and *Evandromyia* (2%)], followed by Ceratopogonidae (n=358) [*Forcipomyia* (27%) and *Culicoides* (11%)] and Culicidae (n=230) [*Culex* (71%), *Anopheles* (28%) and *Aedes* (1%)]. These are preliminary results; it is important in the future to determine whether there are differences between houses in terms of abundance and their relationship with weather variables. The spatio-temporal studies of these families are the basis to determine their dynamics and distribution throughout the year so as to propose valid tools for their control and prevention.

A40

PRELIMINARY ANALYSIS OF THE DIVERSITY OF CHIRONOMIDAE (DIPTERA) PRESENT IN WATER COURSES IN CATAMARCA

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The diversity of Chironomidae larvae was studied in two water courses in Catamarca, the Río River and El Simbolar Stream. They are both located in ecoregions, the former in the Puna and the latter in the Chaco Serrano. The aim of this paper was to analyze the diversity of Chironomidae in relation to environmental variables in watercourses in Catamarca. Sampling was performed in periods of high and low water, using a Surber sampler (300 μ and 0.09 m²). The environmental parameters were recorded: conductivity, pH, dissolved oxygen, total dissolved solids, total hardness, carbonate, bicarbonate, chloride, calcium, magnesium, organic matter, current velocity, water temperature and riparian vegetation. A total of 38 taxa were registered; Orthoclaadiinae (25 larvae), Chironomidae (5 larvae), Tanypodinae (2 larvae), Podonominae (2 larvae) and Diamesinae (3 larvae). The diversity index conforming to the periods of high and low water was: Río River 2.34 and 2.91 and El Simbolar 3.15 and 1.32. High levels of diversity were found in both water courses, reflecting the high biological diversity and conservation status of the studied sites.

A41

NEW RECORDS FOR *GEASTRUM* PERS. FROM CATAMARCA PROVINCE, ARGENTINA

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The genus *Geastrum* Persoon (*Agaricomycetes*, *Phallomycetidae*) represents the evolution of one of the more specialized forms of basidiomes found among the gasteroid fungi. It is characterized by the exoperidium that splits into a variable number of rays. These exoperidial rays serve to protect the endoperidial body and facilitate spore dispersal. Spores are released through a single apical pore. *Geastrum* Pers. has very diverse habitats, from forests to arid regions.

As a part of an integral study of the mycobiota in Catamarca province, we made seasonal field work in different phytogeographical regions where basidiomata were collected. The study and the descriptions were made on the collected material, following the methodology and terminology of Sunhede (1989). The specimens collected were deposited in the University of Buenos Aires Herbarium (BAFC) and in the private herbarium M.M.Dios (FACEN, UNCa).

These records from Catamarca province are new: *G. arenarium* Lloyd, *G. campestre* var. *famatinum* Kuhar & Papinutti, *G. dissimile* Bottomley, *G. hariotii* Lloyd, *G. hungaricum* Hollós, *G. pampeanum* var. *pampeanum* Spég., *G. parvistriatum* J.C Zamora & Calonge, *G. saccatum* Fr., *G. saccatum* var. *parvulum* Spég., *G. striatum* DC and *G. triplex* Jungh.

A42

DINEMASPORIUM LÉV. (XYLARIALES, ASCOMYCOTA): FIRST REFERENCE FOR CATAMARCA PROVINCE, ARGENTINA

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Dinemasporium (Xylariales, Ascomycota) genus was created by Léveillé in 1846. In Argentina, *Dinemasporium canadense* Morgan-Jones was cited in the Espinal region (Allegrucci et al., 2007). The genus is characterized by presenting a superficial, cupuliform to discoid conidiomata with setae; phialidic conidiogenous cells, and hyaline, oblong to allantoid conidia with one setula at each end. It is a large heterogeneous genus.

With the objective of contributing to the knowledge of the fungal diversity associated with plant communities from Catamarca province ecoregions, we studied and analyzed seasonal collections from La Merced de Allpatauca Wildlife Shelter, located in San Antonio town, Fray M. Esquiú department, Catamarca province. The samples were analyzed according to standard laboratory protocols, and the taxonomic determination was made based on specific keys. *Dinemasporium* specimens were identified, growing on *Tillandsia* sp. (eye-RAHN-thos) dead leaves (phyllodes), collected from mulch. *Dinemasporium* genus is cited for the first time in Catamarca and NOA (Northwestern Argentina).

A43

FLORAL COMPARISONS BETWEEN CULTIVATED AND WILD STRAWBERRIES

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Wild species are important genetic resources. In order to have floral characters useful for interspecific hybrids identification, 4 wild species (*Fragaria* sp. and *Duchesnea* sp.) and 3 cultivars were analyzed. Perfect flowers, actinomorphic, pentamerous, rarely 4-6merous, white, in axillary inflorescences emergent from corm or yellow, solitary, axillary emerging from corm and/or runners. Green bracts, pubescent, alternate, with variable size and shape in Epicalyx and calyx. Epicalyx bracts 3-5 toothed serrated margin, longer than sepals, or of the same size. Triangular-subtriangular calyx parts, acute apex, bifid, rarely trifid, entire margin in wild and in a few cultivated species; in *F. vesca*, *F. chiloensis* and some cultivated species, lanceolate shape, longer than sepals. Orbicular or obovate petals, with variable dimensions and differences in base (acute to obtuse) and apex (emarginate, rounded to slightly mucronate). Variable cuticle striation and differences in papillose cells of epidermal petals. Glandular trichomes with unicellular head in *Fragaria* sp., and uni- or tetracelular in *D. indica*. Simple trichomes only base of thalamus or whole surface. Presence of crystals and druses in ovary and style. Comparatively, var Toyonoka shows greater differences in the parameters analyzed. All the following characteristics are relevant traits to identify hybrids: type of flower; shape of calyx and epicalyx; color, shape of petals, cuticle stria, trichomes types, and epidermal cells.

A44

DIVERSITY OF VASCULAR PLANTS IN GUANCHÍN (LA RIOJA – ARGENTINA)

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Guanchín is a small locality in the west of La Rioja (Argentina), located in a narrow agricultural valley flanked by low hills with gentle slopes. We analyzed the diversity and frequency of vascular plants in the plains and hills adjacent to the River Pismanta, along 3 km of its route. We registered the presence of woody species, succulent and cushion plants in plots of 10 x 100m (n=12). Physiognomically the vegetation of Guanchín is a dense shrubland (1.5-2.5 m) of mesic features. In the plots a total of 38 woody species were registered, 65% of which correspond to the families Asteraceae (36.8%), Fabaceae (13.2%) and Verbenaceae (10.5%). The most frequent species were *Acanthostyles buniifolius* (Asteraceae), *Schinus aff. polygamus* (Anacardiaceae), *Vernonia squamulosa* (Asteraceae) and *Colletia spinosissima* (Rhamnaceae). The predominance of the Asteraceae family, the absence of species of *Larrea* and the low abundance and diversity of Fabaceae, cacti and saxicolous bromeliads reveals weak floristic affinities with the ecoregions of the Prepuna and the Monte, with which it has usually been linked. The vegetation of Guanchín is probably a relict of hygrophilous shrublands that showed a greater expansion in the past.

A45

STRUCTURE AND DIVERSITY OF THE MOUNTAIN CHACO FOREST IN THE TAPIA-TRANCAS BASIN (TUCUMÁN)

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The Mountain Chaco is one of the most vulnerable ecosystems with less known biodiversity in Tucumán. The aim of this study is to compare the horizontal structure and diversity of woody plants (DBH \geq 2.5 cm) between the northern (dry) and southern (wet) sector of the Tapia-Trancas basin in the Province of Tucumán. The study sites are adjacent to the localities of Leocadio Paz (northern sector) and Vipos (southern sector). Ten plots (10 x 100 m and 2 x 50 m) were determined to study the diversity of species and forest structure in each site. A total of 41 species of 16 families was registered in the two sites. The most common species were *Acacia praecox*, *Caesalpinia paraguariensis*, *Aspidosperma quebracho-blanco* and *Maytenus viscifolia*, *Ruprechtia apetala* and *Ziziphus mistol*. The southern site registered a larger number of species and individuals than the northern site. A total of 273 individuals (DBH \geq 2.5 cm) were quantified in the 10 plots of 2 x 50 m (=0.1 ha), 68% of which recorded diameters $<$ 10 cm. Four species comprised 50% of the value of importance per species in both sites. The Fabaceae family was the one with highest importance value. Vipos was the site with greater diversity of species, abundance of individuals and with better structural conditions of the forest.

A46

TEMPORAL VARIABILITY OF ANNUAL PRECIPITATION FOR JIMENEZ AND PELLEGRINI DEPARTMENTS, SANTIAGO DEL ESTERO, ARGENTINA (1970-2010)

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Precipitation is an element that has great spatial and temporal variability, so it is necessary to identify and determine changes in its behavioral patterns. This study aims at characterizing the temporal variability of annual rainfall in northwestern Santiago del Estero: Pozo Hondo (27°09'S, 64°29' W), Isca Yacu (27°02'S, 64°37' W) and Bobadal (26°43'S, 64°23'W) (Jiménez Department) and Nueva Esperanza (26°12'S, 64°14'W), Rapelli (26°23'S, 64°30'W) and La Fragua (26°05'S, 64°20'W) (Pellegrini Department). Minimum, average and maximum precipitation were determined using amplitude, standard deviation, coefficient of variation and percentiles. There was a change in rainfall occurrence trend, from a damper to a dryer cycle in the 1990's. There was amplitude in every location, the highest in Rapelli (1038 mm) and the lowest in Isca Yacu (674 mm). Results and statistical analysis allowed us to determine that the Pellegrini Department has a greater temporal variability than the Jiménez Department. In the first two decades (1970-1990), precipitation was higher than normal, while in the remaining two decades (1990-2010) there were long dry periods. These were not found in Jiménez, where fluctuations were lower.

A47

THE 2012 RADIOMETRY CAMPAIGN

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Preliminary results of the third consecutive year of solar UV irradiation measurement campaign at 4 sites of the province of Tucumán, Argentina, are presented. Campaigns are conducted mainly during the dry season, when sugar cane crop fires are lighted everywhere. They are oriented to air particle matter (PM) content and solar UV irradiation at ground level determination. Radiometers are located at four different sites, a reference site taken at the Ampimpa astronomical observatory, characterized by a non polluted atmosphere. PM content can then be determined by comparison between the two data sets. Initial ground PM content values are calculated by a gravimetric method. Further calculation requires a model atmosphere, EXCEL worksheet and collected data. Results correspond to the intervals of coincidence of dates of recorded data among the four sites. Pollution levels were identified by means of cluster analysis followed by an ANOVA test. Differences identified were further treated through Tukey's test. Results were similar to those of previous campaigns, evidencing differences among plain, hill and mountain monitoring site records. However, hill site data exhibited a behavior similar to plains data for the 2012 campaign.

A48

SPECIFIC STRUCTURE AND COMPOSITION OF MIXED-SPECIES FLOCKS OF BIRDS ALONG THE LATITUDINAL GRADIENT OF THE YUNGAS, ARGENTINA

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We analyzed the composition of mixed-species flocks (BM) of birds along the latitudinal gradient of the Yungas, Argentina. Sampling was conducted from May to September from 2006/2009 at 8 locations along the north-south gradient in the Yungas. At each site, 10 transects were established, which recorded the species composition and number of individuals/species of each BM, latitude and longitude and 12 WorldClim climatic variables. We performed a redundancy analysis (RDA) using program R. Seventy-three species were recorded for the 8 sites. The RDA set determined that the two first axes account for 56% of the variation, the important variables being latitude and temperature. The adjusted R² was 0.2523, indicating a large heterogeneity between the North and South sectors. In conclusion, BM differs in composition along the latitudinal gradient of the Yungas. Latitude seems to be the most important variable, followed to a lesser extent by the temperature variables. The variation in the composition of the BM can be accounted for not only by climatic and geographical variables but also by other factors (productivity, complexity of structure and vegetation).

A49

RESPONSES TO ACIDIFICATION OF ALGAL ASSEMBLAGES IN ANDEAN RIVERS OF NORTHWEST ARGENTINA

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Acidic mining causes extreme environmental conditions, because it contains unusually high concentrations of heavy metals since their solubility increases markedly as pH decreases. In the Andean region of Jujuy province at 4200 meters, the exorheic system of the Orosmayo River was affected by the silver exploitation in the area of Mina Pirquitas.

The main objective of this study was to report the structural and compositional changes in the phytoplankton communities, collected with standards techniques in 5 sampling stations in March and October in 2011 and 2012.

In total, 127 taxa were identified, including members of Cyanobacteria (13), Bacillariophyta (72), Chlorophyta (24), Euglenophyta (12), Chryptophyta (3) and Chrysophyta (3). Phytoplankton abundance was highest in the rainy season in all sites, with a maximum of 828 cells.ml⁻¹ in the Ajez River. The Pircas River has acidic conditions (pH ranged from 2.6 to 3.9) with high concentrations of heavy metals. This site showed the lowest number of cells, diversity, and species richness. The diatom communities seem to be more influenced by the high concentration of metal in this river, because their representation was lower than 18.48%. In the water courses with low pH, nitrogen concentration increases but additional dissolution of silica occurs, causing a lower abundance of diatoms. The structure and composition of phytoplankton were affected by the pH gradient.

A50

EVALUATION OF THE PLANKTON BIOMASS IN AQUATIC SYSTEMS OF THE PUNA

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High altitude lakes above 3500 meters exhibit a large biodiversity and great vulnerability to climate change.

There are no limnological studies of salt lakes Rincon and Rio Grande, Andes department, Salta province, despite the intense extraction of lithium mineral. We monitored both wetlands (10 sites) between April and November 2012 in order to assess plankton biomass and its relationship with limnological variables. Physicochemical variables, phytoplankton and zooplankton were quantified by standard techniques.

Both salt lakes showed different average depths, Rio Grande (1.92 m) being deeper than Rincón (0.41m), although the latter site showed higher nitrogen contents, especially nitrite and ammonium. The algal biomass was higher during the rainy season (18.90 mgCl.m⁻²) in relation to drought (4.79 mgCl.m⁻²), Rincon being the more productive system because of a better macronutrient rate (N/P=10.69 vs. 5.80, respectively) due to higher temperature records (average 11.05°C). Zooplankton densities were also higher in Rincon with greater representation of Copepods (16.98 ind.L⁻¹), correlated with pH. Salt lakes Rio Grande and Rincon have higher densities and zooplankton species richness compared to other wetlands in the Puna that are affected by mining activities due to the combination of low pH and accumulation of toxic substances in the latter sites.

A51

EFFECT OF PHYSICOCHEMICAL VARIABLES ON PHYTOPLANKTON AND EPILITHON IN THE SAN JAVIER RIVER (TUCUMÁN-ARGENTINA)

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The study was carried out in the San Javier River (RS) and its main tributary Potrerillo (AP) stream, which belong to the Lules drainage basin. The aim of this study was to analyze the influence of the physicochemical variables on the structure of phytoplankton and epilithon. Sampling sites were AP, RS, and San Javier River downstream Potrerillo inflow (RS + P). Potrerillo stream has oligosaline waters, oligotrophic to mesotrophic, with the highest values of electrical conductivity (EC) (1150µS/cm), turbidity (16.80 NTU), Cl⁻ (10.8 mg/L), SO₄⁼ (108.8mg/L), Na⁺ (64.4 mg/L), NO₃⁻ (3.5 mg/L) and NH₄⁺ (0.23 mg/L). The algal abundance was remarkably low in epilithon: 159 org/cm² and phytoplankton: 110 org/mL, as well as biomass (chlorophyll a =<1 µg/L). Waters from RS, oligotrophic freshwaters, showed the lowest values of EC (326µS/cm), turbidity (3.9 NTU), Cl⁻ (2 mg/L), SO₄⁼ (12.9 mg/L), Na⁺ (14.2 mg/L), NO₃⁻ (2.9 mg/L) and NH₄⁺ (0.06 mg/L). In RS the specific richness increased in phytoplankton (66-71) and decreased in epilithon (60-38). Species observed at RS were not found at RS+P, suggesting that these species could be more 'sensitive' to the new conditions. The results confirm that epilithic communities are the most suitable ones to show the changes that have taken place in a body of water.

A52

ENVIRONMENTAL ANTHROPOLOGY: CONCEPTS OF ENVIRONMENT AND ECOSYSTEM IN ENVIRONMENTAL SPECIALISTS IN SAN FERNANDO DEL VALLE DE CATAMARCA

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The concepts of "environment" and "ecology" are pivotal worldviews in the planning and execution of environmental investigation. The analysis of the epistemological foundations of these concepts provides the basis for understanding the theories and methodologies used in environmental studies. The aim of this study was to determine whether the conceptions of environmental specialists were part of three environmentalism trends: cult of the wildlife, ecoefficientism and environmental justice. The first trend relates to the biocentric conservation of nature, the second to the balance between human activity and environmental recovery, and the third to the irrational exploitation of natural resources and environmental destruction. The methodology used was the ethnographic interview. The sample comprised 15 specialists who work in Secretaría de Estado del Ambiente, whose specialties are 90% biology and 10% geology and engineering. Environmental specialists have a combination of concepts from the first and second trends, which in many cases – such as defense of nature reserves and mining - contradict each other. This implies the need for a greater degree of correspondence between theory and practice.

A53

DYNAMICS OF A WORKSHOP FOR BEEKEEPERS

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This work describes the learning process of beekeepers in Buenos Aires during the 2012-2013 period. The aim is to develop a quality handbook for extraction. Initiation Phase: Formation of groups, with 2 representatives/organization, and establishment of three work areas: N, SW and SE. Preparation Phase: Meeting in each area of the Gantt Chart display and handbook documents developed in the workshops. Agreement on dates for the beginning and end of each activity, venues and dates for the exchange of product from each activity. Explanation Phase: participants were presented with an outline of the tasks to be developed; aspects to consider in the development of each document were clarified. Working groups were formed with an organizer and the printed and digital document to be filled out was handed out. Interaction Phase: groups worked with the documents, there were consultations within and between groups and with the organizers. Presentation Phase: Each group presented its products, which were discussed and agreed upon by all participants. Evaluation Phase: The whole workshop discussed results, prospects for implementation, and evaluation of the learning process. In conclusion, the choice of a workshop on adult learning allowed participants to acquire knowledge and generated a product from individual contributions. It also established an interaction between the different organizations, contributing to the formation of relational networks.

A54

TEACHING-LEARNING STRATEGY IN BIOLOGY BASED ON RESEARCH PROJECTS

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The present work had as aim to implement learning based on research projects to favor the integration of concepts and comprehension of the subjects dealt with in the subject General and Cellular Biology. The methodology consisted in the formation of work teams, the choice of an integration topic that is relevant and identical to students' interests and skills; presentation of the project, formulation of hypotheses and aims, bibliographic investigation, laboratory activities, interpretation of the results and oral presentation of the work done. The following evaluation criteria were established: degree of integration of concepts, level of scientific knowledge and development of critical and reflexive thought. The analysis of the results shows that the application of the selected strategy significantly increased the number of students who regularized the subject (80% in 2012 as against 60% in 2011). With regard to the students, the conclusion is that teaching based on research projects succeeded in the integration of concepts, promoted research ability and became a tool and a methodology to learn new things effectively. Greater autonomy than in a traditional class was achieved since the creativity and motivation of the students were stimulated.

A55

EPISTEMOLOGIC OBSTACLES TO THE NOTION OF NUTRITION. STUDY RELATED TO STUDENTS LEAVING THE SECONDARY SCHOOL

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The notion of nutrition requires an approach which includes biological, social and cultural aspects. Secondary school students have limitations in the process of construing this notion, and these limitations constitute epistemological obstacles that affect the students' ability to promote changes. The objectives of this study are: to identify and characterize those obstacles and to relate them to the didactic perspective developed by teachers. This cross sectional, observational -ex post facto- research includes students leaving the secondary school level as case studies. Information was collected by means of a self-administered questionnaire with 5 categories for analysis. The subjects of the study present a notion of nutrition related to eating, energy accumulation, growth and performance. The limitations observed bring the notion closer to a more traditional didactic perspective. A small group of female students showed a more comprehensive notion because they incorporated relational aspects and others related to health. The obstacles observed belong to the verbal and explanation categories. The notion accounts for an approach far apart from the meaning held nowadays and it is not solid enough to promote real changes. Keywords: nutrition, epistemological obstacles, didactic-epistemological perspective, students.

A56

COMMERCIAL QUALITY OF SEEDS. THE WORKSHOP IN THE GREENHOUSE AS THE MAIN THRUST OF TEACHING IN THE BICENTENNIAL SCHOLARSHIP PROGRAM

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The knowledge of seeds as the beginning and end of a plant's life is the main focus of the agronomy engineer. Growing a certain crop requires knowing the quality of the seed in order to leave progeny and complete the cycle. The General Botany Chair in the Bicentennial Scholarship Program organized a Workshop for Agronomy students of this subject, essential to professionals. The aim was to simulate a commercial seeds greenhouse/lab. Two aspects were considered in the tests: germination and viability. These parameters were measured in the lab as theoretical and practical contents *in situ*. Students worked with agronomic importance species (400 corn, wheat, chickpea and soybean seeds), in germination trays with moist paper and 4 repetitions. On the next 4 and 8 days, they counted and registered the number of germinated, hard and non-germinated seeds, percentages of normal and abnormal seedlings, and finally worked out a report as an Internal Certificate of Germination for each species. To determine viability, a tetrazolium test was made with proper observations and registers. The group work experience and the workshop method were very satisfactory, given that students were able to perform a professional common practice, exchange opinions and solve difficulties with a critical and independent spirit where teachers participated only for guidance.

A57

THE GREENHOUSE AS THE MAIN THRUST OF TEACHING IN THE AGRONOMIST ENGINEERING CAREER. BICENTENNIAL SCHOLARSHIP PROGRAM

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Greenhouse agronomic practices allow the incorporation of methodological strategies of teaching. They favor production in controlled conditions, growing off-season and early crops. Workshop activities served as the main thrust of theories and as a space to develop learning, the same as actions implemented by the National Bicentennial Scholarship Program.

Other advantages of growing crops indoors are working regardless of external conditions and watching all intervening factors in action. The aim of this work was that 20 grant holders should study the plant cycle *in situ*, integrating teaching and learning with greenhouse activities. The students worked with species whose organs (roots and stem) were adapted to vegetative propagation: potato, onion, garlic, sweet potato, sugarcane and Johnson grass.

The workshop provided space and opportunity for agronomic work, allowing a closer look at the plant cycle and teaching students to face problems and propose alternative solutions. The exchange of opinions among students was definitely a reward of the group work. It recreated real situations with a low scale production. As a result, by applying teaching strategies, we encouraged different answers from freshman students to simulated problems, which contributed to their motivation and continuation in the University.

A58

RECOVERY OF CONTENTS AND IMAGES OF HISTOLOGY AND EMBRYOLOGY IN THE CLINICAL SUBJECTS IN THE DENTISTRY DEGREE COURSE

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The objectives of this study were both the identification of the recovery of contents of oral histology and embryology in the syllabuses of clinical subjects and the analysis of electron microscope (EM) images in textbooks in the degree course of Dentistry of the National University of La Plata. In Endodontics, Periodontics and Integrative Pediatric Dentistry straightforward contents and indicators were identified expressing the knowledge of Histology and Embryology as well as inferred ones that do not provide basic knowledge but that the student needs to know. In the EM images, quality, scale bars and figure legends were evaluated. Out of 102 thematic units, 9.80% refer to straightforward contents, 53.92% to inferred contents and 36.27% are not related to histology. The difference is significant (t-test for proportions $p < 0.05$). The books contain a significant proportion of excellent quality ME images, though most of them lack scales and/or type of microscope and magnification. The high percentage of inferred contents evidences the integration of basic and clinical knowledge but the form of presentation of images does not facilitate their proper understanding due to lack of indications.

A59

MOST FREQUENT APPROACHES TO LEARNING IN UNIVERSITY STUDENTS OF HEALTH SCIENCES CAREERS (UNT)

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In the early 90s, the number of applicants to enter Argentine colleges and universities increased substantially. There were students with varying levels of knowledge and study skills. Learning requires the learner's interest in his/her own learning (motivation), the use of skills (learning strategies) and how he/she addresses it (approaches to learning). The aim of this work is to identify the most common approaches to learning in the 1st and 2nd year students of the Faculties of Medicine, Dentistry and Biochemistry, Chemistry and Pharmacy of the UNT. The Study and Learning Processes Assessment Questionnaire (CEPEA) was applied, consisting of 42 items: 21 about motivations and 21 about strategies. The results indicate that 66% of the 1st year students adopt a superficial approach and are interested in "learning" with minimum effort, only to avoid failure. 56% of the students in the 2nd year show a more in-depth approach and are more interested in learning than in just avoiding failure. This work leads us to reconsider teaching methods in order to achieve better academic achievements and reduce dropouts in the early years of biological careers.

A60

ANALYSIS OF NUTRITION/AL PRACTICES REPRESENTATION IN YOUNG PEOPLE IN CATAMARCA

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The purpose of this study is to determine what healthy nutrition is for a group of youngsters from Catamarca and the kind of food they eat daily. This work is interpretative, qualitative and descriptive. Data were obtained from a survey conducted with students between the ages of 15 and 16, both male and female, from a public secondary school in the capital city of Catamarca (n=98). The results show that nutrition as healthy eating is related to the consumption of white meat, vegetables and fruit in a peaceful environment shared with the family. The answers related to their daily eating practices, however, are in contrast with what they understand by healthy eating. Conclusion: this study shows that in the eating habits of young people in Catamarca, the *consumption strategy* is applied, exhibiting the concrete practices and the representations of food, body, health and their cultural influence.

A61

ANALYSIS OF NUTRITION AS A SUBJECT IN NATIONAL CURRICULAR DESIGNS

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The aim of this work is to study the subject Nutrition in national curricular designs and characterize it according to the approach and scope suggested. A document analysis technique was used and the approach to nutrition in the priority learning units' curricular designs was considered the unit of analysis. A comparison was made between the complexity and the morpho-physiological approach. The results show that the subject Nutrition appears in the curricular designs of Biology delimiting vital functions of human beings: energy and physical matter reduced to the processes of consumption, digestion and cell biochemistry, making reference to food quality, diets and energy value. The conclusion of this study is that the curriculum analysed has a marked morpho-physiological curtailing tendency that atomizes the contents related to nutrition and reduces them to structural and functional aspects without considering that Nutrition is included in the school curriculum, and that it is a cross curricular subject because of environmental, health, consumption and science, technology and society problems. Nutrition is highly contextualized because of students' and teachers' conceptions.

A62

FOUNT RESEARCHERS PRACTICE: FORMULATIONS FROM A PERSONAL FRAMEWORK

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The aim of this study was to explore the investigations and results of the FOUNT teachers from an individual dimension, but always in dynamic interaction with social and organizational contexts. From a phenomenological perspective, thematic interviews were conducted in this research. The information provided by respondents was later systematized and analyzed according to the analytical method developed by Strauss. The findings expressed below are grouped into the following categories: In the initial phase of the research process, usually a question is asked that expresses the investigator's question, which is related to the interest of transforming a certain reality. Cognitive interest plays a fundamental role in any process of development of researchers. It also gives a sense of ethics to action oriented research by the desire to reciprocate what society has done for them. Other motivations show the aspiration to transcend through new generations of researchers. They state that responsibility and commitment are the center of these attitudes aimed at improving what sometimes seems to be unbeatable and whose starting point seems to be the individual himself. The investigator's emotionality is strongly implicated as the basis of his/her formation and development.

A63

PRESENT IMPACT OF A PHILOSOPHICAL ACADEMIC SUBJECT: EPISTEMOLOGY, IN THE 2003 CURRICULUM OF THE FACULTY OF AGRONOMY AND ANIMAL HUSBANDRY OF THE UNIVERSITY OF TUCUMÁN

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Epistemology, an optional 2nd year subject, is taught in the Faculty of Agronomy and Animal Husbandry since 2005. The experiences of the first two years (2005-2006) were published in the professional meetings of the Tucumán Biology Association, assessing its impact and its place in the career. For the 2011-2013 classes we assessed the correlation between the students and their averages. The basic contents remain: types of knowledge; scientific practices; international standards for scientific communication; science and limits. Eleven theoretical and practical classes were taught plus one in 2013 with oral expositions, selection of texts and weekly written open-book written evaluations. Students were asked why they chose Epistemology and what difficulties they found, the place of the subject in the curriculum and the benefits of open-book assessment. 50% of the students (best and laggard) were compared with their respective career averages. Out of the total students enrolled $\geq 80\%$ attended classes; out of these, 84% (2011), 88% (2012) and 71% (2013) finished the course; direct correlation was observed between 25% (best) and 25% (laggard) students and their averages. The survey revealed that $\geq 83\%$ of the students were interested/very interested; $\leq 1/3$ thought that the subject should be taught after the 2nd year; 83% read $\leq 80\%$ of texts; 80% accepted open-book-assessment. In conclusion, fewer students think that the subject should be taught after the 2nd year; there is a direct correlation between best and laggard students and their respective averages; the subject is important because of its contents and for the students' scientific and technical makeup.

A64

DIAGNOSTIC ASSESSMENT OF FINAL YEAR STUDENTS OF THE AGRONOMIC ENGINEER CAREER IN RELATION TO ENVIRONMENT AND USE OF ICTs

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ICTs are valuable educational tools. The objectives of this study were to evaluate the use of ICTs by students of the career of Agronomy (FAZ-UNT), analyze the environmental interest that these students present before taking the course and assess previous knowledge of environmental issues. We applied an anonymous diagnostic test at the beginning of the subject Ecology. 7 questions were included: 1) Internet use: always, sometimes, hardly ever; 2) Internet use during the course: 70% -100%, 40% -70%, <40%; 3) 5 websites related to Ecology and Environment; 4) Knowledge about environmental impact; 5) Usefulness of spatial planning; 6) Most polluted rivers in Tucumán; 7) Environmental problems in the Rio Hondo Reservoir. Using descriptive statistics, the results indicate that 57% of students always used Internet and 39% use it with intermediate frequency (40% -70%) for study purposes. Only 11% of respondents knew websites related to the environment. With respect to previous knowledge, results were low (29 and 14%). The results show poor interest in the subjects addressed and reveal that students employ ICTs that could be used for environmental studies.

A65

A PROPOSAL FOR THE TEACHING OF ORGANIC CHEMISTRY FROM A LAKATOSIAN PERSPECTIVE

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Organic chemistry has attracted different opinions regarding its contents and the methodology used by teachers, so it is necessary to discuss the epistemological stance and the didactic model used to teach such contents. The aim of this work was to elaborate an organic chemistry teaching proposal using as an example a practical work on the Lewis theory for chemical bonds.

The implementation of this chemistry historical study from the Lakatos theory point of view, focused on facts and theories which allowed the emergence of a basic concept of Organic Chemistry, its application at the present and its confrontation with other theories, allows the improvement of the teaching-learning process. This proposal will increase student motivation by making the subject more interesting and allowing students to reach a higher academic performance.

A66

IMPORTANCE OF ORGANIC CHEMISTRY IN BIOLOGICAL RESEARCH

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In the teaching of Organic Chemistry, the important element is not only the science that is taught but also the investigations carried out by the teachers through interdisciplinary work. The objective of this work is to show the application of organic chemistry in biological research. Chromatography was used for the determination of fecal bile acids patterns and the removal of secondary metabolites identified by spectroscopic techniques present in hydroalcoholic solutions of *Baccharis boliviensis*, *Plectrocarpa rougesii*, *Senna crassiramea*, *Aphyllocladus spartioides* and *Gochnatia glutinosa*. The determination of the pattern of fecal bile acids in mammals through TLC allowed studies of distribution of the snow leopard in Armenia, the presence of puma and jaguar in the Amboro-Bolivia National Park and the determination of the presence of the Pampas cat in samples from Las Cuevas (Mendoza), and established the presence and distribution of species of Xenarthra, Carnivora, Artiodactyla and Perissodactyla in the region of Bahia Blanca and National Parks. The effect of extracts and metabolites on the germination of cardon seeds showed that they could be responsible for the negative interaction found. These investigations showed that TLC can be applied to the study of mammalian species. Research on allelopathy has allowed the implementation of basic laboratory techniques to separate and identify the metabolites that cause the above interaction.

A67

MORPHOLOGICAL AND ANATOMICAL FEATURES OF *Cassebeera triphylla* (PTERIDACEAE)

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Cassebeera triphylla (Lam.) Kaulf. is the only Argentine representative of the *Cassebeera* genus. This fern grows in rock crevices and in exposed areas of Southern Brazil, Eastern Paraguay, Uruguay and Central, Northwestern and Northeastern regions in Argentina. The aim of this work was the characterization of the morphology and anatomy of this species. The research was carried out with herbarium material from different locations. Conventional anatomical techniques were applied. The results show that the frond is hypostomatic. Bicellular glandular trichomes are observed in the abaxial epidermis. The reflex margin is lobulated. In cross section, the lamina has 1-2 palisade and 4-6 spongy parenchyma layers. Petiole with two xylematic groups, surrounded by pericycle and endodermis. Solenostelic rhizome, covered by scales with apical gland. Diarch roots. Inner cortex sclerenchymatic and outer cortex parenchymatic. The sclerenchymatic tissue is related to the xeric condition. The presence of rhizome scales with apical gland, glandular trichomes in the abaxial epidermis and the two xylematic groups in petiole are new contributions for this species of a conflictive systematic position.

A68

MORPHOLOGY AND ANATOMY OF THE EPIPHYTIC FERN *Pleopeltis macrocarpa* (POLYPODIACEAE)

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Pleopeltis macrocarpa (Bory ex Willd.) Kaulf. is an epiphytic fern. In Northwestern Argentina it grows in basal and mountain forests between 1000 and 2000 m asl. The aim of this research was the morphological and anatomical characterization of this species. The study was carried out with 10 individuals. Stomatal size and frequency were calculated. Conventional anatomical techniques were applied. *P. macrocarpa* has hypostomatic lamina, stomata 54.36 x 49.04 µm, with a frequency of 21 stomata/mm². Scaly fronds with uniseriate trichomes formed by 1-2 cells. In cross section it presents unistratified epidermis, mesophyll with 1-2 palisade and 5-6 spongy parenchyma layers. The cells that surround the frond vascular bundle have thick inner walls. Petiole with 2-3 vascular bundles. Dictyostelic rhizome covered by basally fimbriate scales. Diarch roots with the inner cortex sclerenchymatic and outer cortex parenchymatic with cellulosic helical thickenings. The anatomical and morphological characteristics of *P. macrocarpa* such as thick cuticle in leaf and petiole, scales, and thickening in the root outer cortex allow this species to survive as an epiphyte exposed to environmental factors on trees branches.

A69

AGRONOMIC-PRODUCTIVE-NUTRITIONAL CHARACTERIZATION OF SILAGE MAIZE HYBRIDS IN THE MILK BASIN OF THE TRANCAS DEPARTMENT, TUCUMAN. II: NUTRITIONAL PARAMETERS

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The objective of this study was the nutritional characterization of three maize hybrids (*Zeamays* L.) grown for silage in the milk basin of the Trancas Department, Tucumán, through the determination of the following parameters: % of Crude Protein (CP), % of Crude Fiber (CF), % of Nitrogen-free Extract (NfE), % of Ether Extract (EE) and % of Minerals or Ash (M) in leaf, stem, husk and cob of maize hybrids. The experiment was conducted in a dairy establishment of the town of North Zárate (Dept. Trancas, Tucumán) on commercial batches of corn for silage production. The hybrids evaluated were DK834, DK842 and P30A04, widely available in the area. The materials were ready for chopping and bagging for silage in early April, when they reached the phenological state of fodder grain. Five samples were analyzed for each of the components of the plant (leaf, stem, husk and cob), for each silage maize hybrid. Laboratory tests were made following the protocol proposed by the proximate analysis according to A.O.A.C. standards. The results indicate that silage maize hybrids DK 834, DK 842 and P30A04 show values compatible with an adequate nutritional quality of the silage.

A70

**PARTITIONING STRATEGY OF THE FORAGEABLE GROUND BIOMASS IN DEFERRED
Trichloris pluriflora IN THE SEMIARID SALINE DEPRESSED PLAIN OF TUCUMÁN**

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The aim of this study was to determine the partitioning strategy of the forageable ground biomass in a monophitic pasture of *Trichloris pluriflora* during the deferred phenological state at the end of the winter-spring dry season in the Semiarid Saline Depressed Plain of Tucumán. The study was conducted on the cattle farm "La Celina", located southeast of the Leales Department (Province of Tucumán), a region with semiarid mesothermal climate. We worked on a monophitic pasture of *Trichloris pluriflora* that at the time of the experience was in the deferred phenological state due to the prolonged winter-spring drought conditions. The sampling was conducted over microplots of 1m² of surface, leaving stubble of about 12 cm high (approximately 45% of the weight of the total biomass present). The results show that: i) until mid December, under conditions of intense winter-spring drought, *Trichloris pluriflora* shows a high percentage of senescent biomass, and ii) the presence of 31.32% of green material (stems and leaves) in the plant indicates that, despite the severe environmental conditions prevailing at the time, *Trichloris pluriflora* shows significant regrowth capacity denoting its degree of environmental adaptation.

A71

**VARIATION IN THE AVAILABILITY OF STEMS AND LEAVES IN *Trichloris pluriflora* PLANTS
DURING THE WINTER-SPRING DEFERRED PERIOD UNDER DIFFERENT EDAPHIC
CONDITIONS IN THE SEMIARID SALINE DEPRESSED PLAIN OF TUCUMÁN**

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The objective of this study was to determine the variation along the deferred period (July-October) in the availability of stems and leaves (both dry or senescent and green) in *Trichloris pluriflora* plants under different edaphic conditions in the Semiarid Saline Depressed Plain of Tucumán. Determinations were performed on a 60-acre pasture completely covered by *Trichloris pluriflora*, rationally grazed during the previous summer-autumn period. We identified three situations or environmental conditions (CA), resulting from the change in the slope of the ground, the soil salinity content and the level of accumulation of water in the profile. For each CA, 4 samples were collected from 1 m² of available forage for each sampling date. In each, dry stems (TS), leaves (HS), green stems (TV) and green leaves (HV) were separated and dried to constant weight. From the results, it was determined that *Trichloris pluriflora* under different soil salinity levels was maintained despite the prevailing environmental conditions and the percentages of green material (stems and leaves) allow its temporary use as deferred fodder.

A72

**FOLIAR MINERAL COMPOSITION OF TROPICAL GRASSES UNDER CONDITIONS OF
AGRICULTURAL AND SALINE SOILS IN WESTERN SANTIAGO DEL ESTERO**

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The aim of this study was to evaluate changes in the composition of foliar macromineral tropical grasses prevalent in the NOA under conditions of agricultural and saline soils in western Santiago del Estero Province. The species studied were: *Brachiaria brizantha*, *Cenchrus ciliaris*, *Chloris gayana*, *Panicum maximum* and *Urochloa sambisensis*. Samples of these forage grasses were cut with a scythe at the height of a fist (10 cm), with three replicates per plot. Analyses of the foliar mineral composition of N, K, Na, Ca, Mg and P were conducted according to the methodology proposed by Jones (1967). The results show that: i) in all species and cultivars evaluated, Na content increases in leaf tissue in saline soil, and ii) the rest of the minerals present different situations depending on the species, cultivar and soil type but, in general, P and K tend to reduce their foliar concentration in saline soil, while Ca and Mg exhibit the opposite response.

A73

DEMOGRAPHY OF *Panicum maximum* Jacq. IN SUGAR CANE CROPS IN DIFFERENT LOCALITIES OF EL CEVILAR, LOS VILLAGRA, FAMAILLÁ & LOS NOGALES

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P. maximum (Camalote, Guinea grass, Capim-colonio, PANMA), native to Africa, belongs to the Poaceae family. At present, it is established in high infestation in Tucumán, Salta and Jujuy. There is no information about the demographic behavior of *P. maximum* in sugar cane crops, so the aim of this work was to perform an experimental demographic analysis in cultivated areas. In El Cevilar, Los Villagra, Famaillá and Los Nogales, six subplots of 1.6 by 1.0 m were made in cultivated plots of 5 Has. The design was completely randomized. Between September 2011 and April 2012, natality and mortality of *P. maximum* were recorded weekly. Gross natality (NBR), mortality (MBR) and survival (SBR) rates were calculated. In all localities, the MBR of *P. maximum* showed medium to high values (572.1%; 559.1%; 280.9%; 389.3%), the same as NBR (427.9%; 440.9%; 719.1%; 610.7%). SBR was always low (172.4%; 125.4%; 246.5; 229.7). It is concluded that these values ensure the permanence and infestation capacity of *P. maximum* in new areas.

A74

REPRODUCTIVE CAPACITY (ICR–RCR) AND INFESTATION POTENTIAL (PI) OF *Panicum maximum* IN SUGARCANE CROPS IN GARCÍA FERNÁNDEZ (TUCUMÁN)

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The objective of this study was to establish the reproductive capacities and infestation potential of *Panicum maximum* in the sugarcane crop. Work was carried out in García Fernández (Tucumán, 26°57'22" S- 65°16'12" W) on cultivar TUC 77-42 (4-year ratoon) in 2010-2012. Seven 80 m² completely randomized plots were established. The initial density of settled plants was determined. The average seed production per sampled plant was calculated in the plots. A "des" factor of 70% of loses was used. The tests of seed viability were made with tetrazolium chloride and sodium hypochlorite and germinative power. The IRC (Individuals with reproductive capacity), RRC (Real reproductive capacity) and PI (Infestation potential) were obtained. Results: 9 pl.m² PANMA; 21,142 seeds per plant; 14,799.40 des factor; 6342,60 seeds entering the bank; 68% Average viability; 76% Germinative power; ICR=4312.96; RCR=3277.84; PI = 364.20 m².pl. The descendents of one plant will occupy 364.20 m² during the next cycle. It was concluded that a) a large seed percentage is lost from the plant to the soil bank, b) a reduced number of seeds germinate, c) Infestation Potential is intermediate, but ensures severe infestation in the crop-weed relationship, keeping the establishment and the present association.

A75

SURVIVAL RATES OF *Panicum maximum* Jacq. IN THREE TUCUMÁN LOCALITIES

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P. maximum is a weed with a certain degree of direct association with sugarcane crops in the North of Argentina. The objective of this study was to find differential characteristics of the demographic rates of survival for three Tucumán localities. Work was carried out at Santa Bárbara, Famaillá and García Fernández in cv LCP 85-384 sugarcane crops, three year-ratoon, during 2011 and 2012. At each locality, completely randomized-3,200 m² macro-plots were marked and 3 plots-4 furrows of 1.6mx10m were determined in them. Localities had similar culture management. Total, live and surviving plants were determined in each plot. In order to calculate SvR (Survival Rate) and SvP (Survival Probability) the NBR (Gross Natality Rate) and MBR (Gross Mortality Rate) were determined. For Santa Bárbara, results were TBM 494.7%; TBN 505.3%; SvR 505.2%; PSv 0.5%. For Famaillá: TBM 407.65%; NBR 592.35%; SvR 502.3%; SvP 0.5%. For García Fernández: TBM 500.7%; NBR 499.3%; SvR 409.2%; SvR 0.49%. There are differences in survival rates, the greater being those in Santa Bárbara because the initial populations were larger, the same as the number of live plants of the summer populations. García Fernández showed the smaller survival rate and survival probability was also the lowest compared with that of the other localities due to its smaller initial populations. In Famaillá there were no statistical differences.

A76

EFFECT OF TWO DENSITIES ON SUBTROPICAL CORN (*Zea mays* L.) HYBRIDS

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Density is a major factor for increased yield. The aim of this study was to evaluate 10 hybrids (H), (H1)2K562Hx, (H2)2A120Hx, (H3)P3115, (H4)30P70, (H5)30F35, (H6)30B39, (H7) DK390VTP, (H8)DK922MGRR2, (H9)BG7049H and (H10)W712H at two densities, 4 (D1) and 6.6 (D2) plants.m⁻². We measured yield (Y), 1000 grain weight (W) and grain number.m⁻² (NG). The experiment was established at INTA-Leales, Tucumán, Argentina (27° 03' S, 64° 15' W, 330 m asl) in December 2011, in rainfed conditions. We used plots of 7 m², split-plot design, main plot density and subplots H, and 3 repetitions. The ANOVA of Y (CV=12.93) was significant for H (pv=0.0001) and interaction D*H (pv=0.002). H5, H6, H7, and H4 were the best yields, while H5, H6, H4 and H7 in D2 showed the highest values for the interaction. The ANOVA of W (CV=8.67) was significant for H (pv=0.0001). H3, H7, H9, and H5 showed the highest values for W. The ANOVA of NG (CV=14.98) showed significance for D (pv=0.02), H (pv=0.0001) and interaction D*H (pv=0.0016). D2 was higher than D1, and H6 and H4 were the highest values. H6, H4, H5 and H7 in D2 were the highest values for the interaction. The correlation between NG and Y was significant (0.82). H4, H5, H6 and H7 showed the best performances for Y and NG in D2, while H3, H7, H9 and H5 did likewise for W.

A77

COMPARATIVE STUDY OF GROWTH IN QUINOA, AMARANTH AND CHIA PLANTS

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The growth of quinoa, amaranth and chia seedlings was assessed. Root length (RL) and shoot length (SL), fresh weight (FW) and dry weight (DW) of seedlings and the stem/root (St/RL) growth ratio were measured. We used ANOVA and Tukey's test. **In quinoa** significant differences in RL between the 5th week and the 1st and 2nd were obtained and in SL between the 5th week and the 4th and 3rd as well as with the 2nd and the 1st; in FW there was no difference between the 5th and the 1st week; in DW the 5th week differed from the first 4. No differences were detected between dates in the St/RL ratio. **In amaranth**, RL in the 4th and 5th weeks differed from the rest; in SL the 5th week differed from the first 3; in FW the 5th week differed from the other 3; in DW the 5th week differed from the others; in St/RL the 5th and 2nd weeks differed from the 1st. **In chia**, RL in the 4th week differed from the rest; in SL the 5th and 4th weeks differed from the rest; in FW the 5th and 4th weeks differed from the rest; in DW the 5th week differed from the rest; in St/RL the 5th week differed from the 4th and 3rd. No differences were found in RL or FW when comparing the 3 species; in SL, quinoa differed from chia and amaranth; in PS quinoa and chia differed from amaranth; in the St/RL ratio, quinoa differed from amaranth. It is concluded that stem length, seedling dry weight and stem/root ratio determine the growth of the 3 species at the seedling stage.

A78

GERMINABILITY DETERMINATION AND WATER ABSORPTION OF AMARANTH, QUINOA AND CHIA AT DIFFERENT SEED CONSERVATION PERIODS

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Germination and water absorption in amaranth, quinoa and chia were determined at different seed storage periods in the CEPIA laboratory, INTA Catamarca, at room temperature. Seed samples were taken in June of 2012 and 2013. Germination and water absorption at 24 hours were determined. The species were used in a randomized blocks design, using the years as blocks. We performed ANOVA, Tukey's test and Pearson's correlation coefficient. No differences were detected with respect to germination (90 and 93.33) between years, but there were significant differences among species in chia (86.50) and amaranth(99); in water absorption, differences were observed between years (184 and 208.25) or between species; a positive linear relationship between germination and water uptake at 24 h was determined between years in amaranth (0.9 and 0.92 respectively); a negative correlation in the years studied was found in chia (-0.25 and -0.43); and negative linear relationship was detected in 2012 (-0.67) and a positive one in 2013 (0.76) in quinoa. The negative correlation suggests a possible negative effect of the rate of water absorption on the germination of chia seeds and quinoa in 2012. Chia and quinoa showed a higher germination response in the years under study and in the same storage conditions, while the degree of association between the variables studied varied with species and storage time.

A79

**GERMINATION AND SALINITY IN AN INDUCED AUTOTETRAPLOID
POPULATION OF *Lotus tenuis***

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Lotus tenuis, an exotic diploid forage legume ($2n=2x=12$), has become successfully adapted to the ecological characteristics of the Flooding Pampas region of the Province of Buenos Aires, Argentina. This species is highly valued, basically due to its ability to adapt to soils that do not allow other forage legumes to prosper. A genetic improvement programme of the species resulted in an induced autotetraploid population known as "Leonel" ($2n=4x=24$). The aim of the present investigation was to comparatively evaluate salinity tolerance during the germination of the tetraploid germoplasm with the cultivars Chajá and Pampa Inta. Three treatments were placed in a stove at $21^{\circ}\text{C} \pm 1$, with four repetitions of 25 seeds each one in Petri dishes. Three solutions were used: control (distilled water), first treatment (saline solution 100 mM) and second treatment (saline solution 150 Mm) for both cytotypes. On the fourth day germination energy (EG %) was assessed and germination power (% PG) 16 days after sowing. There were statistically significant differences for EG and PG between control and treatments for both diploid and tetraploid cytotypes. Leonel population presented the highest EG (49) and PG (57) values compared to Chajá (EG 39, PG 49) and Pampa (EG 28, PG 42) in treatment 2. The present results suggest the presence of genetic potential to germinate and emerge under salinity stress.

A80

**PRELIMINARY EVALUATION OF THE EFFECT OF INOCULATION IN AN INDUCED
AUTOTETRAPLOID POPULATION OF *Lotus tenuis***

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An autotetraploid induced population was obtained for the purpose of producing a commercial variety adapted to the ecological conditions of the Depressed Pampas. Seeds were harrowed manually and sown in Petri dishes that were placed in a stove at 21°C in the dark. When the roots were 1 cm long, they were transplanted to individual plastic gavels of 330 cm^3 in sterile vermiculite humidified with Hoagland solution without nitrogen and inoculation was carried out. A total of 36 plants placed in a growth chamber were evaluated. Measurements were performed 30 days after the transplant. The objective was to compare the population's induced autotetraploid behavior with respect to two diploid cultivars through the evaluation of the variables air dry weight (ADW), root dry weight (RDW) and total dry weight (TDW). A complete factorial model was used with a totally random design with two factors: 1) inoculation (strain B733) and without inoculation, and 2) genetic material. For all variables analyzed a significant effect of the interaction was detected. In the diploid cultivars a significant effect of the inoculation was detected only for the RDW while in the autotetraploid population significant effects of the inoculation were detected for the three variables analyzed. The tetraploid germoplasm showed a satisfactory response to the inoculation.

A81

**GUIDELINES FOR THE BOTANICAL IDENTIFICATION OF THE WEED *Urochloa panicoides* P.
Beauv.**

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Urochloa panicoides is an annual weed of the *Poaceae* Family. In Tucumán province lack of control with glyphosate was detected in the 2010/11 and 2012/13 season in corn and soybean fallows as well as in sugar cane and there is a yellow alert in the Resistant Weeds Recognition Net (REM). Specimens from Tucumán province were identified at the reproductive stage using taxonomic keys. Guidelines for identification in the adult stage are: 1) habit: herbaceous; 2) plant height: 10-55 cm; 3) cycle: annual; 4) stems: erect to decumbent branched and rooted in basal nodes, 5) pods: open, 4-7 cm long, hairy and ridged; 6) ligule: from 1 to 12 mm, membranous basis, then like a long flange; 7) blade: from 3 to 20 cm long by 0.5 to 1.5 cm wide, with hairs on both sides; 8) inflorescence: bunches from 3.5 to 9 cm long. Main axis angular and hispid; 9) spikelets: ellipsoidal, from 3.3 to 4.3 mm long by 1.5 mm wide, glabrous, greenish, with notable nerves. Lower glume clasping, usually abaxial. Upper antherium sharp, edge almost 0.5 mm long, subsessile, pedicels with long and stiff whitish hairs; 10) fruit: caryopsis. Resistant and tolerant weeds are an increasing problem in all productive areas, so their early detection and recognition will result in better agronomic control.

A82

ECOLOGICAL FOOTPRINT OF THE SOYBEAN CROP UNDER PRODUCTION SYSTEMS IN TUCUMAN, ARGENTINA

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Energy crops are an important source of biofuels. To determine their sustainability, quantitative indicators are used for energy, environmental, social and economic evaluations. The ecological footprint (EF) determines the biological productive area needed to supply the resources used and to assimilate the residues generated in a productive chain.

The aim of this research was to determine the ecological footprint (EF) of soybean crop under production systems in Tucuman, Argentina. Two production systems (Conventional Direct Planting (CDP) and Transgenic Direct Planting (TDP), and different stages of the production cycle (fallow, planting, crop management, and harvest) were defined. For each production system and stage, an inventory of resources used was made, and resources were converted to energy unit per unit area. Total energy used was transformed into EF following the methodology proposed by Doménech Quesada (2006). Production of one hectare of soybeans, with the use of non renewable energy, generates ecological footprints of 0,099 and 0,104 hectares, with maximum values for the CDP system, due to the use of herbicides. It can be concluded that production systems regarded as conservationist in terms of reduced labor and use of farm machinery generate an EF due to the intensive use of agrochemicals.

A83

THE ECOLOGICAL FOOTPRINT AS AN INDICATOR OF SUSTAINABILITY OF SWEET SORGHUM (*Sorghum bicolor* (L.) MOENCH) CROP IN TUCUMÁN, ARGENTINA

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The objective of this work was to study the sustainability of sweet sorghum as an energy crop, by using Life Cycle Analysis (LCA) techniques and Ecological Footprint (EF). Two production systems: Conventional (CV), with soil tillage, and Conservationist (CS), with no tillage and direct planting, were analyzed. Different stages of the production cycle (fallow/tillage, planting, crop management, harvest, and transportation) were defined for each production system, and an inventory of resources -converted to energy units per unit area- was made. This energy was then transformed into EF in absolute terms (hectares and tons of CO₂ emissions), and in relative terms (%). The EF of the CS was 0.16 Ha or 0.85 t CO₂, as compared to 0.15 Ha or 0.80 t CO₂ of the CV. The stage of Life Cycle with largest EF was that with crop management (40.5% and 42.8%) for both systems. We were able to discriminate production systems (and stages) producing greater impacts. However, the LCA and EF tools do not take into account the use and degradation of natural resources, and the effect of energy crops on biodiversity. We conclude that the use of agrochemicals generates larger impacts on the EF, even in production systems regarded as conservationist, due to the reduction in tillage and the use of farm machinery.

Key words: Bioenergy, Sweet Sorghum, Life Cycle, Ecological Footprint, Energy Crops.

A84

INCIDENCE OF DIFFERENT SCARIFICATION METHODS ON THE EMERGENCE OF *Cercidium praecox* (Ruiz et Pavon) Burkart

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The objective of this study was to evaluate the effect of scarification on the emergence of *C. praecox*. The seeds were scarified by immersion in sulfuric acid for 3 to 5 minutes, testa cutting, grinding, washing for 24 h and control. 15 seeds per treatment were sown in pots containing a mixture of soil, sand and compost, during the months of February-March 2013, for 18 days. The design was completely randomized with 4 replications. The average air temperature was 24.6 °C. We calculated percentage and average time of seedling emergence, which were analyzed using generalized linear models and Fisher's LSD test. Maximum emergence (65 and 63%) was obtained with acid scarification for 3 and 5 minutes. There were no significant differences between them but there were significant differences with the other treatments. The lowest average value for emergence corresponded to control treatments (14%) and washing for 24 h (8%). The average time of emergence with chemical and mechanical scarification treatments and control ranged between 8.20 and 6.46 days and was different from the washing for 24 h treatment (9.7 days). It is concluded that acid scarification is the best treatment to obtain *C. praecox* seedlings in the nursery.

A85

**EFFECT OF A BIOFERTILIZER WITH NATIVE MICROORGANISMS
ON MAIZE PRODUCTION**

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Maize cultivation has nutritional, economic and social importance in the northwest of Argentina, where the use of agrochemicals is customary to increase yield. With the purpose of introducing biotechnologies to improve the production and comparing a local biofertilizer with urea, assays were carried out without irrigation in the Temperate Valleys of Jujuy Province for four successive years (2010 to 2013). Each assay was made with a design of randomized blocks with two replicates and five treatments: T0 (control); T1 (H19); T2 *Bacillus megaterium* (Bm); T3 (H19+Bm) and T4 (Urea). The native strains are able to solubilize phosphorus, produce Indolacetic Acid (AIA) and act as biological control (CB). T1, T2 and T3 were inoculated at a dose of 0.5 ml/100g before sowing. T4 was fertilized with 50 kg/ha of nitrogen as Urea thirty days after sowing. The variables studied were: ear weight without bracts (PF), ear length (L), ear diameter (D) and number of kernel rows (NH). Results were analyzed by ANOVA and Tukey's test ($p > 0.05$). For PF, L and PG there were statistically significant differences between T1, T2 and T3 with respect to T0 and T4 in 2011. Two years of droughts (2012 and 2013) only affected ear filling, especially for PF. Our results suggest that treatments with biofertilization are better than treatment with urea in terms of maize quality under normal rainfall conditions and also enhance drought tolerance and mitigate its negative effects.

A86

**EVALUATION OF VERMICOMPOST FROM LLAMA AND SHEEP GUANO AS A SUBSTRATUM
IN BASIL CULTURE**

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The aim of the present work is to evaluate the effects of the use of different biofertilizers on plants of broad leaf basil (*Ocimum basilicum* L). Basil was sown in a greenhouse in October in 250 cc containers, three seeds per packing being used. The substrata were: a) vermicompost from llama manure (LL) 50% in mixture with 50% soil (V/V), b) vermicompost from sheep manure (LO) 50% in mixture with 50% soil (V/V) and c) soil without amendments (control). After emergence, seedlings were transplanted, leaving one seedling per packing. The variables were evaluated: Air Fresh Weight (g), Root Fresh Weight (g), Total Fresh Weight (g), Root Dry Weight (g), Air Dry Weight (g), Total Dry Weight (g), Height (cm), Number of Leaves, Number of Branches and Leaf Area (cm²). Highly beneficial effects of the vermicomposts were observed compared to the control, LL showing a better performance than sheep manure. Nevertheless LO was better than LL concerning number and area of leaves. The use of vermicomposts resulted in greater benefits for its effects on all production variables. These clean technologies constitute a sustainable alternative to the application of fertilizers in the production of basil.

A87

**EVALUATION OF THE EFFECT OF POULTRY VERMICOMPOST EXTRACT ON THE
CULTURE OF *Spinacia oleracea* L.**

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The aims of this work were to evaluate the effect of the application of a vermicompost extract obtained from poultry droppings on spinach culture with organic managing on a farm in the locality of Humahuaca, Jujuy, and to compare the results obtained through foliar application and fertirrigation. The study was conducted in the Facultad de Ingeniería of the UNJu. We worked with spinach (*Spinacia oleracea*) seeds. Sowing was made in trays using a 1:1 mixture of vermicompost and soil as a substratum. The transplant to 1000cc pots was performed when most seedlings showed 2 real unfolded leaves. Fertirrigation was carried out every 3 days and the fertilizations after 7 days of the transplant every 15 days. The treatments arose from the combination of the method of application of the fertilizer, foliar (F) and fertirrigation, with different doses for both types of application. The variables evaluated were plant fresh weight, plant dry weight, height, diameter and number of leaves. The results showed a positive benefit with the application of extract when the treatments with different doses were compared with the control. The dose with the best results for the fresh weight and in dry weight variables was 100ml/Kg, showing significant differences with the rest of the treatments. No significant differences between the two methods were observed for the evaluated variables.

A88

EVALUATION OF THE GROWTH AND REPRODUCTION OF *Eisenia andrei* IN FIVE ORGANIC SUBSTRATES

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The aim of this investigation was to evaluate the growth, survival and reproduction of *Eisenia andrei* in 5 organic substrata commonly generated in agriculture-related activities in the locality of Humahuaca, Jujuy. Llama, sheep, horse, cow and rabbit manure were used as organic substrata for wormfood. The materials were previously stabilized and placed in wooden boxes at a volume of 0.03 m³, to which a population of 600 individuals of mature *E. andrei* was added. The vermicomposting process had duration of 3 months, during which 3 samplings were realized. The average weight of the individuals was 0.39-0.70 g. There were 2 statistically different groups: horse and llama (0.58 g and 0.70 g respectively) and sheep, cow and rabbit (0.42, 0.40 and 0.36 g respectively). Reproduction and survival at the end of the experiment was different for each substratum used, sheep being the one with the highest values in final population and llama with the lowest (16900 and 408 individuals out of the 600 initial ones). The growth and reproduction of *E. andrei* are directly related to the type of substratum in which it lives and develops. It is not correct to generalize about the survival, development and reproduction of *E. andrei* without indicating the type of indirect substratum.

A89

STUDY OF LIPIDS IN OLIVE TREE VAR. MOROCCAN PICCIOLINE (*Olea europaea L.*) AT DIFFERENT PHENOLOGICAL STAGES

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The quantity and quality of olive oil is one of the main determinants of profitability. Olive color has been traditionally considered as the most appropriate method to establish harvest time, but this method has the disadvantage that not all varieties have the same evolution of skin color in the process of fruit ripening. The objective of this study was to determine the relationship between the lipid content present in fruits of olive tree variety Moroccan Piccioline and their different phenological stages. It is a non-experimental research, descriptive, transversal and quantitative, with two variables: Phenological stage of the fruit in two states: mature and immature, and oil accumulation in the fruit mesocarp considering amount oil droplets and their diameter. For the microchemical tests, successive cuts were made in the apex and in the middle of the fruit. We determined a greater amount of oil droplets in the immature stage as well as an inverse relationship between age of the fruit and oil accumulation in the variety under study; this can be interpreted as a natural process of fruit ripening time at ambient conditions, where it loses water and lipids (oils).

A90

QUALITY ASSESSMENT OF FRUIT IN THREE COMMERCIAL FARMS OF MANDARIN *Citrus reticulata* (Swingle) IN SANTIAGO DEL ESTERO

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The citrus industry is one of the most important in world because of the production volumes and economic resources it generates. The quality of mandarin, *Citrus reticulata* (Swingle), was assessed in 3 40-year-old commercial farms since such estimates are scarce in this province. The plantations are in the departments Robles and Capital. We used epicarp color as a harvest index, and in June fruits that reached commercial maturity in 90% of the rind were harvested. On each farm, 10 fruits/plant were randomly extracted from 6 plants. In each fruit we determined weight, color, cross and equatorial diameter, rind thickness, juice volume, soluble solids and acidity. Acidity percentage, ratio and juice percentage were calculated. Ratio and juice percentage data were subjected to hypothesis tests to see if they met the requirements for the marketing of fruit in domestic or foreign markets. The results for Ratio indicated that the fruits can be destined to domestic and foreign markets, as they had a value > 7, while the juice percentage variable showed that they can only be destined to the domestic market, as it had a value > 30%. It is concluded that the fruit shows early to intermediate ripening and excellent internal quality. External quality in terms of juice percentage, above 35%, could be achieved through the use of proper irrigation.

A91

DETERMINATION OF THE PRODUCTIVE EFFICIENCY OF ORANGES VAR. ROBERTSON NAVEL AND TANGERINE AND MANDARIN VAR. CRIOLLA ON A COMMERCIAL FARM IN SANTIAGO DEL ESTERO

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Productive efficiency (EP) was evaluated in orange, *Citrus sinensis* (Swingle) var. Tangerine and Robertson Navel and of mandarin, *Citrus reticulata* (Swingle), var. Criolla plants in a commercial farm in the Robles department. We evaluated edaphic, phytosanitary, productive and handling characteristics that affect EP. The plantation is 25 years old and has windbreak curtains and 6x6 and 5x5 m separations for oranges and mandarins, respectively. Soil samples were collected at different depths and CEes was measured. 10 fruits/plant from 6 plants/variety were collected at random and weighed. We recorded plant height, crown diameter and fruits/plant. We calculated canopy volume, yield/tree and EP. The results indicate that the soils are sandy loam with good organic matter content, acceptable salinity values and slightly alkaline pH (in the first 20 cm). Zn and Fe deficiencies were observed in some plants. Serious attacks of fruit fly and sectors with ants and mealybugs were found. Chemical controls are made twice a year. Slight attacks of citrus scabies were detected in Robertson Navel. The values of EP (kg/m³) are: Tang = 0.48; Rob Nav= 1.02 and Man = 2.00, therefore it is concluded that these are acceptable values.

A92

ADULT POPULATION DYNAMICS OF *Ceratitis capitata* (WIED.) ON *Citrus sinensis* (L.) IN THREE LOCATIONS IN THE IRRIGATION AREA OF RIO DULCE-SGO DEL ESTERO

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The Mediterranean fruit fly in Argentina generates the greatest economic damage due to the loss of potential markets for exports due to quarantine restrictions. In the study area, the lack of knowledge of factors that influence the quality and health of the fruit results in serious problems. The aim of this study was to determine the fluctuation of adult populations on orange plantations. The research was conducted in three citrus fruit farms in the departments Capital and Silipica. Jackson traps baited with trimedlure were placed in plants and samplings were made every two weeks from May 2012 to March 2013. Adults were counted and identified, and the total average was expressed in adult flies per trap per day (FTD). Out of the two farms studied in the department Capital, one did not exceed the population density of FTD value of 0.10 and remained constant during the period studied. In the other farm, however, the population showed an increase since August, with values of 1.5 and 2.0 (FTD) in the months of November and March respectively. In the department Silipica, the FTD values registered showed an increase since July, reaching a maximum of 0.8 in November.

A93

ANALYSIS OF THE EFFECT OF RAINFALL ON THE COTTON CROP YIELD IN LA BANDA, SANTIAGO DEL ESTERO, ARGENTINA (CAMPAIGNS 1969/70-2010/2011)

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Cotton (*Gossypium hirsutum* L.) crops require certain elements such as effective precipitation and soil, which are important factors for water storage. The aim of this study is to determine the degree of correlation between culture yield and rainfall based on monthly mean precipitation data of 42 campaigns (1969/1970-2010/2011) and mean cotton culture yields in La Banda, Province of Santiago del Estero. Both were statistically processed by a nonlinear correlation analysis. The relationship between the variables mean rainfall and mean cotton yields is non-linear (polynomial curvilinear correlation). Above the values that satisfy the need for water, there are no increases in cotton yields. $R^2 = 0.0824$ indicates that the correlation between the variables is weak or almost non-existent. We conclude that the greater use of rain occurs between 500 and 700 mm, which corresponds to consumptive use. Due to the lack of correlation, it is inferred that the marked increase in performance observed in the last 10 seasons may be due to a combination of genetic enhancement of the species, changes in crop management practices, and the effect of other weather elements that should be investigated in a future work.

A94

INSECTICIDAL ACTIVITY OF *Vernonia fulva* AGAINST *Ceratitis capitata* AND *Tribolium castaneum*

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Many plant extracts or allelochemicals from plants show a broad spectrum of activity against insect pests. Botanical insecticides have long been considered an attractive alternative to synthetic chemical pesticides for pest management because they pose less threat to the environment or to human health and have low toxicity for beneficial species. The objective of this study was to investigate the insecticidal potential of extracts (dichloromethanic, metanolic and petroleum ether) and exudates from the aerial parts of *Vernonia Fulva* (Asteraceae) on *Ceratitis capitata*, a citrus pest and *Tribolium castaneum*, a stored grain pest. All extracts tested in *C. capitata* produced a significant effect on oviposition deterrence, the exudate, the extract CH₂Cl₂ and subextract CH₂Cl₂ being the most active, with inhibition rates of oviposition of 37%, 33% and 29% respectively at 30 µg/cm². In trials with *T. castaneum*, it was observed that subextract CH₂Cl₂ and exudate at 250 µg/g of diet showed a promising antifeedant and insect repellent effect. The tested extracts were not toxic to *T. castaneum*, so they could be used safely in formulations for the biological control of stored grain pests.

A95

NARINGIN IN NARINGENIN CONVERSION BY *Aspergillus niger*

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Naringenin, which is important in the pharmaceutical industry, is obtained by enzymatic conversion of naringin. This process is expensive due to the import of naringinase (an enzymatic complex of α-L-rhamnosidase (EC.3.2.1.40) and β-D-glucosidase (EC.3.2.1.21)). An alternative is to use *Aspergillus niger*, a producer of the enzyme, to obtain naringenin. The aims of this study were to determine the optimal conditions for naringenin conversion using *A. niger* and to study the reuse of the fungus to decrease conversion time. We studied the variations in 1) pH (3.5; 4.0; 5.0), temperature (20, 30 and 35 °C), naringin concentration (5, 10 and 20 g/l) and number of conidia (5 and 10 x 10⁶ conidia/ml); 2) Reuse of the fungus for 120 h, changing the medium with naringin (5 g/l) every 24 h. Naringenin was determined by Habelt and Pittner, reducing sugars by Somogyi - Nelson and TLC to reveal the flavonoid. The maximum process efficiency (Ef: 53.88%) was at pH = 4; temperature: 30 °C; naringin: 5 g/l and 5 x 10⁶ conidia/ml. In these conditions the fungus was reused for 120 h, with the same Ef: 54% and product yield (Yp/s = 0.35 g/g). In conclusion, *A. niger* is effective to obtain naringenin in optimal conditions and fungal biomass with the same efficiency and faster conversion time than when it was reused.

A96

DEVELOPMENT AND VALIDATION OF A MICROMETHOD FOR THE QUANTIFICATION OF 5-ALKYLRESORCINOLS IN CEREAL GRAINS AND DERIVED PRODUCTS

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The aim of this work was the development and validation of a colorimetric micromethod for the quantification of 5nARs based on the use of a Fast Blue RR salt. The microcolorimetric technique was optimized in 96-well microplates using several 5nAR standards, solvents, different types and concentrations of basifying reagents and several concentrations of Fast Blue RR. Absorbance was determined at different times and wavelengths. The optimized technique was used for the quantification of 5nARs in samples of wheat and rye grains and derived food products. Results were validated by a Bland-Altman analysis which included the contents of 5nARs determined by the use of a Fast Blue B salt. The highest sensitivity for 5nARs was obtained at 490 nm with 0.025% ethanolic Fast Blue RR and 5% K₂CO₃. The correlation between the 5nAR contents generated using the two colorimetric methods was very high (R₂ = 0.9944) with a small positive bias near zero (R₂=0.0401). In the new micromethod, incubation time was reduced to 15 minutes and the reaction products were stable for 1 h. These advantages offer fast analysis of 5nARs in cereal grains and their derived products, with low consumption of reagents and solvents.

A97

ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS FROM *SCHINUS*

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The aims of this work were to characterize the composition of essential oils from native *Schinus* of northwest Argentina, and to determine their antifungal activity on toxigenic fungi. Essential oils were extracted from fruits and leaves of *Schinus areira* and fruits of *S. gracilipes*, and *S. fasciculatus*. Their components were identified by GC-MS and calculation of Kovats indexes. The minimum inhibitory concentrations required for the inhibition of 50% (MIC₅₀) and 100% (MIC₁₀₀) of mycelial growth were determined on *F. verticillioides* and *F. graminearum* by microdilution assays. Thyme essential oil was used as positive control. Essential oils contained sabinene and bicyclogermacrene (*S. areira*, leaves); sabinene, limonene, β-phellandrene (*S. areira*, fruits), sabinene, α-phellandrene and limonene (*S. fasciculatus*, fruits); and α-pinene, β-pinene and sabinene (*S. gracilipes*, fruits). MIC₁₀₀ of oils from fruits and leaves of *S. areira*, and fruits of *S. gracilipes* were 24‰ (*F. verticillioides*) and 12‰ (*F. graminearum*), and for *F. fasciculatus* 12‰ (*F. verticillioides*) and 6‰ (*F. graminearum*). The essential oil from fruits of *F. fasciculatus* showed the highest antifungal activity which was associated with α-phellandrene. The activity of essential oils of *Schinus* was 30-60 and 17-9-fold lower than that observed for thyme oil.

A98

LEAF ANTIFUNGALS OF *SCHINOPSIS*: ISOLATION, IDENTIFICATION AND BIOACTIVITY ON TOXIGENIC SPECIES OF *FUSARIUM*

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The aim of this work was to isolate and identify antifungals from leaf extracts of *Schinopsis lorentzii* and *S. haenkeana*, useful for the control of etiological agents of ear rotting in maize and wheat. Leaves of *Schinopsis* (*S. lorentzii*, *S. haenkeana*) were sequentially extracted with dichloromethane and ethyl acetate. The extracts obtained were evaporated to dryness. The dry residues were suspended in 50 ml of methanol and filtered to obtain the methanolic fractions of dichloromethane (FmCH₂CL₂) and ethyl acetate extracts (FmAcOEt). The components of these fractions were separated by column chromatography (CC) in Silica gel and gas chromatography coupled to mass spectrometry. The antifungal activity was evaluated by bioautography and microdilution assays in liquid medium, and CI₅₀ was determined. The separation in CC of components from FmCH₂CL₂ and FmAcOEt, and the bioautographic assay showed a band of low polarity (Rf= 0.7) with antifungal activity on *Fusarium*. The band contained alkylcatechols (ALQct) and lupeol (LUP). The CI₅₀ obtained were 32.23 µg/ml (*F. graminearum*) and 150 µg/ml (*F. verticillioides*) for ALQct, and 75.87 µg/ml (*F. graminearum*) and 810.7 µg/ml (*F. verticillioides*) for LUP. *F. graminearum* was more sensitive to the identified antifungals than *F. verticillioides*. The lowest CI₅₀ were obtained for ALQct on both *Fusarium* species.

A99

ANTIFUNGAL ACTIVITY OF COMPOUNDS FROM *Zuccagnia punctata* ON WHEAT AND MAIZE PATHOGENS

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Corn and wheat are vulnerable to ear rot caused by *Fusarium*. The most harmful species, *F. graminearum* and *F. verticillioides*, also contaminate grains with mycotoxins. The aim of this work was to isolate antifungals from the ethereal extract (EE) obtained from a tincture of *Z. punctata* and to quantify its bioactivities on *F. graminearum sensu stricto* and *F. verticillioides*. The tincture obtained from leaves of *Z. punctata* was partitioned with diethyl ether. EE was fractionated in a Silica gel column. Five pools were collected based on TLC and UV-VIS analysis. Antifungals were detected by bioautography assays, isolated by HPLC and identified by UV-VIS spectroscopy and GC-MS. The antifungal activity of the pure compounds was determined on *F. graminearum sensu stricto* (Fse) and *F. verticillioides* (Fv) by microdilution assays and 50% inhibitory concentration (IC₅₀) was calculated. Three antifungals were detected. Two were identified as: 2',4'-dihydroxychalcone (DC) and 2',4'-dihydroxy-3'-methoxychalcone (DMC). Spectrophotometric analysis suggested that the third compound is a flavone. The IC₅₀ of DMC were 81 µg/ml (Fse) and 128 µg/ml (Fv) while those of DC were 132 µg/ml (Fse) and 185 µg/ml (Fv). The EE contained phenolic antifungals. They inhibited the growth of both pathogens, but DMC showed the highest bioactivity. Further research will be oriented towards the identification of the third antifungal.

A100

PEANUT, SESAME AND SUNFLOWER CEREAL BARS ENRICHED WITH CLA BY CONJUGATION WITH *Lactobacillus rhamnosus*

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Sunflower, sesame and peanut were enriched with conjugated linoleic acid (CLA) and used to develop a functional food, increasing polyunsaturated fatty acids. CLA has beneficial properties: it is anticarcinogenic, anti-atherosclerotic, immune modulatory and body fat reducer. Objective: to incorporate into cereal bars sunflower, sesame and peanut paste enriched with CLA by using conjugating strains (C14-*Lactobacillus rhamnosus*). In the pastes we analyzed gross fiber, ash, moisture, free fats and proteins. Lipids were extracted using the by technique of Folch et al. derivatized by the method of Chin et al. Linoleic acid (LA) and CLA were identified by gas chromatography. Cereal bars were prepared with 25, 50 and 75% of paste with CLA. The degree of satisfaction was measured with a verbal hedonic scale with three items: (+1) "like", (0) "neither like nor dislike" and (-1) "dislike". CLA concentration was significantly higher ($p < 0.05$) in sesame. Statistical analysis of enriched cereal bars CLA showed no significant differences ($p > 0.5$) between satisfaction and change in concentration. "Dislike" was expressed only in the presence of 50 and 75% compounds, and it was decided to use the 25% concentration. Conjugating strains could be used to make cereal bars and biscuits enriched with CLA. This food can be used in fortified diets for the renutrition of children or elderly people that require a large amount of calories in small volumes, and it can also be of use for sportsmen.

A101

CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF NORTHWESTERN ARGENTINA HONEY

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Honey is a very complex food product produced by honeybees and varies considerably in composition as a result of plant origin, area, weather, conservation and so on. Many pathological processes are associated with oxidative stress caused by an excess of free radicals. For this reason, it is important to find natural products with antioxidant capacity. We evaluated the chemical composition (moisture, soluble solids, total sugar content, reducing sugars, protein, total phenolic compounds and flavonoids) and the free radical scavenging capacity (ABTS radical) of seven honey samples from Santiago del Estero and Tucumán (Argentina). The chemical composition has values within the ranges proposed in the Argentine Food Code. Moisture was between 14 and 15%, soluble solids between 79.8 and 80.5°Bx (Brix degrees), total sugar content between 610 and 772 mg/gr honey, reducing sugars between 447 and 604 mg/gr, protein between 0.5 and 1.2 mg/gr, total phenolic compounds (gallic acid equivalent, GAE) between 163 and 672 µgGAE/gr and flavonoids (quercetin equivalent, QE) between 8 and 45 µgQE/gr. All samples showed free radical scavenging capacity but the most effective one was from Frías (Santiago del Estero) whose botanical origin is quebracho. This may be due to the higher content of total phenolic compounds in this sample than in the other ones assayed.

A102

FREE RADICAL SCAVENGING ACTIVITY OF MEDICINAL PLANTS FROM TUCUMÁN, ARGENTINA

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Free radicals generated by cells lead to protein and DNA damage. Compounds from natural sources, capable of protecting against damage produced by reactive oxygen species, may have potential application in the prevention and/or cure of disease. The aim of the present study was to evaluate the free radical scavenging potential of aqueous and ethanolic extracts of plants popularly used as vulnerary agents: *Caesalpinia gilliesii*, *Melia azedarach* and *Plantago lanceolata*. Infusion, decoction and tincture of these species were prepared and phenolic compounds (PC) were determined by the Folin-Ciocalteu method. The 1,1-diphenyl-2-picrylhydrazyl radical (DPPH) was used for the determination of free radical scavenging activity of the extracts, butylatedhydroxytoluene (BHT) and quercetin being taken as standards. *P. lanceolata* infusion showed higher PC content than the other species and higher free radical scavenging potential (effective concentration 50%, EC₅₀: 5.78 µg/ml) than its decoction, tincture, BHT, or *C. gilliesii* and *M. azedarach* extracts. The PC concentration correlates with the radical scavenging activity, confirming that PC contributes to the activity of these plant extracts. Results show that *P. lanceolata* infusion is a potential source of antioxidants that could be used in the pharmaceutical and food industries.

A103

TANNINS FROM THE BARK OF A NATIVE ARGENTINE TREE WITH BIOTECHNOLOGICAL POTENTIAL

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Currently, a large number and variety of natural refined products exist on the market and are used as additives for food and beverage industries. They include refined tannic products, which are often obtained from *Quercus* sp. Previous studies about *Caesalpinia paraguariensis* (Fabaceae) indicated that it has an interesting tannins composition that could have application in oenology. The aim of this work was to determine the best extraction method according to the yields and concentration of specific phenolics of oenologic interest. The dried and ground plant material was extracted at 10% w/v by (A) maceration with 50% v/v methanol, and extraction by soxhlet apparatus with 50% v/v methanol (B), 60% v/v ethanol (C) and 50% v/v acetone (D). Yields, total polyphenolics (TP), precipitable tannins (PT) and anthocyanes (AnT) were determined for each extract by Graham HD, Hagerman AE and Puissant-Leon, respectively. The soxhlet methods had higher yields (%): A 6.95; B 10.18; C 7.66; D 8.58. D was the most efficient method, although considering that TP, PT and AnT concentrations were not significantly different ($p < 0.05$) among the assayed extracts, C could be the best method (TP: 5.31 mg/ml, PT: 0.15 mg/ml, AnT: 0.18 mg/ml), because it supports their potential biotechnological application.

A104

CHARACTERIZATION OF STRAWBERRY JUICE CULTIVATED IN NORTHWESTERN ARGENTINA. EFFECT ON FOOD PATHOGENS

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The aims of this work are to characterize sugars and phenolic compounds profiles of strawberry juice cultivated in Tucuman and evaluate the antimicrobial effect of juice against pathogenic bacteria isolated from food. Strawberry juice (J) was extracted and a fraction was clarified (CJ). Total phenols (TP) were determined using the Folin-Ciocalteu reagent. TF and carbohydrate profiles were determined by HPLC. *Salmonella enteritidis*, *Salmonella typhimurium* and *Shigella flexnerii* were grown in BHI media supplemented with J or CJ, incubated for 24h at 37 °C and optical density and cfu/ml were determined. J contains TP (890 g GAE / ml), ellagic acid, ferulic, gallic, and coumaric acid and, at low concentrations, cinnamic acid and kaempferol. In J, fructose and glucose were the main sugars, while sucrose concentration was three-fold lower. The growth of *S. enteritidis* and *S. typhimurium* was inhibited by J and JC, but the effect of J was 50% greater than that observed with CJ, indicating that the main antibacterial effect is due to TP. *Sh. flexnerii* growth was not affected by J or CJ. These results are an important contribution to biotechnology considering the future application of phenolic compounds in strawberry juices as natural antimicrobials in food.

A105

GLUCOSIDASE ENZYMES AND AROMA COMPOUNDS PRODUCTION BY *Oenococcus oeni* IN A WINE-LIKE MEDIUM

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Malolactic fermentation conducted by lactic acid bacteria may increase aroma compounds such as those derived from glycoconjugate precursors and the C4 compounds diacetyl, acetoin and 2,3 butanediol. We investigated β -glucosidase and α -arabinofuranosidase and C4 compounds production during *O. oeni* MS9, MS20 and MS46 growth in a synthetic wine-like medium (WM) supplemented with sodium pyruvate (1 g/l) or with the synthetic glycoside Eriocitrin (1 mg/ml) at pH 4.8. Cells were pre-cultured in an adaptation medium and inoculated in tests media. Enzymatic activities and C4 compounds were measured in whole cells and culture supernatants by spectrophotometric methods, respectively. In WM medium, microorganisms grew about 1 log cycle at the end of the exponential phase. At this time enzyme activities were maximum (between 7 and 10 U) and the C4 compounds production lower than 3 mg/l. Pyruvate or synthetic glycoside addition did not significantly affect their growth responses. In the presence of the glycoside, β -glucosidase and α -arabinofuranosidase activities increased between 60-80 and 80-90%, respectively, the MS46 strain showing the highest production. Only in the presence of pyruvate did the C4 compounds increase above the acceptable value for diacetyl (5 mg/l) in wine. Thus, the tested strains were not able to produce sufficient pyruvate amounts to form C4 compounds at concentrations that alter the wine quality.

A106

IDENTIFICATION AND GENOMIC ORGANIZATION OF THE GLUTATHIONE TRANSFERASE (GST) GENE FAMILY IN *Fragaria vesca*

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Plant Glutathione Transferases (GSTs) are proteins encoded by a large gene family, expressed in stress response. The woodland strawberry *Fragaria vesca* shares sequence identity with the cultivated strawberry *Fragaria x ananassa*, and a draft of its genome is available in public databases of the GenBank. The aim of this study was to identify and analyze the genomic organization of the GST gene family in *Fragaria vesca*. A total of 49 full length GST genes were identified and the proteins encoded were divided into 8 classes according to the Conserved Domain DataBase (CDD) of NCBI. The tau class, with 32 members, is the most numerous; the classes phi and theta are represented by 6 and 5 members respectively. The DHAR class has 3 members, the zeta and lambda classes 2, and the classes TCHQD and microsomal are represented by only one member. They present a conserved N-terminal, GSH binding domain, and a variable C-terminal domain for binding to hydrophobic substrates. The tau class GSTs identified in the stress response in *F. ananassa* share 92% identity at the amino acid level with members of *Fragaria vesca* class tau GSTs. The analysis of the GST gene family in *Fragaria vesca* provides a starting point to reveal the roles of these proteins in strawberry.

A107

NATIVE *Bacillus thuringiensis* RT DELTA-ENDOTOXIN PRODUCTION IN A LOW-COST CULTURE MEDIUM FOR *Spodoptera frugiperda* CONTROL IN CORN SEEDLINGS

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Bacillus thuringiensis (*Bt*) is a bacterium that produces insecticidal crystal inclusions targeted to particular groups of insects. *Spodoptera frugiperda* (*Sf*) (Lepidoptera: Noctuidae) is a major corn pest in northwestern Argentina so it is important to produce these toxins as an alternative to chemical pesticides since they have no adverse effects on man, animals or beneficial insects. The aim of this study was to assess delta-endotoxin production in a low-cost medium and to test protection of corn seedlings. The *Bt* RT strain was grown in a 3 l fermentor using an optimized medium containing cerelese, whey, powdered milk, vinasse, sucrose, starch and soybean meal. Three treatments were evaluated: healthy seedlings (T1), infested seedlings with *Sf* (T2) and infested seedlings with the formulation (T3). Dry weight of shoots was determined on the 7th day. The estimated delta-endotoxin (mg/L) during fermentation was: 361.62 (24 h), 418.92 (48 h), 567.57 (72 h), 560.72 (96 h) and 664.32 (120 h). The average dry weights (g) were: 0.32 (T1), 0.26 (T2) and 0.29 (T3). For semifield assays, significant differences between T1 and T2 ($\alpha = 0.05$) were detected while no significant differences were observed between T1 and T3. CIUNT 26/D409, PIP 297

A108

STUDY OF THE TOXICITY OF IONIC DISSOLUTION PRODUCTS FROM NEW BIOACTIVE GLASSES

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The discovery of bioactive glasses (BGs) has yielded a family of biomaterials of great relevance for regenerative medicine. The aim of the present study was to assess the toxicity effects of the ionic dissolution products (IDPs) from new BGs based on 4S5S-type glass containing (wt %): 2% SrO (4S5S.2Sr), 1% or 5% Li₂O (4S5S.1Li, 4S5S.5Li). The IDPs were obtained by incubating 1% w/v particles (<5 µm) of BGs in egg water at 37°C for 72 h. The determination of soluble ions lixiviated from the BGs was conducted through ICP-MS. The toxicity assays were carried out on dechorionated zebrafish embryos (*Danio rerio*) at 48 h post fertilization (hpf). The embryos were incubated at 28.5°C in 6-well culture plates containing either 5 mL of egg water (control) or egg water enriched with the IDPs. We carried out 2 replicates with 30 embryos per treatment. The survivorship percentage was recorded at 120 hpf. The embryos were anesthetized and fixed in PFA. No significant differences were observed in the survivorship of the embryos treated with IDPs compared to the control. In all cases we found the embryonic development expected for the incubation time assessed. The results obtained here evidence the biocompatibility of the IDPs released by microparticles of 4S5S BG doped with 2% SrO (4S5S.2Sr), 1% or 5% Li₂O (4S5S.1Li, 4S5S.5Li).

A109

CHARACTERIZATION OF CHANGES IN THE COMPOSITION OF MARE MILK SECRETION

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Dynamic changes in mammary secretions occur during the transition from prepartum accumulation of milk colostrum to postpartum production. Changes in mare milk secretion composition prior to and after foaling were characterized. For this purpose three mares (*Equus caballus*) from Peruvian Paso breed were used. 24 mare milk secretion samples were collected at different time points ranging from 2 days prior to foaling through day 26 of lactation. Concentration of carbohydrates, total proteins, whey proteins and lactoperoxidase (activity assay) were determined. Results showed that total protein and whey protein concentrations were higher in the prepartum than in the postpartum period. Carbohydrates concentration increased from a mean of 1.125 g% in precolostrum to a mean of 2.12 g% in mature milk. Lactoperoxidase activity tended to be lower in the postpartum than in the prepartum period. Considerable variability was observed among mares. The composition of mammary secretions changes dramatically during the perinatal period and these results show agreement with physiological events occurring in mammary gland around foaling such as an increase in immunoglobulins prior to foaling and a rapid decline after it, and the dilution effect due to increased secretion volume which accompanies lactogenesis.

A110

WHEY LYSOZYME ACTIVITY IN PERUVIAN PASO MARES

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Lysozyme is a bacteriolytic enzyme that breaks bacterial cell walls by hydrolyzing glycosidic linkages. It is present in all living organisms in a variety of shapes, sequences and genes. The enzyme activity in milk from different species of economic importance has been described. The aim of this study was to analyze the activity of lysozyme in mare whey at different stages of lactation. Three mare milk samples of *Equus caballus* "Peruvian Paso" breed were used. The whey was separated by acid precipitation of casein. Lysozyme activity curves were made in a spectrophotometer with *Micrococcus luteus* as the enzyme substrate. Results show that lysozyme activity is high in pre-colostrum and colostrum samples, approximately 90% compared to mature milk. Lysozyme activity in different mares show, on one hand, two individuals with activities ranging about 2000 to 3500 mU/100µl and, on the other, individuals exhibiting ranges from 4000 to 6000 mU/100µl. The behavior observed in three mare samples is similar to that observed in the perinatal period of tapir, another Perissodactyla. The intra-specific differences observed in lysozyme activity are important. They describe the lysozyme activity in pre-colostrum, colostrum and mature milk from breeding mares and show an intra-specific variation in lysozyme activity.

A111

EFFECT OF FAT RICH DIETS ON THE LIPID PROFILE AND BLOOD PARAMETERS OF RABBITS

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Our aim was to study the effect of the consumption of chia (*Salvia hispánica*) oil and a fat diet on the lipid profile and hematological parameters of normal and hypercholesterolemic rabbits. The animals were fed a commercial diet (CD), a commercial diet with 1% cholesterol (DH), fat (DG), or chia oil (DCh), a DH supplemented with chia oil (DH-Ch), or a DH supplemented with fat (DH-G) for six weeks. Total cholesterol (TC), HDL, LDL, and TG, RBC, WBC, hematocrit, leukocyte count and erythrocyte membrane fluidity were determined. DH increased TC (mg / dl): 871.9 ± 144 vs 59 ± 5.6 , LDL: 666 ± 99 vs 23.8 ± 3.1 , HDL: 164 ± 45 vs $58, 7 \pm 4.1$ and TG: 222.3 ± 32.6 vs 91.7 ± 14 . DCh decreased HDL in rabbits with DC (22.5 ± 6 vs. $58, 7 \pm 4.1$) and TG in DH (86 ± 26 vs 222 ± 32). DH-G increased TG compared with DH (430 ± 145 vs 222.3 ± 32.6) and decreased RBC ($\times 10^6$): 4.0 ± 0.1 vs DC: 5.4 ± 0.2 and DH: 5.0 ± 0.2 and hematocrit (%): 28 ± 1 vs DC: 36.78 ± 1.33 and DH: 34.3 ± 1.1 . The WBC DH increased with respect to DC ($\times 10^3$) 9.2 ± 2.9 vs 3.9 ± 0.9 . Anisocytosis, fragmentocytes and acanthocytes were detected in DH and DG. Membrane fluidity increased slightly with the addition of chia oil. $\omega 3$ in the diet lowered TG level, but decreased HDL protective effect. A diet rich in fat and DH increases cardiovascular risk.

A112

HEMAGGLUTINATION OF *Spodoptera frugiperda* HEMOLYMPH (LEPIDOPTERA: NOCTUIDAE)

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Lectins are part of the humoral component of the insect defense mechanism related to the recognition of foreign particles. These proteins are able to bind carbohydrates specifically, agglutinate bacteria and other cells and facilitate phagocytosis. Their interaction with the prophenoloxidase system (proPO), an efficient mechanism of melanization, is known. The aim of this work was to study the agglutination capacity of *Spodoptera frugiperda* hemolymph. Aliquots of hemolymph (HL) from larvae and pupae at increasing dilutions up to 1:16 in the presence and absence of phenylthiourea (PTU), an inhibitor of the prophenoloxidase cascade, were placed on a touchstone. To demonstrate the effect of hemagglutination human erythrocytes were added. Agglutination of erythrocytes up to a degree of 1:8 for samples without PTU and up to 1:16 for samples with PTU was observed in assays. The effect was more noticeable in larvae HL. Results show the presence of lectins in the hemolymph of *S. frugiperda*, which are not inhibited by PTU and retain their capacity for hemagglutination even at higher dilutions. Therefore their interaction with the proPO system has no effect on their activation, unlike other Lepidoptera in which this substance is able to inhibit certain types of lectins. This work represents a contribution to the knowledge of processes associated with defense reactions in this insect species.

A113

MACROMINERALS LEVELS DURING TRANSITION IN CATTLE FROM THE CENTER REGION OF SANTA FE

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We determined levels of macrominerals in Holstein Friesian cows in transition from the central region Santa Fe during the 2011-2012 autumn and spring. UV-visible spectrophotometry determination for calcium (Ca), magnesium (Mg) and phosphorus (P), and flame photometry for potassium (K) and sodium (Na) were used. The mean values and standard deviations of Ca (mg dL^{-1}), Mg (mg dL^{-1}), P (mg dL^{-1}), Na ($\text{mmol} \cdot \text{L}^{-1}$) and K ($\text{mmol} \cdot \text{L}^{-1}$) in antepartum ($n=55$), partum (21) and postpartum (62) were respectively: *autumn* 9.33 ± 0.82 ; 8.58 ± 0.92 ; 9.41 ± 1.2 - 2.1 ± 0.22 ; 1.94 ± 0.46 ; 2.08 ± 0.29 - 6.12 ± 1.3 ; 5.6 ± 0.85 ; 5.44 ± 1.12 - 139.789 ± 3.017 ; 137.60 ± 1.568 ; 139.75 ± 3.143 - 4.666 ± 0.524 ; 4.611 ± 0.363 ; 4.755 ± 0.443 and *spring* 8.68 ± 0.76 ; 8.58 ± 0.92 ; 8.12 ± 0.92 - 1.93 ± 0.21 ; 1.94 ± 0.46 ; 2.26 ± 0.59 - 5.97 ± 1.27 ; 5.6 ± 0.85 ; 5.87 ± 1.51 - 132.47 ± 40.022 ; 138.222 ± 2.045 ; 132.676 ± 32.445 - 4.208 ± 1.257 ; 4.85 ± 0.532 ; 4.531 ± 1.133 . The slight decrease in P concentration in postpartum in the autumn can be attributed to the high milk production in this period. Throughout the transition period and seasons studied, Ca was below reference values, without the clinical response typical of deficiencies. The reduced serum concentration over the course of the transition period of Ca and Mg is due to the endogenous loss in milk produced during pregnancy and lactation. The input and the related homeostatic mechanism regulating levels of blood macrominerals in cows were appropriate and allowed for an optimal nutritional metabolic balance, resulting in no production diseases.

A114

PARAMETERS OF ENERGETIC METABOLISM IN DAIRY COWS IN THE TRANSITION PERIOD

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We studied the parameters of the energetic metabolism during the transition period, autumn and spring 2011. Holstein Friesian cows were selected at random, determining CC (corporal condition), in 4 round-ups of the center region of Santa Fe. Energetic parameters were determined using enzymatic-colorimetric methods. ANOVA was applied. The mean values and standard deviations of CC, Glucose (mg/dL), Urea (mg/dL), Cholesterol (mg/dL) and NEFA (mmol/L) in autumn ($n=110$) - spring ($n=148$) were respectively: *Antepartum* 2.67 ± 0.36 - 3.57 ± 0.26 ; 34 ± 1.3 - 53 ± 0.9 ; 29 ± 0.6 - 40 ± 0.7 ; 182 ± 6.5 - 157 ± 2.8 ; 0.86 ± 0.16 - 1.62 ± 0.11 . *Parturition* 2.64 ± 0.39 - 3.08 ± 0.24 ; 38 ± 1.2 - 47 ± 0.7 ; 30 ± 0.6 - 35 ± 1.0 ; 194 ± 6.4 - 126 ± 2.8 ; 0.85 ± 0.13 - 1.33 ± 0.12 . *Postpartum* 2.66 ± 0.37 - 2.68 ± 0.38 ; 41 ± 1.1 - 46 ± 0.8 ; 31 ± 0.7 - 41 ± 0.8 ; 202 ± 6.2 - 170 ± 3.3 ; 0.82 ± 0.17 - 2.01 ± 0.14 . NEFA average values in the three periods were above reference values in the spring and autumn. In antepartum and parturition, CC was lower than the recommended value, which can be explained by the association between CC loss and increased NEFA levels. The average increase in NEFA before calving would be related to endocrine changes, lower dry matter intake and mobilization of body fat. We found $p < 0.05$ for NEFA for the same period between two seasons due to small differences in the nutritional management of animals in each herd.

A115

EVALUATION OF SUGAR CANE CROP RESIDUES IN BEEF CATTLE FEEDING SYSTEMS.

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Sugar cane residues could be used in beef cattle systems as a feed resource. This alternative might be effective in reducing feeding costs and environmental impact. Objective: to evaluate sugar cane crop residues as a feed resource in growing steers. The experiment was conducted at INTA Leales, Tucumán. The design was cross-over, 3 treatments, 4 experimental units and 3 periods of evaluation. Treatments: T1: sugar crop residue (SCR); T2: SCR+1kg Soybean meal; T3: SCR+1kg Soybean meal+0.4kg corn. The SCR quality was: 80% DM; 5.3%CP; 70.4% NDF; 43.4% ADF; 55% DMIVD. We evaluated individual daily feed intake (FI) and daily weight gain (WG) of bradford steers with 201±12 kg initial live weight. Differences between treatments means were compared by Tukey's test (p<0.05). Means with different letters indicate significant differences. The FI (DM kg) was 2.4±0.13b; 3.9±0.30a and 4.5±0.26a for T1, T2 and T3 respectively. The FI was significantly higher for T2 and T3 than T1. The WG (gr/steer/day) was T1: -50c; T2: 354b and T3: 595a. The results showed that sugar cane crop residues with a strategic supplementation could be use in growing categories. SCR alone is not recommended for these categories.

A116

ENERGETIC METABOLISM IN THE SEASONAL CYCLE OF *Tupinambis merianae* LIZARDS

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Tupinambis lizards, like other ectothermic vertebrates, depend on external sources of heat to regulate their body temperature, which induces a period of inactivity (hibernation) during the cold months in subtropical and temperate regions. This seasonal lethargy is usually accompanied by a drastic decrease in metabolic activity and body temperature, during which the animals are inactive and do not feed. However, during this period, energy resources for the maintenance of vital functions are needed. The aim of our study was to determine the existence of changes in the energy metabolism of *Tupinambis merianae* during the seasonal cycle. We identified plasma levels of glucose, cholesterol, triglycerides and lipase at different stages of the annual cycle using 10 captive adults of both sexes. To enable individual monitoring, each animal was implanted with a microtransponder. Values for glucose, cholesterol, and triglycerides were elevated during the active phase, decreasing towards its end. Simultaneously, lipase activity was relatively low. In contrast, during hibernation, the maximum values of lipase activity were observed associated with minimal levels of glucose and triglycerides. These results indicate that the animals used primarily carbohydrate metabolism during the active stage, changing to a strictly lipid form during dormancy.

A117

FRESH PORK CONSUMPTION DETERMINED BY CONSUMER AND SEX

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This study was conducted to determine the difference between fresh pork consumption according to consumer sex in La Plata. Information was collected with a questionnaire of closed and semi-open questions with a population of 240 men and 161 women. Data were analyzed by correspondence analysis and descriptive statistics. 56% of the men and 66% of the women eat pork. 35% of the men and 43% of the women substitute pork for beef when they cannot get it and 74% of the men and 80% of the women consider it tender. 32% of the men accompany pork meat with raw vegetables and women with potatoes (17%) or raw vegetables (21%). The correspondence analysis between men and women showed the following values of inertia (p <0.05): different meat cuts: 7%; reasons for consumption: 3%; reasons for non-consumption: 12%, cooking methods: 1%, who cooks: male or female: 11%. The reason for consumption "for pleasure" presented the most significant value of inertia: 81% (p <0.05); the choice cooking system "grilled" and "indifferent" showed values of inertia of 33% and 42% (p <0.05) respectively, and who cooks "man" 43% and "indifferent" 34% (p <0.05). In conclusion, it is evident that there are no differences in the consumption habits of fresh pork between men and women in La Plata.

A118

BROMATOLOGICAL CONTROL OF FOODBORNE PATHOGENS USING RAPID MOLECULAR AND TRADITIONAL CULTURE METHODS

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Foodborne diseases are a major health problem worldwide, and shortening the detection time of foodborne pathogens allows quick report to the authorities responsible for food control to prevent possible outbreaks. 68 samples collected by Bromatological inspectors were processed. We detected the absence/presence of Salmonella and *E. coli* O157 using a rapid molecular method, "3M^{3M} Molecular Detection System", DNA amplification and detection in 75 minutes, in pre-enriched samples. *E. coli* count in "Petrifilm EC" was performed. Salmonella and *E. coli* O157 were isolated using the official methodology ISO6579:2002 and USDA2012 respectively. Salmonella spp was detected in 3 of 68 samples, which were confirmed by isolation in a conventional culture. *E. coli* O157 was detected in 3 samples. Using the official methodology, only 2 strains were isolated and 1 of them was characterized as O157 stx₂₊ by PCR. In 6 out of the 68 samples, the generic *E. coli* count exceeded the provisions of the existing regulations (> 500 cfu/g). The rapid methods for pathogens detection are an efficient alternative compared to the official method, although it is not always possible to isolate the bacteria in positive samples, which is mandatory for official reference methods.

A119

EXPLORATORY STUDY OF LACTIC MICROBIOTA FROM ARTISANAL CHEESE EXPOSED TO DIFFERENT TEMPERATURES

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Artisanal goat cheeses are rarely subjected to ripening processes so it is difficult to observe lactic microbiota (ML) expression. The aim of this study was to evaluate the effect of temperature on ML growth on artisanal cheese. Two goat cheese samples were collected from three dairy farms (E, M and Z) in Amblayo-Salta: fresh cheese (QF) and aired cheese (QO: E and Z 15 days, M 4 days) which were distributed in two fractions and subjected to the following treatments: T1 at 4°C (+/-2) and T2 at 12°C (+/-1) (moisture 56.5%) for 20 days. Bacterial isolations were done at 0, 7 and 20 d; samples were kept at 37°C in microaerophilic conditions for 24, 48 and 72 h. Colony and cellular morphology, mobility, gram dye, catalase and nitrate reduction were analyzed. Motionless, gram positive, catalase and nitrate negatives strains were selected (characterized as lactic acid bacteria, BAL). We isolated 161 BAL at t=0 (E 48%, Z 43% and M 8%); QF had a greater content of BAL than QO (21-53%). The number of BAL decreased in QO at T1, 7 d (39-77%) and increased at T1, 20 d (57-88%) while QF from dairy farms E and Z showed the opposited behavior. BAL increased in QO at T2, 20 d (54-89%) while QF showed the opposited behavior. T2 produced more BAL (54%) in QF and QO at 20 days. The initial number of BAL depended on the dairy farm and QF showed higher BAL than QO; T2 contributed to BAL growth.

A120

ASSESSMENT OF LACTIC BACTERIA INTERACTION WITH FOOD ANTINUTRITIONAL COMPONENTS TO PREVENT THEIR DELETERIOUS EFFECTS ON THE HOST

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Many antinutritional or toxic compounds are ingested daily by humans and animals. Vegetable lectins are endogenous proteins present in legumes, cereals and seeds whereas aromatic amines are generated by processing of meat. Since these substances resist inactivation by cooking and digestive processes, they reach the intestinal lumen and blood circulation unaltered. Their toxic effects are evidenced by morphological and physiological changes in the intestinal mucosa and genotoxic effects on colonocytes. It has been demonstrated that probiotics can remove and metabolize carcinogens and antinutritional compounds from food and from the gut, decreasing their deleterious effects on the host. In this work we assessed the interaction of potentially probiotic bacteria with 2-amino-3-methyl-3H-imidazo[4,5-f]quinoline (IQ) or the lectin of *Phaseolus vulgaris* in order to remove and prevent their toxicity on intestinal cells. Four propionibacteria and lactobacilli were incubated with these substances before assessing the cyto- and genotoxicity of the reaction supernatants on mice colonocytes. IQ was significantly more toxic than kidney lectin and no strain was able to remove it. In contrast, all strains were able to bind and remove lectin, decreasing its toxic effects on enterocytes.

A121

***Lactobacillus rhamnosus* CRL1505 AND ITS PEPTIDOGLYCAN AS ENHANCERS OF ANTIVIRAL RESPIRATORY IMMUNITY**

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The effect of nasally administered *Lactobacillus rhamnosus* CRL1505 and its peptidoglycan (Pg) on respiratory antiviral immunity triggered by poly(I:C) was studied. Mice were nasally treated with viable (LV) or heat killed (LH) CRL1505 strain or Pg for 2d. Then, these groups and untreated control mice were nasally challenged with 3 daily doses of poly(I:C) (250 µg/mouse). INF γ , IFN β , IFN α , TNF α , IL6, IL10 in bronchoalveolar lavage (BAL) and serum, expression of CD3, CD4, CD11b, CD11c, CD103, MHCII, IL10 and INF γ in lungs, and lung injury were determined. Poly(I:C) increased the levels of all the evaluated cytokines, accompanied by the recruitment of immune cells into the lung. In addition, increased protein content and LDH activity in BAL and altered lung wet weight:dry weight ratio were observed, indicating increased permeability of the alveolar-capillary barrier and lung injury. LV, LH or Pg administration enhanced INF γ , IFN β and IL6 production and increased MHCII⁺CD103⁺, MHCII⁺CD11b⁺ dendritic cells and CD4⁺INF γ ⁺ and CD4⁺IL10⁺ lymphocytes in lungs. Mice treated with LV, LH or Pg showed lower lung tissue damage. Results show that nasal administration of non-viable Lr1505 or its Pg maintains the probiotic properties of the viable strain and therefore they could be used to beneficially modulate the antiviral inflammatory response in the respiratory mucosa.

A122

CELLULAR MODIFICATIONS IN *Actinomyces odontolyticus* BY THE ACTION OF *Xenophyllum poposum*

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Actinomyces odontolyticus (Ao) is found in high proportions in the biofilm of supragingival plaque. It has been implicated in coronary and radicular caries. Complementary substances of oral hygiene are one of the preventive measures to control these cariogenic microorganisms. The inhibitory and bactericide activity of *Xenophyllum poposum* (Xp) was demonstrated in studies by our research group. Minimum Inhibitory Concentration (MIC) of the ethanolic extract (EE) of Xp on Ao was 13.7 mg/mL and Minimum Bactericide Concentration (MBC) was 27.4 mg/mL. The aim of this work was to analyze cell changes caused by the EE of Xp on Ao by transmission electron microscope (TEM).

Methodology: an 18-h culture was supplemented with the MBC of EE and incubated for 48 hours in air +5% CO₂. Then it was centrifuged and the sediment was prepared for TEM analysis. A microorganism growth control was carried out without the inhibitory substance. Results demonstrated that the EE of Xp caused damage at the microorganism cell wall level and vacuolization in the cytoplasm. Conclusion: Xp has bactericidal action on Ao, exerting its effect at the level of the cell wall; therefore this natural substance could be used in the chemical control of supragingival biofilm in order to prevent dental caries. Supported by CIUNT.

A123

EVALUATION OF THE ANTIBACTERIAL EFFECT OF INSOLUBLE MICROPARTICLES AGAINST *Staphylococcus aureus*

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Several tests are used to determine solution-antimicrobial susceptibility in bacteria. However, a colloidal suspension is required for insoluble biomaterials. The aim of this study was to determine the efficacy of the agar dilution method (ADM) for the evaluation of the antibacterial effect of insoluble microparticles.

Methodology: ADM was used by placing solid particles in the still molten agar. Different concentrations of ZnO and graphite (G) were used (2, 4 and 6 mg/ml). Ca(OH)₂ was used as a reference control. These substances were tested against *Staphylococcus aureus* (Sa) ATCC 29213 which was inoculated in BHI agar and incubated in optimal conditions for this strain. CFU/ml and percentage of viable cells were calculated. Results were statistically analyzed (ANOVA). A growth control was performed.

Results: 1) 2 mg/ml of ZnO and G decreased the number of viable cells by 63% and 66% respectively; 2) 4 mg/ml decreased by 74% for ZnO and 81% for G; 3) similar results were found with 6 mg/ml; 4) Ca(OH)₂ inhibited Sa growth.

Conclusions: Since the tested materials showed an inhibitory effect on microorganism growth, these results suggest that ADM is suitable for the study of the antibacterial effect on insoluble microparticles. Work supported by CIUNT and PICT-2009-0087.

A124

TISSUE REPAIR MECHANISMS INDUCED BY *Lactobacillus plantarum* IN DIABETIC FOOT ULCERS

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Diabetic foot ulcers are difficult to heal due to the dysfunction of cells involved in tissue repair, to exaggerated inflammatory response and increased metalloproteinases. A comparative study was conducted between the effectiveness of conventional treatment, surgical debridement, and the topical application of a culture of *L. plantarum*. 25 patients with ulcers were randomized into two groups: 13 treated with the conventional therapy and 12 with a daily application of 10⁵ *L. plantarum* /ml. Studies on biopsies: 1) Bacteriological, 2) Pathology, 3) Histochemical, 3) Flow Cytometry, 4) PCR for TGF-β1 and IL-8, 5) Manson Staining. In the exudate, metalloproteinases (MMP-2 and MMP-9) were determined by zymography. The results showed that the conventional treatment produced no clinical or bacteriological changes or changes in cytometry values (CD34=1.5%, CD133= 0.08%). High levels of metalloproteinases and decreased collagen deposition were found. *L. plantarum* showed mature granulation tissue and a decrease in CFU (p<0.01), a decrease in metalloproteinases and increased collagen deposition. *L. plantarum* favors the emergence of mature granulation tissue and reduces infection, allowing healing of the ulcers.

A125

INFLUENCE OF POLYMORPHONUCLEARS ON THE INTERACTION OF BACTERIA ISOLATED FROM CYSTIC FIBROSIS PATIENTS

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Cystic Fibrosis (CF) is a genetic disease caused by mucus hyperviscosity. The interaction between bacteria, mucin and polymorphonuclears (PMNs) induce pulmonary inflammation. We studied the *in vitro* interactions of bacteria from patients with CF in a medium that simulates the environment found *in vivo*. *Pseudomonas aeruginosa* (Ps), *Burkholderia cepacia complex* (Bcc), *Staphylococcus aureus* (Sa) and *Streptococcus Millieri* (Sm) were cultured with mucin and DNA. To compare their influence human PMNs were added. We determined CFU, biofilm by crystal violet, elastase with Congo red elastin and PMN necrosis by flow cytometry. The elastase produced in both media by Ps, Ps+Sm, Ps+Bcc and Ps+Sa was greater than that caused by the bacteria alone and by the other mixtures (p<0.005). The elastase produced by Ps, Ps+Sm, and Ps+Ps in PMN medium was greater than that produced in medium containing DNA (p<0.005). CFU of Sa and Sm with Ps decreased (p<0.05) in both media, they being higher with DNA (p<0.01). The biofilm formed was similar in both media. PMNs necrosis was highest with Bcc (1.94%), followed by Sm (1.75%) and Ps (1.66%). It was enhanced in Ps+Bcc and Ps+Sm (p<0.01) and Bcc+Ps+Sm (p<0.05). The medium with PMN promoted greatest elastase and UFC production than the medium with DNA. Bacteria and mixtures thereof induce a marked PMN necrosis. *In vitro* studies should take this observation into account.

A126

KERION DE CELSO (*Kc*). TUCUMÁN. ARGENTINA

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Kc is the colloquial term to allude to scalp inflammatory infections caused by *Trichophyton* and *Microsporum*. The aim of the present work was to determine the incidence of *Kc* in outdoor patients in the Hospital del Niño Jesús in Tucumán, between January 2009 and June 2013. We examined the hospital records of 613 patients. The final diagnosis was established by direct observation of the etiological agent in skin flakes, hair and/or suppurative materials and cultures. Out of the total clinical histories analyzed, 9 were positive for *kc*. 100% of the patients a) had the habit of playing on the dirt; b) had not been diagnosed in time; c) the injuries were observed between one month and one year after they appeared, and d) were treated empirically with antibiotics. In 8 patients, the etiological agents were isolated: (5) *Microsporum gypseum*, (2) *Trichophyton mentagrophytes* and (1) *Microsporum canis*. The results obtained are consistent with findings worldwide: the incidence of this disease is low (1.3%). We believe that mycological studies should be conducted in lesions compatible with *Kc*, both to confirm and to determine diagnosis so as to ensure timely and effective treatment.

A127

SCALP RINGWORM IN CHILDREN: 695 CASES IN TUCUMÁN

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Introduction: Scalp ringworm (tinea capitis) is a fungal infection that constitutes a sanitary problem whose incidence and causal agents change according to geographical location, climate and socioeconomic characteristics. The aim of this work was to establish the incidence of scalp ringworm in children in Tucumán. Materials and methods: We studied 864 samples of inpatients and outpatients of the Hospital del Niño Jesús in Tucumán between January 2000 and June 2013. Skin scales and hair samples were examined and processed with conventional mycological techniques. Results: A total of 695 children gave positive results, prevalence being found in males. The order of frequency of the isolations was: *Microsporum canis* (91.6%), *Trichophyton tonsurans* (4.3%), *Microsporum gypseum* (3.3%) and *Trichophyton mentagrophytes* (0.8%). Conclusions: We found a predominance of scalp ringworm in male children. *M. canis* (91.6%) was the dermatophyte with greatest incidence. It is necessary to highlight that the definitive diagnosis requires the assistance of a mycology laboratory since clinical diagnosis can only be presumptive.

A128

HUMAN PAPILLOMAVIRUS: SINGLE AND MULTIPLE INFECTIONS AND DIFFERENT RISK FACTORS IN WOMEN LIVING IN TAFÍ DEL VALLE

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Infection with oncogenic human papillomavirus (HPV) types is a necessary cause of cervical cancer, the second most frequently occurring cancer in women worldwide. HPV-DNA is found in approximately 12% of all human cancers. Genital HPV types have been subdivided into low-risk and high-risk types, which are frequently associated with invasive cervical cancer. The aim of this work was to establish the DNA of HPV and determine different risk factors in women living in Tafí del Valle. Cervical cell specimens obtained from 90 women aged 14-70 years were included. A structured questionnaire gathered information on risk factors for HPV infection and cervical cancer (according to IARC-WHO). Detection and typing of the viral DNA genome was performed by polymerase chain reaction combined with a restriction fragment length polymorphism assay (PCR-RFLP) or hybridization. HPV DNA was detected in 44.05% of the clinical samples, with 25% high risk types. The results showed a variable HPV infection: single infection (25%) and multiple infections with 2 to 6 genotypes. In addition, risk factors such as number of sexual partners and smoking were identified. This study helps in the identification of women at high risk of developing invasive CC.

A129

AMELOBLASTOMA, HPV AND P53

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Ameloblastomas are odontogenic tumors with an aggressive local behavior. While Human Papilloma Virus (HPV) is often identified in various oral pathologies of the soft tissue, there are studies that associate it with ameloblastomas, having detected it in 30 to 60% of cases. It has been postulated that the gene p53 (phosphoprotein) in one of its polymorphic forms would increase the risk of malignant transformation in neoplasms in which HPV is identified. The detection of the genome was performed in a previous work using the molecular technique PCR-LIS.SSCP with two pairs of primers, My 09/11 and Gp 05/06. Recognition of HPV suggests a role of the virus in this pathology. In order to detect polymorphism in codon 72 of p53, from 1 to 3 sections were obtained from the files of the surgical pathology laboratory with a histopathological diagnosis of ameloblastoma. The technique used was allele-specific PCR to characterize the proline/arginine residue with two pairs of primers, reading the electrophoresis run in polyacrylamide minigels 6% stained with ethidium bromide. Results arg/arg 0%, arg/prol 22%, pro/pro 77%. Controls: arg/arg 54%, arg/prol 36%, pro/pro 9%. There was a significant relation between the marker (p53) 72p and the tumor (Fisher p = 0.014) compared to the controls.

A130

PREVALENCE OF RETAINED THIRD MOLARS TREATED AT THE SURGERY DEPARTMENT OF THE FOUNT BETWEEN 2003 AND 2012

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The third molar is the tooth that most frequently fails to complete its normal eruption process, its retention being a very common condition. The mandibular growth pattern is genetically independent of tooth volumetric development. The last teeth to erupt have fewer possibilities of reaching an adequate location, therefore third molars usually adopt an anomalous position in the arcade due to lack of space, compromising the disposition of other teeth. The aim of this study is to determine the prevalence of the position of retained third molars according to age, sex, location (upper or lower molar) in order to determine which is the most common position (angle) so as to establish the degree of surgical difficulty. 87 panoramic and periapical radiographs were selected from medical histories of patients treated at the Surgery Department, determining the variables of our research and excluding fully erupted third molars. The results showed that out of 87 molars, 66 (75.86%) were lower and 21 (24.14%) upper molars. Out of 66 lower molars, 40 (60.62%) were mesioangular, 10 (15.15%) were vertical, 5 (7.57%) were distoangular and 11 (16.66%) were horizontal, from which we concluded that the most common position is the mesioangular and that age, sex or tooth disposition have no influence on it.

A131

PROTOONCOGENE C-MYC IN BUCCAL MUCOSA OVEREXPRESSION

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The superfamily c-myc would be associated with different neoplasms. C-myc is amplified when the cell proliferation index is high. For some epithelial tumors, aggressiveness and risk of metastasis would increase when there is overexpression of c-myc. The objective of this work was to study the amplification and/or overexpression of the protooncogene c-myc in benign proliferative lesions and cancer located in buccal mucosa. Consequently, we analyzed 15 footage samples corresponding to the former and 10 carcinomas corresponding to squamous cells, all HPV, and 10 control samples. We applied the molecular technique of coamplification with locus of reference (B-globin) with reading of the amplicons by electrophoresis run in polyacrylamide minigels 6%. In benign lesions (proliferative), c-myc was amplified 33% and 27% in oral cancer. Controls were amplified 10%. Conclusions: The protooncogene c-myc was amplified in a low way in normal cells (controls) and at higher percentages in benign proliferative lesions and cancer of the oral mucosa; but according to previous findings, c-myc amplification would be insufficient by itself to cause the cellular transformation, although it could be a prognostic biomarker.

A132

STUDY OF HUMAN DENTAL ENAMEL MICROSTRUCTURE IN RELATION TO MICROHARDNESS AND CHEMICAL COMPOSITION

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We identified two types of human enamel, radial (outer) and with bands (inner), both with a defined organization that determines a different functional behaviour. That is why it is interesting to relate enamel types to their microhardness and chemical composition. The objective of this study was to determine the chemical composition by using Energy Dispersive X-Ray Spectrometry (EDS) analysis and Vickers microhardness testing in both types of enamel. Samples of enamel of deciduous teeth, which were resin-embedded and worn, were analyzed with EDS for Ca, P and CL ions in the outer enamel (OE) and inner enamel (IE) of the free faces, microhardness testing with 10g loads and application time of 10" in the same zones. The results were \bar{X} in radial OE: Ca 37.02 (DE 3.84); P 15.16 (DE 4.79); Cl 0.41 (DE 0.14) and for IE: Ca 37.42 (DE 4.92); P 14.99 (DE 4.40), Cl 0.23 (DE 0.09). Anova test: there was no difference between OE and IE for Ca (p= 0.78) or P (p=0.9), but there were significant differences in CL (p = 0.0001). \bar{X} of microhardness in radial OE was Hv₁₀= 351.47 V_k (DE 63.84) and in EI Hv₁₀= 251.15V_k (DE 27.25) with a significant difference p<0.000 (t-test) Microhardness does not depend on mineral content but on prism disposition in the different enamel types. The high Cl content can account for its low solubility in the acid used in dental treatments.

A133

KERATOCYSTIC ODONTOGENIC TUMOR (KCOT). CLINICAL AND PATHOLOGICAL FEATURES OF 15 CASES

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The keratocystic odontogenic tumor (KCOT) is a benign odontogenic intraosseous tumor with a lining of parakeratinized stratified squamous epithelium. Although benign, it has an aggressive behavior. It was designated as a primordial cyst, but at present its neoplastic nature has been established. The purpose of our study was to analyze clinical and pathological aspects of 15 cases of KCOT, some of them termed cysts in the archives, collected between 2007 and 2013. These cases represented 4.5% of total oral biopsies. The mean age of the patients was 36 ys. This series showed preponderance of males (66.6%). The mandible was the site of highest occurrence (80%). Most of the cases were locally destructive with extensive involvement of bony tables and adjacent tissues (93%). The multilocular radiolucency in mandibular body and ramus was common, with or without associated teeth (66.6%). The histopathological features were parakeratinized stratified squamous epithelium (100%), well-defined basal layer, corrugated surface, hyalinization and satellite cysts (20%). The orthokeratinized epithelium excludes the diagnosis of KCOT.

A134

VASCULAR REACTIVITY IN HYPERTENSION BY CHRONIC NITRIC OXIDE DEFICIENCY: ROLE OF OXIDATIVE STRESS

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In hypertension (HT), oxidative stress alters nitric oxide (NO) levels. Objective: To study in aortas isolated from rats with HT because of chronic deficiency of NO (L-NAME rats: RL) vascular reactivity (VR), nitrites levels and effect of oxidative stress. Methods: RL were treated with; tempol: RL-T or ascorbic acid: RL-VitC for 6 weeks. In isolated aortas basal tone (BT) was measured by sodium nitroprusside (SNP) response and VR was measured by noradrenaline (NA) and KCl response. Nitrites were measured by Griess reaction. Results were compared with control rats (CR) and CR treated with antioxidants.

Results: RL showed HT (mean arterial pressure: MAP: 181 ± 11 , $n=10$ vs. CR: 110 ± 2 mmHg, $n=10$, $p<0.001$). Antioxidants did not modify MAP in RL or CR. SNP response was higher in RL than RL-T and RL-VitC. VR to NA was lower in RL and was reverted only in RL-T. VR to KCl was similar in all groups. RL showed lower nitrites (3728 ± 317 vs. CR: 6927 ± 578 pmol/mg, $p<0.001$). RL-T showed similar nitrites than CR. In CR, endothelial scraping decreased nitrites to similar values of RL. Conclusions: Although in RL antioxidants did not reverse HT, they decreased BT. The fact that scraping did not modify NO would indicate that endothelial dysfunction is involved in BT. Recovery of NO and BT by antioxidants would indicate that RL showed vascular damage with NO-dependent endothelial dysfunction.

A135

CARDIOVASCULAR RISK FACTORS IN ADOLESCENTS IN SANTA ROSA DE LEALES SCHOOL

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Cardiovascular disease risk factors (CVDRF) have an increasing prevalence in the young and prevention should begin at an early age. Objectives: I) to identify CVDRF in students, evaluating clinical and biochemical CVD risk factors; II) to teach activities that promote healthy habits. In 76 boys and 79 girls, aged 13 and 18, a survey was conducted of the personal and family history of CVDRF. Anthropometric measurements, blood pressure and random blood glucose were investigated, considering cut-off values for percentile for age and sex. Workshops on different CVDRF, living spaces and physical activity were conducted. Results showed: 8.9% were obese (BMI ≥ 97 th percentile) and 16.7% overweight (BMI p85 to p96). 25% showed increased waist circumference ($> p90$) and 3% hypertension ($> p95$), smoking 15.5% and 63.2% alcohol consumption. No abnormal glucose levels were detected. Family history revealed that 20.6% had diabetes, 7% hypertension and 9% CVD. The satisfaction survey conducted among students about workshops showed that 28.6% liked more Toxic Habits, 21.4% of Overweight/Obesity and 20% Diabetes. This work contributed to improve the life quality of students and their families through health education, encouraging changes in lifestyle to correct modifiable CVDRF and prevent disease.

A136

JAK2V617F MUTATION IN PHILADELPHIA-NEGATIVE CHRONIC MYELOPROLIFERATIVE NEOPLASMS (NMPC PHI-): PRELIMINARY STUDY IN TUCUMAN

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The mutation in the JAK2 gene is one of the diagnostic criteria of the classification of the WHO for polycythemia vera (PV), primary myelofibrosis and essential thrombocythemia (ET). JAK2V617F mutation was studied in patients with NMPC Phi- in Hospital Centro de Salud between 2008 and 2012. We performed a retrospective, descriptive and cross-sectional study. We studied EDTA blood samples for the detection of JAK2V617F (real-time PCR, Roche LightCycler) and for hematological analysis (analyzer Sysmex KX-21N). We studied 18 patients, 55.5% out of whom were male. The age range was 43-79 years. 13 patients had PV, and 5 ET. We studied the presence of the JAK2V617F mutation in only 9 cases of PV, it being found in 8/9 (89%). The JAK2V617F mutation was present in 3/5 (60%) of ET. Two ET patients had the mutation JAK2V617F and BCR/ABL simultaneously. JAK2V617F was heterozygous in all cases. The analysis of hematological parameters showed significant differences ($p < 0.05$) in erythrocyte and platelet counts, hemoglobin, hematocrit and age range between the two conditions. There was no significant difference in hematological data for the presence of JAK2V617F in ET patients. Although only a few patients were studied, this is the first analysis of the JAK2V617F mutation in Tucumán.

A137

APPLICATION OF THE CRYOHEMOLYSIS TEST IN THE DIAGNOSIS OF HEREDITARY SPHEROCYTOSIS

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Hereditary spherocytosis (HS) is one of the most frequent hemolytic anemias in our area. There are many laboratory tests that help in its diagnosis. The one most often used is the Osmotic Erythrocyte Resistance (OER) test, which reveals the lack of resistance that the spherocytes show to the entry of water. The disadvantages it presents are its inability to detect the mild forms and the fact that it tests positive for spherocytosis due to other causes. In the cryohemolysis test (CHT) the spherocytes are exposed to sudden changes in temperature in hypertonic conditions. This phenomenon is independent of the surface/volume relationship of the spherocytes. Our objective was to determine CHT sensitivity and specificity. Materials and methods: CHT was performed according to the method described by Streichman et al. CHT was applied to 30 healthy individuals, in 1 patient with a confirmed diagnosis of HS and in 9 patients and families with a clinical suspicion of HS. The results were compared with the OER test. Results: the reference values for CHT found in the healthy population were 4.0% - 12.5%. The HS individuals showed a mean of 49.2%. 100% sensitivity and 97% specificity were obtained. Conclusions: the analysis of the results obtained showed that CHT can be used as another tool to diagnose this pathology in our population.

A138

PHENOTYPE CHANGES IN THE INTESTINAL MUSCLE LAYER DURING DIABETES

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Intestinal smooth muscle cells (ISMCs) are fully differentiated cells that harbour a unique repertoire of contractile proteins such as smooth muscle alpha actin (α -SMA), smooth muscle myosin heavy chain (SM-MHC) isoforms and smoothelin, which are required for the motility function. ISMCs behaviour depends on several genetic and environmental cues. Transforming growth factor beta (TGF- β) proteins are multifunctional cytokines regulating diverse cellular functions: growth, apoptosis, extracellular matrix (ECM) synthesis and differentiation.

Using an experimental model of diabetes and TUNEL, RT-PCR, western blot and immunohistochemical techniques, we examined changes in morphology, proliferation, apoptosis and specific contractile marker proteins at the intestinal muscle layer. Our results indicated a significant decrease in the apoptotic process in diabetic animals. No changes in proliferation were observed. A significant decrease in α -SMA, MYH11 and smoothelin expression and increased collagen III and fibronectin deposition were evidenced in diabetic muscle layer. In addition, we determined a down regulation in TGF- β 1 ligand and TGFRII receptor. The data suggest that the diabetic state leads to a change from the contractile phenotype of ISMCs to a secretory phenotype. This might be induced by deregulated TGF- β 1 signalling. All these changes could be responsible for motility disorders in the diabetic intestine.

A139

ANTITUSSIVE EFFECT OF CHAÑAR AND MISTOL ARROPE IN RATS

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Fruits of *Geoffrea decorticans* (chañar) and *Ziziphus mistol* (mistol) can be eaten as food and be used to prepare arrope, which is employed both in the diet and in popular medicine for the treatment of sore throat, cough and colds. The present work will try to scientifically validate the antitussive effect of arrope on Wistar rats. Previous investigations have shown that arrope has significant anti-nociceptive effects at a dose of 1000 mg/kg of weight, showing that the mechanism of action involves the opioid system. To evaluate the antitussive activity of arropes in rats, a classical model of cough induction with ammonia was used. For this study, an opioid drug, codeine (codelasa®), at a dose of 2.6mg/kg of weight, was used as a positive control. The results show that both arropes at a dose of 1000 mg/kg administered orally for three days increased the latency period of the onset of cough in 218.0% and 117.6% respectively. Also a decrease was observed in the frequency of cough with mistol (74.02%) and chañar (57.15%). The effect of arropes on the latency period is significantly lower than codeine, although the frequency is similar to it. In conclusion, the results indicated that the antitussive effect of both arropes could be due to their opioid properties and also provided experimental evidence for their traditional use in the treatment of respiratory illness.

A140

YACON ROOTS IMPROVE HEPATIC STEATOSIS IN HIGH-FRUCTOSE FEEDING

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Obesity appears to have emerged largely from changes in our diet and reduced physical activity. An important dietary change is the substantial increase in the consumption of dietary fructose, a common sweetener used in the food industry. A high flux of fructose to the liver disturbs glucose metabolism and increases *de novo* lipogenesis and triglyceride synthesis. This leads to insulin resistance and hepatic steatosis. The aim of this study was to determine the protective effect of Yacon roots on hepatic lipid accumulation in high-fructose-diet-fed (HFD) rats. Oral administration of Yacon flour (340mg FOS/kg body weight) twice a day significantly decreases body weight and fat mass of HFD rats after 8 weeks of treatment. Hepatic triglyceride content and score index calculated from morphometric observations were significantly decreased in HFD+Yacon rats. mRNA expressions of hepatic hydroxy-methylglutaryl CoA synthase (HMGCoAS), fatty acid synthase (FAS), glycerol-phosphate acyltransferase (GPAT) and PPAR α gene were upregulated in HFD+Yacon rats. HFD+Yacon rats showed decreased leptin levels as well as decreased leptin/adiponectin ratio and HOMA-IR. These findings suggest that Yacon amelioration of HF-induced fatty liver appears to be conferred by a reduction in hepatic lipogenesis and an acceleration of energy expenditure.

A141

EFFECT OF YACON LEAF EXTRACT AND ENHYDRIN ON THE ENDOCRINE PANCREAS OF DIABETIC RATS

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Diabetes mellitus is a chronic metabolic disease characterized by hyperglycemia. Yacon (*Smallanthus sonchifolius*) is an Andean crop used in traditional medicine. In our laboratory we demonstrated that leaves decoction and its main lactone enhydrin were effective in reducing blood glucose levels and useful in the treatment of diabetic animals. The present study was undertaken to evaluate the effect of Yacon leaf extract and enhydrin on the endocrine pancreas to establish one of its possible mechanisms of action. The decoction and enhydrin were given to diabetic rats for 30 days at a daily dose of 140 mg/kg b.w. and 0.8 mg/kg b.w., respectively. Blood glucose, glycosylated hemoglobin (HbA1C) and insulin levels were determined in plasma. Immunohistochemical studies were performed on pancreas of diabetic animals with anti-insulin antibody. Oral administration of decoction and enhydrin resulted in a significant decrease in blood glucose and HbA1c levels at end of the treatment. Immunohistochemical studies revealed that treatment produced a significant increase in β -cell numbers. However, no changes were detected in plasma insulin levels during the experimental period. Our results suggest that Yacon leaf decoction and enhydrin improves the diabetic state by increasing the mass of positive insulin cells in the pancreas.

A142
**CHRONOTYPES FREQUENCY DISTRIBUTION IN DIABETIC PATIENTS
IN THE JUJUY PROVINCE**

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The biological clock plays a central role in metabolism control. When obese and type 2 diabetic patients (DM2) were chronotyped, decreased HDL cholesterol levels, increased body mass index and glycated hemoglobin A1c levels were observed in the Evening type (ET), raising the possibility of using it as a marker for disease outcome. However, there is no information about the prevalence of ET among DM2 patients. The aim of this study was to estimate the chronotypes frequency distribution in diabetic patients in the Jujuy province to estimate the percentage of vulnerable patients. A total of 343 DM2 subjects, 236 women (40-86 years old) and 107 men (33-82 years old), were chronotyped (Horne-Östberg questionnaire).

We observed that 50.4% were Neutral and 43.2% Morning type, reflecting the normal tendency toward morningness with aging. Only 6.4% of the patients were Evening types. They are still a minority when studied separately by gender (men 3.7% and women 7.6%). Given that Evening types are a minority and that all patients should follow healthy lifestyles the usefulness of ET as a marker for disease outcome becomes questionable. We also observed that the main chronotype changes with gender, it being Morning type (50.4%) for males and Neutral type (52.5%) for females. The questionnaire will continue to be administered to increase the sample size and consolidate the data tendency.

A143
SUBCELLULAR STUDY OF RAT LIVER TREATED WITH CADMIUM AT LOW DOSES

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The aim of this study is to evaluate the ultrastructural alterations in the liver parenchyma of rats treated with low doses of Cd²⁺. Wistar male rats were intoxicated with 10 mg CdCl₂/kg orally administered for 12 weeks. Controls were treated with distilled water. The rats were sacrificed on the 4th, 8th and 12th week and the liver was dissected and analyzed by routine techniques for transmission electron microscopy. The results showed that in control animals, at all times analyzed, the subcellular structures of the liver parenchyma were preserved. In contrast, Cd²⁺ treatment produced morphological alterations dependent on the treatment period. Ultrastructural changes in hepatocytes were observed after the 4th week, showing an increase in the number of lipid droplets, a decrease in glycogen granules and dilated rough endoplasmic reticulum associated with swollen mitochondria with loss of crests. Sinusoidal congestion was also observed with mild hypertrophy of Kupffer cells and formation of collagen fibers. On the 8th and 12th week of treatment most of the hepatocytes exhibited cytoplasmic vacuolization. In conclusion, these results demonstrate that since the 4th week of treatment with 10 mg/kg of Cd²⁺ the liver shows the first signs of toxicity and a progressive deterioration in its morphology, affecting its normal function.

A144
APOPTOSIS IN *Leptodactylus chaquensis* TESTIS DURING THE REPRODUCTIVE CYCLE

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There is limited data on apoptosis in amphibian testis but nothing is known about *Leptodactylus chaquensis*. The aim of this paper is to analyze the frequency of this process in adult male animals collected during the reproductive and postreproductive periods. Testes were processed for identification of apoptotic cells using the TUNEL technique and for transmission electron microscopy (TEM). Apoptosis percentage was determined in both periods by counting the number (n°) of cysts with TUNEL positive cells/n° of total cysts at each maturation stage. Seminiferous tubules of the reproductive period showed a greater number of cysts, with a significant predominance of primary spermatogonia (G1), secondary (G2) and primary spermatocytes (C1), than tubules of the postreproductive period. Apoptosis was evident at all stages of maturation and in both periods of the cycle. However, in the reproductive period, a significant increase in the percentage of TUNEL positive cysts was observed, mainly at G2 and C1 stages. TEM observations confirmed these results. Apoptotic cells show a spherical morphology surrounded by a clear halo, with cytoplasmic disorganization and a fragmented nucleus with condensed chromatin. Apoptotic bodies were observed. The highest percentage of apoptosis during the reproductive period may play a role in controlling spermatogenesis, ensuring adequate spermatozoa production.

A145

ULTRAESTRUCTURE OF GANGLIA INVOLVED IN THE INNERVATION OF THE FEMALE AMPHIBIAN REPRODUCTIVE SYSTEM

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It is known that the reproductive function of vertebrates is under direct neural control. The aim of this work is to study the ultrastructure of ganglia, from which the nerves that innervate *Rhinella arenarum* ovary and oviduct would emerge. Ganglion samples taken from the coelomic cavity, below the common intestinal artery, were fixed and processed following routine techniques for transmission electron microscopy. The observations show: **a- neurones** characterized by their large size, with nucleus showing a single prominent nucleolus and with chromatin condensed near the nuclear envelope. The cytoplasm shows the presence of rough endoplasmic reticulum that is formed into clusters that correspond to the so-called Nissl corpuscles, a Golgi apparatus surrounded by numerous vesicles and mitochondria and neurofilaments; **b- nerve fibers** in which neurofilaments, mitochondria and numerous vesicles can be observed. Two types of fibers, myelinated and unmyelinated, can be identified; **c- axon terminals**, some of which show multiple small electronlucid vesicles (probably containing acetylcholine) while in others transparent small vesicles coexist with larger vesicles presenting an electrondense core (containing high molecular weight neurotransmitters). Ultrastructural analyses allow us to suggest that ganglia would be autonomic prevertebral ones.

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HISTOLOGY OF REPRODUCTIVE ORGANS OF *Leptodactylus bufonius* (ANURA, LEPTODACTYLIDAE) IN THE PREOVULATORY PERIOD

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Leptodactylus bufonius lays its eggs in foam nests on land in a burrow. Previous studies showed particularities in oviducts related to aquatic reproduction modes. We analyzed the ovaries, oviducts and testes to increase our knowledge of the reproductive process in a terrestrial mode of oviposition. Material and Methods: ovaries, oviducts of gravid females and testes and adult males were fixed with buffered formalin at pH 7.0, stained with H-E, AB at pH 2.5 and 0.5, combined with PAS, and TB. Results: ovaries with vitellogenic follicles, vitelline envelope, follicular and theca cells. Oviductal mucosa: cephalic glands sectors with glycosaminoglycans (GAGs) with a carboxyl radical, phosphates and sialylated lining epithelium with sulfated GAGs. Middle zones with sectorization of GAGs: basal zone with acid GAGs and middle apical zone with neutral GAGs. Caudal zone with neutral GAGs (PAS+). Luminal extracellular matrix with a fibrillar appearance. Testicles: cysts with few unripe luminal sperm, Sertoli cells and Leydig cells. Discussion: in vitellogenic ovaries and oviductal mucosal it was possible to qualify and quantify GAGs. The distribution of these compounds is species-specific. Neutral GAGs and handles would allow hygroscopic gel formation in the early stages of ontogenetic development. Conclusions: This species has the conditions necessary to optimize the reproductive function.

A147

ANALYSIS OF THE RELATIVE EFFICIENCY OF INDUCING AGENTS OF *Rhinella arenarum* OOCYTE ACTIVATION

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At fertilization, transient increases in intracellular calcium are essential for triggering egg activation events. Several cell-signalling pathways leading to the release of calcium and a variety of calcium-dependent effector molecules involved in MPF degradation, meiosis resumption and early embryonic development have been proposed. In previous studies, we tested the effect of activators and inhibitors of cell-signaling cascades involved in the activation process of *Rhinella arenarum* oocytes. The aim of this study was to compare the effect of several activators of *Rhinella arenarum* oocytes and to determine their relative effectiveness. Ovarian oocytes matured *in vitro* with progesterone were treated with thimerosal, caffeine, myoinositol, arachidonic acid and PD 98059 at submaximal doses, and the results were analyzed by statistical methods. Highest percentages of oocyte activation were obtained with caffeine 5 mM (68.5 ±2.5%) and thimerosal 200 µM (73.5±17.5%) and lower percentages with myoinositol, arachidonic acid and PD 98059. All tested compounds are able to enhance *in vitro* oocyte activation, but caffeine treatment is the most effective and reproducible one.

Handling of experimental conditions that mimic normal fertilization is important when designing protocols to be applied to human reproduction and animal production.

A148

SEASONAL VARIATION OF STEROID SYNTHESIS IN *Rhinella arenarum* FOLLICLES

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Although steroids have been considered the mediators of *in vivo* oocyte maturation, the physiological regulator of such process has not been determined yet. We decided to study the participation of the ovarian follicle in the seasonal steroids synthesis by TLC and its relationship with oocyte maturation. Complete follicles (fc) from ovaries of *R. arenarum* obtained in different seasons were incubated in Ringer solution (RA) in the presence or absence of hCG (10UI/mL) for 3, 6, 9 and 20 h. Steroids were extracted and analyzed by TLC. The fc remained in RA and at 24 h rupture of the germinal vesicle (RVG) was monitored. The results indicate that the winter fc incubated with hCG release P₄ after 3 h of incubation, but only those fc incubated with hCG for 20 hours were able to mature (60% RVG). In the same period T levels were not detected by TLC. During the summer the stimulated follicles released testosterone (T) at all times analyzed, 35% of them matured at 6 h, 48% at 9 h and 100% ovulated *in vitro* at 20 h of incubation. Control fc did not mature (0% RVG) and steroids were not detected by TLC in either season. In the summer, T was the predominant steroid produced in the fc under gonadotropic stimulation. These results provide evidence of seasonal changes in ovarian steroidogenesis of *R. arenarum in vitro*.

A149

BIOLOGICAL ROLE OF AN OVIDUCTAL GLYCOPROTEIN OF 74 KDA (GP74) IN AMPHIBIAN FERTILIZATION

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At present the role in amphibian fertilization of an oviductal acidic protein of 74KDa (gp74) obtained from the jelly diffusible components is not known. The aim of this work is to study the biological activity of gp74 and determine its participation together with Ca²⁺ in gamete interactions. Oocyte fertilizability progressively decreases as a function of extraction time of the diffusible components and washing medium of the jelly coats. The addition of diffusible proteins, previously purified, partially restored fertilizability rates, which increased significantly by the addition of Ca²⁺ 4 mM. It was demonstrated that gp74 produces changes in the oocytes surface similar to those induced by acrosomal lysines that are physiologically released during the acrosomal reaction, this effect being enhanced by Ca²⁺ addition. The lytic effect was not observed in the oocyte in the absence of sperm. The same effect was obtained when sperm were previously treated with gp74 in the presence or absence of Ca²⁺. The results demonstrate for the first time in anuran amphibian that a specific glycoprotein acts on the sperm promoting acrosomic content release. This effect is enhanced by the presence of the cation in the medium, suggesting that both participate as factor-cofactor in the induction of the acrosomic reaction.

A150

METABOLISM OF FOLLICULAR CELLS IN THE OOCYTE-FOLLICULAR CELL COMPLEX (COCs) OF *Chinchilla lanigera*

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Chinchilla lanigera, endemic to South America, is highly appreciated in the fur market. In order to successfully address animal assisted reproduction techniques it is important to select good quality COCs. The aim of this work was to study the metabolism of follicular cells obtained from ovarian follicles of different sizes as parameters to determine the quality of COCs. The ovaries were removed from freshly slaughtered adult females and placed in Phosphate Buffer Saline at 37°C. COCs were aspirated from large (3.0 mm), medium (2.0 mm) and small (1.0 mm) follicles. Follicular cells were incubated in modified human tubal fluid at 37°C in an oven gassed with 5% CO₂ and 100% humidity, adjusting its concentration to 1x10⁶ cells / ml. Glucose consumption was determined by the spectrophotometric enzymatic method and oxygen consumption was studied by oxigraf. Oxygen consumption of follicular cells from large, medium and small follicles was 3.2%, 0.9% and 1.4% respectively. Glucose consumption of follicular cells from large, medium and small follicles was 8.60%, 1.88% and 62.08%. This indicates that as follicles grow in the ovary their cells show a higher biological activity evidenced by an increase in oxygen consumption. However, glucose consumption decreases, suggesting the use of other energetic substrates.

A151

PHOSPHOLIPASE A₂ IN THE ACROSOME REACTION OF *Chinchilla lanigera* SPERM

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In mammals, sperm must undergo acrosome exocytosis (AR) to fuse with the plasma membrane of the oocyte and ensure successful fertilization. In this process, sperm phospholipases including PLA₂ are involved. PLA₂ hydrolyzes membrane phospholipids in arachidonic acid (AA), triggering AR. Objective: to study *in vitro* the involvement of PLA₂ in AR induced by progesterone in *Chinchilla lanigera* epididymal sperm. Samples were taken by puncture of the epididymis cauda of sexually mature animals and trained with Human Tubal Fluid for 2:30h in a gassed stove at 37°C. The sperm were treated with I) Concentrations of AA for 15 min. II) Concentrations of quinacrine (5-40µM) and aristocholic acid (40-320µM), PLA₂ inhibitors, at 15 and 5 min respectively, and AR was induced with progesterone. All reactions were stopped with formaldehyde. Acrosomal status was assessed with Coomassie Blue staining. The addition of AA induces AR in a dose-dependent manner, maximum response being obtained with 50µM (35%). Both inhibitors resulted in a decrease in the percentage of AR. However, the inhibitory effect was greater with quinacrine. The AR obtained with exogenous AA is a clear indication of the involvement of PLA₂ in this process. However, the low percentages of inhibition suggest the participation of other signaling pathways involved in the AR of *Chinchilla lanigera* sperm.

A152

UROKINASE TYPE PLASMINOGEN ACTIVATOR ACTION IN BOVINE OVIDUCTAL EPITHELIAL CELL CULTURES

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Plasminogen activators convert plasminogen into an active enzyme, plasmin. Urokinasetype plasminogen activator, uPA, binds to its receptor, uPAR, and triggers intracellular signaling pathways activating transcription factors such as AP-1. This research suggests that bovine oviductal epithelial cells express uPAR and it proposes to analyze uPA effect on the expression levels of c-fos, a component of the transcription factor AP-1. Aliquots of three-dimensional cultures of bovine oviductal epithelial cells of 48 h were used for uPAR detection. Another aliquot was utilized to study uPAR expression by RT-PCR and immunohistochemistry. 20 mg of 48 h explants were incubated at 0, 30, 45 and 60 min with 10 nM uPA. Total RNA extraction was processed using QiagenRNeasy Micro Kit and cDNA was synthesized. *c-fos* expression was analyzed by Real-Time PCR using GAPDH as a housekeeping gene. uPAR was detected in the apical region of oviductal epithelial cells and the presence of mRNA was verified by RT-PCR. *c-fos* expression levels showed an increase at 45 min after uPA induction. This study demonstrates that uPA could initiate the activation of transcription factors in oviduct. uPA could regulate the expression of genes involved in cell proliferation and extracellular matrix remodeling.

A153

EFFECT OF THE PLASMINOGEN/PLASMIN SYSTEM ON BOVINE *IN VITRO* FERTILIZATION (IVF) USING AN EXOGENOUS ACTIVATOR AND INHIBITOR

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In our laboratory, Plg was detected in oolemma and zona pellucida (ZP) of *in vitro* matured bovine oocytes. Streptokinase (SK) acts as a specific cofactor in Pg-Sk complexes and transforms Plg to Plm. ε amino caproic acid (EACA) is an exogenous inhibitor of Plm. We hypothesized that Plm is involved during bovine *in vitro* fertilization and early cleavage. Cumulus-oocyte complexes (COCs) were aspirated from abattoir ovaries and matured *in vitro* for 22 h. Frozen bovine sperm were centrifuged with sperm capacitation medium and microdrops were placed under mineral oil. COCs were co-incubated with sperm for 5 h. IVF was carried out in control conditions or with the addition of SK or EACA. Presumptive zygotes were transferred to CR1aa medium. Cleavage rate was evaluated 48 h after insemination and embryos were transferred to CR1aa medium with 10% FBS. Blastocysts rate was assessed on days 7 and 8. Cleavage rate was higher in IVF embryos with SK compared to control, but this increase was not reflected in blastocysts rate. This could indicate that Plm would participate during IVF and development of zygotes up to the 8-cell stage. The addition of EACA to IVF medium produced a cleavage rate decrease. Plm inhibition would have a negative effect on IVF and *in vitro* bovine embryonic development.

A154

EFFECT OF BMP-5 ON THE DEVELOPMENT OF *IN VITRO* PRODUCED BOVINE EMBRYOS

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Previous studies demonstrate that bone morphogenetic protein 5 (BMP-5) is differentially expressed in the isthmus of bovine oviducts and is present in the oviductal fluid. In this study we investigated the expression of BMP receptors (BMPR-IA,-IB and -II) and the effect of BMP-5 on *in vitro* produced bovine embryos. Oocytes aspirated from abattoir ovaries were matured and fertilized *in vitro*. For the first objective, presumptive zygotes were cultured in CR1aa medium until day 2 and pools of 2, 4, and 8 cell embryos were collected and processed for RT-qPCR analysis. For the second objective, presumptive zygotes were cultured in CR1aa without serum in the absence or presence of 100 ng/ml of BMP-5. Cleavage rate was evaluated at day 2 and then the embryos were transferred to CR1aa + 10% FBS until day 8. On days 7 and 8, the blastocyst rate was recorded. The expression of the 3 BMP receptors was detected in all the embryonic stages analyzed. Although the addition of BMP-5 to embryo culture medium had no effect on cleavage rate, a higher proportion of embryos developed to blastocysts in the BMP-5 group. The expression of BMP receptors in early embryonic stages and the positive effect of BMP-5 on developing bovine embryos cultured *in vitro* suggest that BMP-5 could act as an embryotrophic factor during preimplantation embryo development.

A155

PHYSICO-CHEMICAL CHARACTERIZATION AND ANTI-BIOFILM ACTIVITY OF PROPOLIS FROM ARGENTINE STINGLESS BEES

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Among products that may be obtained from beehives, wax, honey, royal jelly and propolis are prime examples. Propolis is a resinous substance collected by bees from exudates of plants and is highly appreciated by humans due to its biological properties. For this reason, in this paper, ethanolic extracts of propolis from colonies of native bees *Scaptotrigona jujuyensis*, *Tetragonisca fiebrigi* and *Plebeia sp.* were characterised. The anti-biofilm effectiveness of these substances was tested on *Pseudomonas aeruginosa* bacteria. Propolis was collected from colonies of native bees from Estación Experimental Agropecuaria Famaillá, INTA, in Tucumán. The physicochemical parameters of stingless bee propolis samples were determined following the guidelines of Norma IRAM-INTA 15935-1. We also carried out a preliminary chemical study of the chromatographic profiles (TLC and HPLC) and infrared spectroscopy. The percentage of wax in the samples ranged from 70.5 to 82.5%, while the resinous fraction was low for all three species (4 -9%). Constituents of the nonpolar fraction would be responsible for the demonstrated antipathogenic activity on *Pseudomonas aeruginosa*.

A156

BIOFILM KINETICS FORMATION IN UROPATHOGENIC *Escherichia coli* (UPEC) STRAINS. COLONIZATION IN THE URINARY TRACT OF FEMALE BALB/c MICE

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Introduction: Uropathogenic *Escherichia coli* (UPEC) causes 70-95% of urinary tract infections (UTI) in which the main virulence factor is the ability to form biofilms. It is necessary to detect UPEC biofilm forming strains and search for alternative treatments. Aims: a) to determine the ability to form biofilm and the kinetics of formation in clinical isolates of UPEC; b) to study the ability of biofilm forming UPEC strains to colonize the organs of the urinary tract of female BALB/c mice. Materials and Methods: a) biofilm forming ability was determined in 30 strains of UPEC. Biofilm kinetics formation was followed for 12 h; b) two biofilm forming UPEC strains were selected for the intravaginal inoculation of BALB/c mice two times. At 24 and 48 h, and 5, 7 and 14 days mice were sacrificed and the organs from the urinary tract and vagina were removed, disrupted and plated on MacConkey agar. Results: biofilm production starts at 6 h, increases until 8 h and remains constant until 12 h. The selected strains colonized all urinary tract organs up to 48 h; during the following days, colonization persisted only in kidney until day 14. Conclusion: we developed an animal model of urinary tract colonization with biofilm-producing strains inoculated intravaginally, with persistence in kidney, useful for further studies in the prevention/treatment of UTI.

A157

ANTIMICROBIAL AND ANTIBIOFILM ACTIVITY OF EXTRACTS FROM *Amaranthus muricatus*

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Amaranthus muricatus (Moq.) Hieron, also called "Yerba meona", is used in folk medicine in South America as a poultice for skin infections. The aim of this study was to evaluate the activity of extracts of Yerba meona on the growth and biofilm production of *Staphylococcus aureus*. The dried plant material was removed by soaking with solvents of increasing polarity. Solutions were prepared at two concentrations, 50 µg/ml and 5 µg/ml extracts dissolved in a mixture of DMSO/distilled water (1:1). We used Muller Milton, pH 6.0. Incubation at 37 °C for 24 hours. Growth was determined by optical density at 560 nm on a microplate reader. We worked with gentamicin as a positive control. The extracts (ethanolic, acetone and hot water), obtained from the aerial parts of *A. muricatus*, inhibited the production of biofilm and bacterial growth by 40-55%. Furthermore, ethyl acetate extract was able to inhibit only the production of biofilm (by 80% at the highest dose tested). Based on these results we conclude that ethyl acetate extract presents a selective inhibition of biofilm unrelated to the inhibition of bacterial growth, thus reducing the pathogenicity of *Staphylococcus aureus*.

A158

TRYPANOCIDAL ACTIVITY OF 4-HYDROXY-3-(3-METHYL-2-BUTENYL)-ACETOPHENONE, THE MAIN SECONDARY METABOLITE FROM *Senecio nutans*

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A p-hydroxyacetophenone derivative, 4-hydroxy-3-(3-methyl-2-butenyl)-acetophenone (4-HMBA), is the main secondary metabolite isolated from the aerial parts of *S. nutans* Sch. Bip. (Asteraceae), a medicinal plant commonly known as "chachacoma" that is widely used in Andean traditional medicine. The antibacterial and antifungal properties of 4-HMBA were reported previously. In this work the trypanocidal activity against infective and non-infective stages of *Trypanosoma cruzi* was evaluated. 4-HMBA was isolated from a chloroform extract by column chromatography and characterized by EI-MS, ¹H and ¹³C RMN spectroscopies. The compound was active on epimastigotes, trypomastigotes and amastigotes of *T. cruzi* with IC₅₀ values of 1.79 µg/mL, 82.08 µg/mL and 5.05 µg/mL, respectively. The CC₅₀ on Vero cells was 110.15 µg/mL at 24 hours. The results show that 4HMBA exhibits *in vitro* trypanocidal activity against non-infective and infective forms of the parasite.

A159

FREE RADICAL SCAVENGING ACTIVITY OF SESQUITERPENES FROM *Senecio punae*

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Senecio punae (Asteraceae, Senecioneae) is an endemic shrub growing in the Argentine Puna desert at 3500-4600 m asl. We present here the study of the free radical scavenging activity of a diethyl ether extract (EE) obtained from the fresh aerial parts of this species. The fractionation of the EE employing different chromatography techniques yields two eremophilanes: dehydrofukinone (D) previously reported¹ and a second one (F) with molecular formula C₁₅H₂₂O₂. Its structure, it being a hydroxylated derivative of compound D, was established by NMR (mono and bidimensional) and mass spectrometry techniques. The EE, D, and the fraction containing compound F were screened for their potential as antioxidants using the *in vitro* model 1,1-diphenyl-2-picrylhydrazyl (DPPH)². The fraction containing F showed the highest antioxidant activity compared to control, with free radical scavenging of 61% and 42% at 500 µg/ml and 250 µg/ml, respectively. These results, together with its molluscicidal, antibacterial, antibiofilm, and insect repellent properties, all measured in our laboratory, allow us to determine the medicinal potential of *S. punae*.

¹ Mendoza L., Montanaro S., Bardón A., Cartagena E. Borkosky S. Libro de Resúmenes del XVIII SINAQO, 2011, p. 240.

² Yamaguchi T., Takamura H., Matoba T., Terao J. *Biosci. Biotechnol. Biochem.* 1998, 62:1201-4.

A160

ANTIBACTERIAL ACTIVITY OF *Tibouchina longifolia* (MELASTOMATACEAE)

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The aim of the present work was to evaluate the effect of acetone/H₂O extract and subextracts of *Tibouchina longifolia* (Vahl) Baill. ex Cogn. against strains of *Staphylococcus aureus* ATCC (*St.a.*) 27835 and 25922 and *Escherichia coli* (*E. coli*) ATCC 35218 and 14213. Dried aerial parts of *Tl* were extracted with acetone-H₂O (7:3) (I). Extract concentrated under vacuum was partitioned successively liquid-liquid with CH₂Cl₂, (II), EtOAc (III), n-BuOH (IV) and aqueous fraction (V). Antibacterial activity tests were performed by both agar diffusion and plate microdilution methods to determine the minimum inhibitory concentration (MIC). Tests were performed in duplicate. All extracts except (II) showed antimicrobial activity by the agar diffusion method against all tested strains. MIC values: I: 0.625, 0.625, 1.25 and 1.25 mg/mL for *St.a.* ATCC 25922 and 27835 and *E. coli* ATCC 35218 and 14213 respectively. III: 0.156 mg/mL for *St.a.* ATCC 25922, and 0.625 mg/mL, for *St.a.* ATCC 27835 and *E. coli* ATCC 35218 and 14213. IV: 0.156 and 0.625 mg/mL for *St.a.* ATCC 27835 and 25922. For *E. coli* ATCC 35218 and 14213, MIC was 0.156 and 1.25 mg/mL. V: 1.25 mg/mL for *St.a.* ATCC 25922 and *E. coli* ATCC 35218 and 14213, MIC for *St.a.* ATCC 27835 was 0.312 mg/mL. These results show that subextracts III and IV were the most active ones against the *St.a.* strains tested.

A161

ANTIBACTERIAL ACTIVITY OF *Cyclolepis genistoides* D. Don (ASTERACEAE)

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Cyclolepis genistoides D. Don (Asteraceae) (*Cg*) or "palo azul" is an Argentinean endemic shrub used in folk medicine as a diuretic. The aim of this work was to evaluate *in vitro* the antibacterial activity of methanol extract (ME), hexane (HSE) and dichloromethane (DSE) subextracts and the total alkaloids fraction (AF) of *Cg* against strains of *Staphylococcus aureus* (*St.a.*) ATCC 25922 and 27835 and a clinical isolate. Air-dried and powdered stem bark was extracted exhaustively with MeOH (1litre) using a Soxhlet apparatus for 24 hours. The ME was divided into two fractions (ME1 and ME2). From ME1 we obtained HSE and DSE. From ME2 we obtained the total alkaloids fraction (AF). Antimicrobial activity tests were performed by the mh agar diffusion method and microdilution plate to determine the minimum inhibitory concentration (MIC). The tests were performed in duplicate. MIC values expressed in mg/ml for *St.a.* ATCC 25922 and 27835 and clinical isolate respectively were: AF: 2.5, 1.25, 0.312, DSE: 1.25, 0.156, 0.312. All extracts and AF were active against all strains tested. DSE and AF were the most active ones. The study of DSE and AF continues in order to determine the metabolites responsible for the antibacterial activity evaluated.

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ANTIFUNGAL ACTIVITY OF *Rapahnus sativus* ETHANOLIC EXTRACT AGAINST *Candida albicans*

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Fungal infections by opportunistic yeasts such as *Candida spp.* in immunocompromised patients have increased during the last decade. Available antifungal drugs possess high toxicity, fungistatic action or high costs. *Rapahnus sativus* L ethanolic extract (RSE) has been described to possess antifungal activities against phytopathogenic fungi, which led us to investigate if this extract could exert antifungal activity against human opportunistic pathogenic yeasts such as *Candida albicans*. RSE was assayed alone, between 62.5-500 µg of extracted material (EM).well⁻¹ and combined with fluconazole (FLU) (1 µg.plate⁻¹) to assess its anti-yeast activity against *C. albicans* (ATCC 10231) by agar well diffusion assays. The results showed that RSE exerted inhibitory effects on *C. albicans* growth, even in the absence of FLU, at quantities ranging from 500-125 µg EM, which led us to conclude that RSE contains anti-yeast compounds. These findings provide the basis to continue the study of RSE as a source of natural antifungal agents in order to identify and elucidate the chemical structure of the responsible compounds.

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IMPACT OF AZOXYSTROBIN ON THE *Fusarium graminearum* COMPLEX UNDER DIFFERENT ENVIRONMENTAL CONDITIONS

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Phylogenetic species of the *Fusarium graminearum* complex (Fg complex) generate wheat and maize ear rotting and contaminate the grains with trichothecenes. The species *F. meridionale* (Fm) and *F. boothii* (Fb) are present in maize of the northwest while *F. graminearum sensu stricto* (Fgss) is found in wheat in the center of Argentina. The aim of this work was to evaluate the impact of azoxystrobin on the growth and sporulation of the Fg complex under different environmental conditions. Fb and Fm strains isolated from maize of Tucumán and Fgss from Buenos Aires were grown on agar medium + 2% milled maize supplemented with azoxystrobin (0.5, 15 and 25 µg/ml), with water activity (aw) at 0.99, 0.97 and 0.95, and temperatures of 25 and 10°C. Mycelial growth rates were determined and macroconidia suspensions were obtained. Maximum growth was observed at 25 °C and at the highest concentration of azoxystrobin tested. Fb and Fgss sporulated at 25 °C, obtaining the highest density of spores for Fgss and Fb at aw = 0.95. Fm did not sporulate in any condition. Phylogenetic species differentially responded to azoxystrobin, and the response was dependant on the environmental conditions tested.

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