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(Asociación de Biología de Tucumán)

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LECTURES

A1

“Miguel Lillo” Lecture

WILL PLANTING TREES SAVE US FROM OURSELVES? EXPLORING THE IMPACT OF EXOTIC PINE AFFORESTATION IN PATAGONIA, ARGENTINA

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Land-use change, including the conversion of natural ecosystems to produce tangible products such as food or wood, is one of the most prominent manifestations of global change in terrestrial ecosystems. In particular, the planting of tree species in previously non-forested ecosystems to achieve rapid growth and potential carbon sequestration has become an attractive option proposed for long-term carbon (C) storage and climate change mitigation. Nevertheless, there are many open questions regarding how ecosystem processes are modified as a function of this land-use change. We took advantage of an unplanned natural experiment involving a 40-year-old forestation project, where a single conifer species (*Pinus ponderosa*), was planted regionally in Patagonia, Argentina, replacing natural ecosystems ranging from semi-arid steppe to broadleaf forest along with a broad range of precipitation (250–2200 mm mean annual precipitation [MAP]). We evaluated the effects of this change in dominant vegetation on ecosystem C and nitrogen cycling, net primary production (NPP) and decomposition, and modification of the soil fauna. Comparing C fluxes and stocks in paired natural and afforested sites demonstrated that aboveground net primary production (ANPP) was consistently greater in afforested along the gradient, while litter decomposition markedly decreased, resulting in the accumulation of organic carbon in detritus and aboveground woody biomass. Our results suggest that a change in the species composition of the dominant vegetation was sufficient to modify the major drivers of C and N cycling in these sites independently of climate constraints. Alterations of ecosystem processes due to afforestation significantly diminished the climate footprint along this broad precipitation gradient. The implications for ecosystem C cycling suggest that inhibition of C turnover from reduced photodegradation and recalcitrant leaf litter are key variables contributing to the observed patterns of C accumulation. Given the vulnerable nature of the C stocks, however, these changes may not contribute to long-term C sequestration in these ecosystems.

OPENING LECTURE

A2

MEDICINAL CANNABIS: Challenges of an alternative pharmacotherapeutic

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Medical use of cannabis dates back to the 3rd millennium BC, however, in the 21st century its use for therapeutic purposes is in a very controversial situation, due to low interest that traditional medicine gives it and an increasingly significant amount of people who make use of it by self-medication, especially in pathologies in which allopathic medicine has been inefficient. In most cases, cannabis preparations are of unknown quality and composition, making difficult the reproducibility of sought results. Cannabis contains more than four hundred different chemical compounds, including at least more than 100 cannabinoids. The predominant psychoactive chemical compound is delta-9-tetrahydrocannabinol (THC). Apart from THC, the best known and most studied compounds are cannabidiol (CBD) and cannabinal (CBN). The last two compounds have effects that are different from the effects of THC and also act on the nervous system. A cannabis plant produces other active constituents, such as terpenes and flavonoids, and these compounds seem to play an important role in cannabis preparations. Phytocannabinoids selectively act in the Endocannabinoid System (SEC). SEC is a complex system, and it is made up of specific cannabinoid receptors, their endogenous ligands (endocannabinoids), and their enzymatic synthesis and degradation systems. It is an intracellular communication system involved in the regulation and maintenance of cellular homeostasis, with modulating functions of central and peripheral processes. Worldwide cannabis prohibition was established in 1961 by the Single Convention on Narcotic Drugs of the UN; it is in lists I and IV, which are reserved for most dangerous drugs, with little medical value. Cannabis was introduced in these sections despite the absence of a WHO study confirming its low medical value. However, experts from the National Academy of Science, Engineering and Medicine of USA have recently conducted an exhaustive review of medical literature regarding the health effects of cannabis. The report concluded that there is conclusive or substantial evidence that cannabis is effective in treating chronic pain in adults; as an antiemetic in chemotherapy-induced nausea and vomiting treatment; to improve spasticity symptoms reported by patients with Multiple Sclerosis. In addition, the International Association for cannabis as medicine, the Department of Health of Canada, the Ministry of Health of the Netherlands and the Spanish Cannabinoid Research Society, have joined to prepare a list of pathologies that can be treated

with cannabis such as Alzheimer, asthma, cancer, diabetes, fibromyalgia, HIV/AIDS epilepsy, among others. At its annual meeting in 2020, the Commission on Narcotic Drugs (CND) of the UN plans to address the modification of cannabis status.

PANEL: “CONTAMINATED ENVIRONMENTS. REMEDIATION STRATEGIES”

A3

URBAN SOLID WASTE REMEDIATION STRATEGY (USWS) - TAFÍ VIEJO’S CASE

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The Remediation Technology (operations that alter the composition of waste and pollutants) applied to Urban Solid Waste (USW) is relatively new and originates from the exponential urban growth of the last 60 years and to the greater percentage of technological products (basically plastic) replacing biodegradable products. This increased amount of waste has resulted in the proliferation of open-sky dumps that constitute an "Environmental Liability", which is transferred to future generations, because of restrictions on the use of this degraded land. The solution to this problem is an adequate Integral Management of Urban Solid Waste and avoiding open sky dumps that not only cause soil, water, and air pollution but are also unhealthy spots for the proliferation of pests and vectors that transmit infectious diseases. The municipalities are legally responsible for the planning, implementation, and control of the Integral Management of the USWs; the current management in the municipality of Tafí Viejo, Tucumán, made the political decision in 2016 to carry out a USWIM program in order to identify the environmental problems in the community with the concept of a circular economy. This USWRS Program is conducted in two phases. In the first one, 3 objectives were fulfilled: (1) Promotion of participatory processes with citizens; Systematic environmental education of students and neighbors with environmental promoters of the management of Ecology and Environment in schools and house-to-house visits in the municipality; Eco-redeems; participation in public events and the creation of Green Points. (2) The application of the resources demanded by the collection of USWs has been rationalized through differentiation from the source of the waste by the neighbors, establishing collection days for wet (organic) and dry (inorganic) waste. (3) An Environmental and Technological Interpretation Centre (CIAT) has been created; the dry USW Separation, Classification and Valuation Plant was put into operation there and inaugurated on March 15th of 2018; this Center and the Green Classroom have allowed continuing with the formation of values aimed at improving environmental quality and generate genuine job opportunities in the municipality. The second phase will consist of the treatment of wet (organic) USWs from the production of compost and power generation through biodigesters. The participation of professional biologists in the operation and research of the processes linked to the CIAT is of paramount importance to develop the projects that are carried out there. Thus, a program of interns was started through an agreement with the Faculty of Natural Sciences at the National University of Tucumán (UNT).

A4

BIODEGRADATION OF PLASTIC RESIDUES OF TUCUMÁN: A NOVEL ALTERNATIVE

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The excessive accumulation of residues generated by human consumption is an evident fact. There are five islands of permanent garbage floating in the oceans that are estimated to cover 250,000 tons in the surface area and more in sea depth. These results from the consumption of millions of people, which especially accelerated in the last 50 years. This process and patterns will worsen by 2025, with an estimated 8,000 million people inhabiting the planet. Within the continents, especially in underdeveloped countries, this panorama of consumption added to the mismanagement of residues results in garbage dumps in permanent formation and expansion. Tucumán does not escape this problem; on average, 2000 tons per day of urban solid garbage are produced, of which at least 600 tons correspond to plastic residues. Currently, we have already detected and isolated some moth larvae that ingest plastics in Tucumán. The objectives of our study are (1) to identify the species of moths (Lepidoptera) capable of consuming plastic; (2) to describe the complexes of bacteria and enzymes associated with the degradation of the plastic; and (3) to develop a method of efficient degradation of plastic.

A5

BIOREMEDIATION: SUSTAINABLE PROCESSES FOR THE RESTORATION OF CONTAMINATED ENVIRONMENTS

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Actinobacteria are microorganisms with the greatest potential to carry out bioremediation processes. Previously, the ability of actinobacteria to restore soils contaminated with Cr (VI) and lindane was demonstrated, and it was inferred that the amount of biomass necessary for field-scale treatment is 40 kg/ha of contaminated soil. Taking into account the importance of the cost/benefit ratio to ensure the sustainability of the process, the development of microbial biomass production systems from low-cost raw materials is imperative. Biodiesel is a clean, renewable, quality, and economically viable source of energy, which also contributes to the conservation of the environment, so it represents an alternative to fossil fuels. Crude glycerol is the main by-product of biodiesel production. Glycerol has numerous applications; however, its production is exceeding its demand, for every kilogram of biodiesel produced, 100 g of glycerol are produced. On the other hand, Tucumán province is the main sugarcane producer in the country, and its sugar industries are combined with ethanol distilleries. The main problem of these industries is the generation of large volumes of vinasse, which are released into the environment in different bodies of water, causing an undesirable impact. Actinobacteria can use a wide variety of carbon sources for their development. Therefore, the sustainable production of actinobacteria for use in bioremediation is being studied using crude glycerol or vinasse as sources of carbon and energy. This approach promises a great impact, both socio-economic and environmental since it will contribute to the sustainability of both biotechnological processes (production of biodiesel/bioethanol and microbial biomass) and will contribute to the restoration and preservation of environmental heritage.

SYMPOSIUM: “BIOLOGY OF ANIMAL BEHAVIOR”

A6

PRIMARY ADAPTATIONS IN THE EVOLUTION OF TETRAPOD COGNITION: SPATIAL ORIENTATION AND NAVIGATION IN AMPHIBIANS

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In the evolution of learning and memory mechanisms, the study of spatial orientation and navigation is a relevant topic in behavioral biology. This fact takes place because every animal must know how to move in the environment, from their shelters to the different sources of resources. Thus, many works have been developed in various vertebrate species (from fish to humans), exploring the phenomena involved in the selection of relevant stimuli to orient themselves in an environment, as well as the neural mechanisms of spatial cognition. In this sense, the use of a vertebrate model such as amphibians for the comparative study of spatial learning is highlighted, showing the advantages of its simple brain organization to allow the analysis of the basic circuits that underlie this behavior. Specifically, using a brain-behavior approach, different factors that modulate spatial cognition in amphibians will be shown and how these primary adaptations are conserved in the evolution of tetrapod cognition.

A7

SEXUAL BEHAVIOR: ARACHNIDS AS A STUDY MODEL

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Sexual selection is a key concept of evolutionary theory to explain the development of secondary sexual characters that do not respond to natural selection. Sexual selection postulates that certain features are the result of competition between individuals of the same sex for access to intercourse and the choice of the other sex, usually females. The study of sexual selection not only involves processes prior to copulation (male–male competition and female choice), but also processes that act during and after it such as *sperm competition*

(competition between the ejaculate of two or more males copulating with a female and influencing the behavioral, physiological and anatomical characteristics of the males leading to an increase in the success of fertilization), and *female cryptic choice* (the one that generates differences in the success of fertilization between males with different characteristics mediated by the females). Thus, sperm competition extends competition between males, and cryptic female choice extends the choice of females beyond the beginning of copulation. Pholcidae family spiders are a good model for studying copulatory and post-copulatory sexual selection processes. Females copulate with several males during the reproductive season and males perform different movement patterns with their sperm transfer organs (palps) during copulations; these are very different among species and are associated with different functions related to sperm competition and cryptic female choice. In this sense, some of our work has focused on evaluating behaviors related to the duration of copulation, copulatory and post-copulatory behaviors, the success of sperm transfer and sperm removal, female stimulation, pre- and post-copulatory care, paternity, consistency of behavior in sexual interactions, estimation of sperm viability, among others –all variables associated with the differential success in fertilization of the different males that copulate with a female. Finally, several species of the family live in synanthropic habitat, facilitating their capture and breeding in the laboratory, which allows them to have a large number of specimens when performing various experiments and to be able to ask questions related to the evolutionary processes that have influenced reproductive biology in this family.

A8

ANIMAL BEHAVIOUR: A TOOL FOR CONSERVATION

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Since ancient times there are records of the link between animals and humans, due to various reasons (source of food and shelter, to track and hunt prey, for companionship and/or for home guardian, as herd keeper, as sports goal, as a means of transport, as messengers and more recently as a model to experiment with new medication). This close relationship has helped humans to study animal behavior in detail, but they were isolates knowledge or anecdotes. It was not until the twentieth century that this knowledge was included in a scientific framework. That is how Ethology arose as the science that studies the behavior of animals in their natural environment. According to ethologists, the habitat of an animal has great importance; not just the ecology of its physical surroundings, but also the animal's social interactions with its own and with other species, the sensory world in which the animal lives (*umwelt*), and the different environments in which the animal has evolved. Animal Behaviour is a relatively new science and has developed rather slowly in Argentina. However, through its recent development, especially in Behavioural Ecology, it has offered numerous options for research on fauna. The study of animal behavior has made and is currently making important contributions to other disciplines applied to the study of human behavior, neurosciences, environment and resource management, to the study of animal welfare, and to the education of future generations of scientists. Within the framework of the XXXVI Scientific Conference, I present a summary of past and ongoing studies carried out by our Institute on species of lizards of the *Liolaemus* genus in relation to various topics such as territoriality and mate choice, parasitism and behavior, use of microhabitat, thermal ecophysiology, the function of coloration in males and its relationship to intra and intersexual communication, among others. In addition to their intrinsic value, these studies provide valuable information that can be used in the development of management strategies and conservation of animal species.

A9

HUMAN ANIMAL INTERACTION: BOND'S BASES AND MECHANISMS

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Human beings, as a social species, have evolved in relation to nature and especially toward pets, with apparent consequences for both. These relationships include emotional, psychological, and physical interactions among people, animals, and the environment. Knowing the bases and mechanisms of the human–animal bond (HAB) facilitates the understanding of interactions' impact on the well-being of both. In this way, attachment is an important factor, and the oxytocinergic system is the main mechanism involved in setting up of bond. Also, oxytocin has implications in social memory, in sexual and maternal behavior, in reducing stress and anxiety, and in increasing confidence. After eye contact, the hormone is released, particularly during pleasant tactile interactions, in which there is also a decrease in the stress levels of both. After positive interactions, an increase in β -endorphin, prolactin, β -phenylethylamine, and dopamine in both species is observed. The rise of dopamine plasma concentrations in humans and dogs, suggests that they perceive pleasant sensations during the interaction. Recent research reports positive effects on the immune system, with a significant increase in salivary immunoglobulin A in people after petting a dog. Contributions from genetics suggest that oxytocin receptor gene polymorphisms have an impact on the search for proximity to an unknown person or its owner, and how dogs behave friendly with strangers. Functional neuroimaging techniques (PET) could be a useful tool to examine the underlying neuronal mechanisms of wellbeing associated with HAB, which is shown in regional brain

responses. Lower stress response was found in people in the presence of their companion animal, correlated with the deactivation of some cortical and para-limbic brain regions. In short, the relationship between humans and animals is dynamic and mutually beneficial, being influenced by the behaviors of both. This bond includes emotional, psychological, and physical interactions between people, animals, and the environment, which can be explained through the study of the biological bases and mechanisms involved at different levels.

ORAL COMMUNICATIONS

A10

PARASITOIDS OF *Spodoptera frugiperda* SMITH LIVING IN A COUNTRY PRODUCTIVE SYSTEM WITH TWO CORN VARIETIES IN TWO SEEDING SYSTEMS, IN SANTIAGO DEL ESTERO, ARGENTINA.

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In Santiago del Estero, the “fence” is a traditional production system that associates several crops, and the most used association is corn-crookneck pumpkin. Several studies have shown that the “fall armyworm” *Spodoptera frugiperda* is one of the most harmful insect pests for this polyculture. The objective of this work was to identify the parasitoid species that affect the larvae of *S. frugiperda* in two varieties of corn in two sowing systems. The association between the crookneck pumpkin, *Cucurbita moschata* (Duchesne ex Lam.), and two types of corn was evaluated. The trials were performed in two towns; 1) EEA Francisco Cantos INTA La Abrita, Silipica Department, and 2) In a Field in Vaca Huañuna, Figueroa Department; it was planted in the second half of January 2019; the treatments evaluated were: monoculture Leales25 (T1); Polyculture Leales 25-crookneck pumpkin (T2); monoculture Criollo (T3); Polyculture Criollo-crookneck pumpkin (T4). We worked on a randomized blocks design with 5 blocks. A weekly sampling was carried out with random extraction of plants in one meter of a furrow; each plant was checked, and the living larvae were collected, which were placed in containers with an artificial diet. In the laboratory, they were monitored until the emergence of the parasitoid. The presence of three parasitoid species in the EEA F Cantos was recorded: *Chelonus insularis* (Cresson) (Hymenoptera: Braconidae), *Campoletis grioti* (Blanchard) (Hymenoptera: Ichneumonidae), and *Archytas marmoratus* (Townsend) (Diptera: Tachinidae). Also, in Vaca Huañuna, the same species were registered plus a species of Hymenoptera: Braconidae Microgastrinae.

A11

CHANGES IN *Rhinella arenarum* OVARIAN FUNCTIONALITY UNDER REGIONAL CLIMATIC VARIABLES

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Amphibians have variable reproductive methods that are subject to environmental conditions. *Rhinella arenarum* presents a seasonal ovarian cycle and its reproductive period is triggered by the increase in photoperiod brightness, temperature, and rainfall. Changing these climatic variables can affect its reproductive life. This paper analyzes the influence of regional climatic variables on *R. arenarum* ovarian functionality. The competence of oocytes to mature *in vitro* and their lysis, in saline solution and due to progesterone effect, were analyzed in *R. arenarum* adult females during three time periods: 1993–1994, 2004–2005, and 2017–2018. Experimental data was related to EEAOC (Estación Experimental Agroindustrial Obispo Colombes) climate variable records: temperature, humidity, rainfall, radiation, and heliophany occurring in the region in identical periods. The statistical analysis showed a significant decrease in the ovarian functionality of *R. arenarum*, which is expressed by the decrease in oocyte maturation (from 91% to 72%) and the increase in lysis (from 8% to 25%). In the reproductive period (September–March), the specimens were exposed to a luminosity of 14 h/day, but the effective heliophany was 7 h/day. In the experimental periods, rainfall fell below the expected value curve. However, in the 2017–2018 period, there was an increase in temperatures, humidity, and radiation, matching with the increase in lysis and the decrease in oocyte maturation. Changes observed in ovary functionality were accompanied by those of the climatic variables analyzed. Although there are numerous factors affecting the reproductive life of amphibians, we show the potential effect of regional climatic variables at an individual level in *R. arenarum*.

A12

INTRASEXUAL SIGNALS IN LIZARDS: DOES SIZE MATTER?

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Animals use a diverse array of signals to communicate aspects of their health, social or reproductive status; particularly visual signals are used in intersexual (e.g., courtship) and intrasexual (e.g., territoriality) contexts. Among reptiles, most lizards communicate through visual signals, involving coloration patterns, temporal displays, and posturing. In many iguanids, the use of push-up or headbob displays are common and conspicuous during agonistic encounters. Such displays are “honest” signals that provide reliable information about the sender. Also, individuals can enhance the information by using modifiers –inflation of gular region, back arching and lateral body compression. In this study, we describe and analyze the visual displays during visual encounters between different-sized males of *Liolaemus scapularis*. The encounters were video-recorded under lab conditions in the Instituto de Comportamiento Animal-FML. Preliminary results showed differences in the number and type of displays between *L. scapularis* males. Smaller males showed more variety and frequency of aggressive signals –headbob, push-up and body compression– than the bigger ones, and submission posture as well. The findings were correlated with spectral variables, obtained in previous studies for the same species. A positive relationship between behavior and UV and blue reflectance was observed, as well as a negative relationship with morphological features, and with yellow and red reflectance. Results are discussed in the context of intrasexual competence.

A13

FIRST STUDY ON THE IMPORTANCE OF THE CAMELIDAE RESOURCE DURING PREHISPANIC TIMES IN THE LOW LANDS OF THE PROVINCE OF TUCUMÁN (ARGENTINA)

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In archaeological antecedents of the piedmont of Tucumán, skeletal remains of camelids were reported, and the exploitation of these animals in the pre-Hispanic past was suggested, although until now there are no systematic studies on this subject. This contribution aims to address the role and importance of the Camelidae resource in the life of the populations that inhabited this area during pre-colonial times. To this end, anatomical, taxonomic, taphonomic, and morphometric analyzes were performed on archaeofaunal samples from sites with different chronologies: Yago (300–700 AD) and Yanimas 1 (750–1250 AD). The results indicate a predominance of Camelidae and Cervidae over the other determined taxa. Among the skeletal remains of camelids, specimens of *Lama glama* and *Lama guanicoe* were recognized. Likewise, individuals with different age ranges were identified, from infants to adults. Several of these remains have cut marks, intentional fractures, and different degrees of thermal alteration. It is proposed that during the first millennium of the Era and the beginning of the second, camelids, among other artiodactyls, were integrated into the subsistence economic strategies of human pedemontan groups and constituted an important contribution to their diets. The exploitation of *L. guanicoe* would have occurred through hunting or its handling in semi-woodland. In the case of *L. glama*, in addition to its processing and consumption, it would have been used for other uses in the domestic and/or symbolic sphere (formatted instruments, bezoars). It is also suggested that the presence of juveniles in the samples indicates the *in situ* management of herds.

A14

SYRPHIDS OF THE APHID COMPLEX PRESENT IN THE ALFALFA CROPS (*Medicago sativa* L.)

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Alfalfa (*Medicago sativa* L.) is one of the most relevant fodder species within the agricultural-livestock systems. It forms a microclimate where species of insects and mites proliferate; the aphids are the plague of greater incidence. Among the natural enemies that control them are predators, parasites, and entomopathogens. Among predators, syrphids play a distinguished role in the regulation of aphids. At the adult stage, they are floricultural, and at the larval stage, they have great voracity for their prey, extracting the soft and easily assimilable body content. The objective of the present work was to identify the species of syrphids present in the alfalfa crops on the aphid complex. Sampling was carried out in a cattle establishment in the dairy basin in Trancas, using the trawl and collection network of plant material method with aphid colonies and immature states of syrphids. The adults of the latter species, obtained in a brood chamber or by direct catching, were taxonomically identified with the help of a stereoscopic microscope and using keys. The identified species from the order Diptera, family Syrphidae were *Allograpta obliqua* (Say), *Allograpta* sp. and *Platycheirus* sp. (identification in process). The knowledge

about the syrphids species in the alfalfa crops is scarce and, due to the appetite they present, its investigation is necessary as a complementary tool for efficient biological control.

A15

HISTOLOGICAL STUDY OF THE MIDGUT OF *Diatraea saccharalis* (LEPIDOPTERA: CRAMBIDAE) LARVAE TREATED WITH PIRROLIZIDINE ALKALOIDS OF *Senecio rudbeckiaefolius*

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Senecio genus species contain a large variety of secondary metabolites whose demonstrated toxicity against herbivorous insects and vertebrate is attributed to the production of pyrrolizidine alkaloids (PA). In previous work, we checked the lethal and sublethal effects of the alkaloidal fraction of a methanolic extract of *Senecio rudbeckiaefolius* on *Diatraea saccharalis* larvae, the main pest that affects the cultivation of sugarcane in Tucumán. In Lepidoptera, the midgut epithelial lining has been postulated as a likely target for the action of insecticides. The aim of this work was to histologically analyze the midgut of *D. saccharalis* larvae fed on an artificial diet added with PA of *S. rudbeckiaefolius*. To this purpose, force-feeding bioassays were performed with aqueous solutions of the PA fraction at 100 and 200 mg/L concentrations. Larvae were fixed in Bouin's fluid at 7-, 10- and 14-days post-inoculation and processed by histological technique for arthropods. Although it was found that the PA affect neither the integrity of the midgut epithelium nor the peritrophic membrane that covers it, the secretion of a thick extracellular matrix was observed in the anterior region of the midgut and a significant reduction of the fatty bodies. The inhibition of larval development observed in the surviving larvae suggests that the PA exert their action on the insect neuroendocrine system, interfering with the molting process.

A16

ISOLATION AND CHARACTERIZATION OF EXUDATE GUMS FROM *Prosopis nigra*

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In the last years, natural gums have emerged as an alternative for use as a food additive or encapsulating agent in the food industry. Gummy exudates are produced and secreted by plants after an assault to provide protection, sealing the cut and preventing dehydration. Numerous trees distributed in arid and semi-arid regions secrete these types of substances. Our objective is focused on the purification and characterization of gummy exudate from *Prosopis nigra* for its potential application in the food industry. Plant samples were collected in the indigenous community of Amaicha del Valle (Tucumán) during April 2017. Botanical identification was carried out based on the vegetative and reproductive structures, the histological study of the wood, and the morphological characterization of the exudate. The secreted polymer was purified (40% w/w gum exudate shield) and characterized by FTIR, showing the characteristic peaks of sugar polymers. The antioxidant activity was evidenced by the ABTS radical-cation method in aqueous and ethanol extracts showing an SC₅₀ of 67 and 40 µg/mL, respectively, as well as total phenolic content of 2.10 and 0.60 mg/g GAE. The emulsifying capacity was evaluated, as well as the stability of the formed emulsion against different oils and pH. After one week, 40–50 % of the initial volume of the emulsion was preserved, and those with fish oil retained 98% of the volume after heating. Thus, the purified polymer of the *P. nigra* exudate turns out to be a potential source for its use as an oil encapsulating agent for the food or pharmaceutical industry.

A17

ENVIRONMENTAL FACTORS INFLUENCING BIRTH WEIGHT OF CREOLE GOATS AND THEIR CROSSES WITH SAANEN GOATS IN THE PROVINCE OF TUCUMÁN

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With the objective of evaluating the factors that influence the birth weight of Creole kids and Creole–Saanen crosses, we worked with data from 933 kids born during the fall and spring between 2001 and 2006. Weights were taken within 24 h of birth. The data were analyzed with the statistical software R, using a mixed linear model, which included as fixed effects: year (Y), time of birth (T), sex of the offspring (S), type of birth (TB), and the interactions of the YxTB and SxT, and as random components of the model, individuals and error. The comparisons of means were made with Tukey's test. The influence of the year ($p < 0.001$), time of birth ($p < 0.001$), type of birth ($p < 0.001$), and sex of the offspring ($p < 0.001$) were observed. The interaction YxTB ($p < 0.05$) and SxY ($p < 0.01$) also affected the kids' birth weight. In relation to time, lower birth weights were observed in kids born in the fall compared to those born in spring (2.63 kg and 2.74 kg,

respectively). The single birth kids had weights higher than those of multiple births (2.89 kg vs. 2.59 kg). Males' birth weights were higher than those of females (2.84 kg vs. 2.50 kg). In all the years considered, males had birth weights greater than females, being the males born during 2001 the heaviest and the females born during 2002 the lightest. The males born in spring were the heaviest. It is concluded that all the environmental factors considered systematically affected the birth weight of the kids.

A18

ANTIFUNGAL ACTION OF *Wickerhamomyces anomala* - KILLER PHENOTYPE (Wa-FK) ON PATHOGENIC STRAINS OF *Candida*

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Yeasts with killer phenotypes have antifungal activity. This was proven in phytopathogenic strains by our group. However, there are few studies on their action in clinical isolates, which tend to have decreased sensitivity or resistance to current antifungals. The aim of this study was to evaluate the antifungal activity of WaFK on fungal isolates obtained from human clinical samples (NPCC, Neuquén, Argentina). WaFK was studied against 27 pathogenic *Candida* strains: *C. albicans* (10), *C. glabrata* (7), *C. parapsilopsis* (5), *C. tropicalis* (2), *C. lusitanae* (2) y *C. krusei* (1). The assays were performed using the YEPD-MB agar growth inhibition technique. Each suspension of 1x10⁶ cells/mL of the pathogenic microorganism was seeded on an agar plate, and then a cross-shaped stretch mark of WaFK was performed. It was incubated 48 h at 28 °C. The presence of inhibition halo of pathogen growth was considered as a positive sensitivity to killer toxins. The microorganisms studied were considered sensitive to the killer toxin when growth inhibition halo was observed. All the *Candida* isolates faced against WaFK showed sensitivity, and a halo of growth inhibition of the pathogenic strains was observed. The results obtained suggest that Wa-FK has a fungistatic effect rather than a fungicide one. Under the assay conditions, toxins produced by WaFK demonstrate antifungal activity. The subsequent identification and purification of these would potentially allow the development of a mycosis control agent in humans.

A19

EVALUATION OF THE BEHAVIOR OF ANTIOXIDANT ENZYMES AND PROINFLAMMATORY CYTOKINES IN ACUTE LEUKEMIA

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Different neoplasms show increased levels of reactive oxygen species leading to pro-inflammatory and oxidative stress (EOx) states. The aim of the present work was to study biomarkers involved in the antioxidant defenses and inflammation in acute leukemias (AL). For this purpose, 47 patients with AL and 36 control subjects (C) were studied at the Institute of Applied Biochemistry of the UNT (August 2016–December 2018). Gene expression of the transcription factor *nuclear erythroid factor 2-related factor 2* (Nrf2), antioxidant enzymes catalase (CAT) and superoxide dismutase (SOD), and cytokines TNF- α and IL-6 were evaluated by real-time PCR. At the serum level, the concentration of malondialdehyde (MDA) was determined as an indicator of oxidative damage and the activity of CAT. Of the total AL studied, 43% were of lymphoid origin, 38% myeloid, and 19% promyelocytic (LPA). MDA levels were similar in the groups analyzed. However, higher CAT activity was detected in the LPA ($p < 0.05$). AL group showed lower levels of SOD and IL-6 expression than the C group ($p < 0.05$), the expression of the remaining genes studied showed no change between groups. Our results show a different antioxidant behavior according to the origin of leukemia, which could be a consequence of the greater cellular detoxification required in the LPA, evidenced by higher cat activity in these patients. Although no greater activity in the Nrf2 factor pathway was detected, the lower expression of IL-6 and SOD would reflect a complex response to EOx in these neoplasms.

A20

NRF2 TRANSCRIPTION FACTOR: ITS ROLE AS A REGULATOR OF THE OXIDATIVE STATE IN BETA TALASEMIA MINOR

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Nrf-2 transcription factor plays a crucial role as one of the cellular defense systems, which activates its response to inflammation and oxidative stress. This study aimed to study the role of Nrf-2 as a modulator of the expression of genes involved in cytoprotection in patients with the beta-thalassemic trait (RBT). For this purpose, 26 individuals with RBT and 41 controls were analyzed at the Instituto de

Bioquímica Aplicada of UNT, during 2016 and 2018. Molecular characterization of RBT involved the detection of mutations: Cd39, IVSI-1, IVSI-110, and IVSI-6. Thiobarbituric acid reactive species were determined (TBARS), and superoxide dismutase activity (SOD), interleukin-6 concentration (IL6), and gene expression of the transcription factors *Forkhead Box O3 (FoxO3)* and *Nuclear Factor Erythroid 2- related factor (Nrf-2)* were evaluated. Cytoprotective enzymes, catalase (CAT), superoxide dismutase (SOD), peroxiredoxin-2 (Prx-2) and the proinflammatory cytokines IL-6 and tumor necrosis factor- α (TNF- α) were quantified by real-time PCR. The most frequent mutation was IVSI-110 in 30.8% (8/26) of the cases. At a systemic level, SOD activity and TBARS levels were significantly higher in RBT patients compared to the control group ($p < 0.05$). At the gene level, the RBT group showed significantly higher expression levels for Nrf-2, SOD, Prx-2, IL-6, and TNF- α regarding the control group ($p < 0.05$). The results obtained suggest that the transcription factor Nrf-2 would act as a modulator of inflammation and oxidative stress and would influence the clinical presentation of this hereditary anemia.

A21

SUBCLINICAL HYPOTHYROIDISM, HYPERCOAGULABILITY AND LEVOTIROXIN

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Subclinical Hypothyroidism (CAH) is associated with hypercoagulability. **Objectives.** To evaluate the effect of levothyroxine in these alterations. **Materials and methods.** Exploratory, descriptive, transversal design. 37 women (17 to 51 years old), during 2018–2019, were divided into three groups G1: Euthyroid (E, n = 19), G2: HSC (n = 10) and G3: Patients w/Levothyroxine (PT, n = 8). BMI was determined. TSH, T4L, lipids (mg/dL): Total cholesterol (CT), LDL cholesterol (LDLc), HDL cholesterol (HDLc), and triglycerides (TG). Platelet count (PC), average platelet volume (VPM), platelet distribution amplitude (PDW), activated partial thromboplastin time (APTT), prothrombin time (PT), fibrinogen and platelet aggregation (adrenaline 50 μ M and 25 μ M). Kruskal-Wallis variance analysis, 5% Conover post-test. **Results.** Age $p = 0.19$: 28 ± 8 (G1); 36 ± 14 (G2); 34 ± 10 (G3). BMI (K/m²) $p = 0.90$: 26 ± 5 (G1); 26 ± 5 (G2); 25 ± 5 (G3). TSH (μ U/mL) $p < 0.001$: 2.4 ± 0.8 (G1); 5.9 ± 2.8 (G2); 1.3 ± 1.1 (G3). T4L: normal values. CT: $p = 0.12$: 179 ± 34 (G1), 213 ± 50 (G2); 191 ± 31 (G3). HDLc $p = 0.36$. LDL $p = 0.75$: 112 ± 36 (G1), 122 ± 44 (G2), 115 ± 30 (G3). TG $p = 0.62$: 91 ± 34 (G1), 125 ± 67 (G2), 95 ± 30 (G3). TP% $p = 0.43$: 80 ± 12 (G1), 85 ± 9 (G2), 80 ± 8 (G3), APTT (s) $p = 0.026$: 46 ± 5 (G1), 41 ± 5 (G2), 47 ± 3 (G3). Fibrinogen $p = 0.21$. VPM (fL) $p = 0.017$: 9 ± 1 (G1), 10 ± 1 (G2), 8 ± 1 (G3). CBC (fL) $p = 0.02$: 11 ± 2 (G1), 12 ± 2 (G2), 10 ± 1 (G3), PDW correlated sig. with TSH (G1: 0.96, G2 :0.70, G3:0.98). Platelet aggregation ($p = 0.66$). **Conclusions.** CAH patients presented a significantly higher VPM and PDW compared to E and PT. PDW correlated positively with TSH levels. These platelet changes favor, together with higher lipid concentrations, a prothrombotic state, observing a correction in levothyroxine treatment.

POSTER PRESENTATIONS

A22

PRELIMINARY STUDY OF A GELATINE STRUCTURAL GLICOPROTEIN (*Rhinella arenarum*) IN EFFLUENTES OF THE SALI RIVER BASIN

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The Oviductal Pars Convoluta (PC) *Rhinella arenarum* secretes all the components that make up the oocyte gelatin. Among them, 300 kDa glycoprotein (gp300) is a structural molecule of this matrix in the aqueous external medium of fertilization. The objectives were: (a) to isolate and identify bacteria in different water samples (WS), the beds of which end up in the Colorado River (Tucumán): WS1 (provides the Trash), WS2 (industrial effluent coming out of the Trash), WS3 (effluent coming out of the San Miguel Citrus), and WS4 (effluents that come from the Trash and Arcor-Misky by the Calimayo stream); and (b) to preliminarily determine whether gp300 exhibits inhibitory activity on isolated bacterial species. In ovariectomized females and treated with 17 β -estradiol (E2), the secretion of gp300 was obtained from PC. Bacteria isolated from the different WS were identified by biochemical properties, and the antibacterial activity of gp300 was determined qualitatively by well diffusion and agar dilution according to CLSI (Clinical and Laboratory Standard Institute). From WS1 was isolated: *Escherichia coli*, *Citrobacter koserii* and *Pseudomonas putida*; from WS2: *Klebsiella pneumoniae*, *Citrobacter freundii* and *P. putida*; from WS3: *K. pneumoniae*, *Morganella morganii*, *C. freundii* and *Pseudomonas moselli* and from WS4: *E. coli*, *Enterobacter cloacae*, *P. putida*, and *C. freundii*. Induction with E2 promotes the secretion of gp300 in the PC, allowing it to be isolated from the rest of the gelatin molecules. It did not exhibit antibacterial activity in preliminary trials carried out.

A23

PROTHROMBOTIC STATE ASSOCIATED WITH OLANZAPINE TREATMENT IN RABBITS

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Olanzapine (O) is an atypical or second-generation antipsychotic used in the treatment of psychiatric diseases. It is known to produce metabolic disorders such as Metabolic Syndrome (MS); however, the prothrombotic state, typical of MS, has not been studied. This work aimed to evaluate the metabolic alterations and the prothrombotic variables in rabbits treated with O. Male rabbits were administered with the vehicle (control group, CG) for five weeks or treated with 3 mg/kg weight O (OG group). Body weight, visceral fat, lipidogram, creatinine, transaminases, and glucose tolerance were evaluated. From platelet-rich plasma (PRP), the morphology of platelets and the fibrin network were studied by scanning electron microscopy. The activated partial thromboplastin time (APTT) and recalcification and concentration of fibrinogen were measured. There were no changes in lipidogram, transaminases, and visceral fat. Body weight and creatinine levels increased, and induced glucose intolerance. The platelets of the CG were spherical with few pseudopods, while the OG presented numerous pseudopods and extensions indicating activation. The fibrin network of the CG consisted of fine and thick fibers with an organized arrangement, while in the OG there was a predominance of fine fibers ($p < 0.05$), forming a less tense fibrin network. Therefore, the treatment with O altered glucose metabolism, renal function, and produced a prothrombotic state with premature activation of platelets and the formation of an altered fibrin network.

A24

RELATION BETWEEN SOLAR RADIATION VARIABLES AND PSYCHOMETRIC STATES IN THE DWELLERS OF THE PUNA JUJEÑA ASSOCIATED WITH CHRONOBIOLOGICAL STUDIES

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Jujuy province has distinguished physical environments. In this sense, the Puna Altiplano occupies two-thirds of the provincial area, that due to its hostile environment, results in low population density being less studied, which arouses interest. This work aims to suggest the relation that exists among light, environment, and psychometric welfare in inhabitants of the Puna Jujeña. For this, geographic-climatic and environmental variables were analyzed (natural lighting-photoperiod, heliophany and intensity, georeferencing and seasonal period, among others), to be contrasted with welfare data through WHOQOL-BREF (W-B) quality of life questionnaires, hypothesizing that ambient lighting influences people's behavior and well-being. Thirty-three individuals with a neutral chronotype (vespertine-matutine test), aged from 20 to 50 years, were studied. The W-B instrument was used in all four seasons of the year, producing a profile with four scored items (physical and psychological health, social and environmental relations) and two individual items about the perception of personal quality of life and health. The results of the W-B questionnaire showed psychometric resolving power differentiating opposite seasons of the year. The statistical analysis (variance, Tukey test, correlation coefficients) showed that there were no significant differences for the variables analyzed between spring–summer and between autumn–winter, coinciding with the measured values of photoperiod and maximum intensity of light. The trend indicates that the values of all the studied variables descend towards the winter solstice, and rise towards the summer solstice, adjusting to the expected chronobiological models, showing altitudinal accentuation.

A25

ACROSOME REACTION IN SPERM OF *Leptodactylus chaquensis*: EFFECT OF IONOPHORE A23187 AND BLOCKERS OF CALCIUM CHANNELS

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In marine mammals and invertebrates studied, calcium (Ca^{2+}) is involved in physiological processes such as acrosome reaction (AR). In this regard, little is known about amphibians. The aim of this work was to study the effect of the Ca^{2+} ionophore on the AR in *L. chaquensis* sperm and the presence of dependent Ca^{2+} voltage channels (type L and T) in them. The gametes obtained by testicular dilaceration were incubated in Ringer 10% (R10%) with: ionophore A23187 (1, 5, 10 μM) and blockers of L and T channels: verapamil (0.009, 0.01, 0.03, 0.06 mM) and lanthanum (0.2, 0.5, 0.8, 1.2, 1.5 mM) and amiloride (0.3, 0.5, 0.6, 1 mM), respectively. In all cases, Ca^{2+} 2mM was added as an AR inducer to the medium with blockers. As control, gametes were incubated with: Mother Ringer, R10% or R10% + 2 mM Ca^{2+} . The gamete count in different phases of the AR (F1–F5) was performed at different times for 60 min. The ionophore A23187 at doses of 1 and 5 μM exerted an inducing effect of AR in a dose and time-dependent manner, while with 10 μM the gametes finished the AR at 10 min exposure. Only with the 1 mM concentration of amiloride, 76% of the gametes remained unreacted (F1). With all doses of lanthanum, more than 50% of sperm were observed in F1. In the presence of 0.03 mM verapamil, there were no significant differences in F1, compared to controls. These preliminary results suggest that: the Ca^{2+} ionophore exerts an inducing effect of AR. The high percentages of sperm

arrested in F1 incubated with Ca^{2+} and pharmacological blockers of Ca^{2+} channels would suggest the presence of channels showing differential sensitivity for the three drugs used.

A26

ASSOCIATION BETWEEN THE INCREASE OF BONE MARROW FAT AND BONE MICROARCHITECTURE OF MANDIBULAR CONDILAR PROCESS. A PRELIMINARY STUDY

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In previous work we had shown that the increase in fat in the bone marrow of the mandibular condyle, expressed as (1) number of adipocytes/mm² and (2) percentage of adipocytes/ tissue volume, is accompanied by reduction of (3) bone volume, (4) trabecular thickness and (5) trabecular number and significant increase of the variable (6) trabecular separation. In this context, the aim of this work was to determine the type of relationship between variables (1) and (2) related to variables (3), (4), (5) and (6). To archive this, we determine the linear correlation coefficient (r), which is a numerical measure that allows us to establish the degree of linear association between two quantitative variables. The results indicated by the correlation coefficient obtained that both the number of adipocytes/mm² and the percentage of adipocytes by tissue volume are directly associated with the trabecular thickness (r = 0.74 and 0.81 respectively) these values of (r) indicate a strong association between these variables. On the other hand, both the number of adipocytes/mm² and the percentage of adipocytes per tissue volume are inversely associated with the number of trabeculae (r = -0.61 and -0.62, respectively); these values of (r) indicate a strong association between these variables. These results suggest that the increase in bone marrow fat negatively influences the bone microarchitecture of the mandibular condyle since although it causes an increase in the trabecular thickness of the bone, these are very scarce. *Subsidized by CIUNT.*

A27

EVALUATION OF HEMATOLOGICAL PARAMETERS IN CASES OF PYOMETRA AND BREAST TUMORS IN CANINE PATIENTS OF THE VETERINARY HOSPITAL OF THE NATIONAL UNIVERSITY OF TUCUMÁN

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Pyometra and breast tumors are the most frequent pathology in adult female dogs. Both are directly related to neutering and with a leukogram that indicates acute inflammation. The aim of this work was to evaluate hematological parameters such as the leukogram, erythrogram, and total protein dosage in patients that developed these diseases. Regarding the methodology, we performed hemograms and total protein dosage with refractometry in female adult dogs diagnosed with pyometra and breast tumors, that were treated at the Veterinary Hospital of the National University of Tucumán, during 2018 and the first half of 2019. The results show that both clinical conditions present leukocytosis, the presence of immature forms of neutrophils, and the nuclear derivation index, as indicators of "left derivation". The hematocrit and total protein values did not show significant variations with respect to the reference values. Although it is well known that neutrophilia and left shift are clinically important biochemical indicators of inflammatory diseases, our results suggest that these alterations are more variable yet more extreme in pyometra, while in breast tumors, they are more moderate and oscillate in a shorter range. It is worth to highlight the importance of informing and fostering the spaying of female dog pets, in order to prevent the development of these diseases.

A28

CATECHOLAMINES OF NEURAL ORIGIN IN *Leptodactylus chaquensis* OVARY

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Previous works from our laboratory showed that catecholamines are involved in endocrine and gametogenic functions of the amphibian ovary. Based on this background, the objective of this work was to determine the sources of catecholamines of nervous origin in ovaries of *Leptodactylus chaquensis*. For this, gonad samples were fixed and processed following routine techniques for immunohistochemistry and transmission electron microscopy. The analysis of the samples at the subcellular level showed that the nerves that innervated the gonad were made up of unmyelinated fibers and their axon terminals showed many small and clear vesicles in coexistence with a few larger vesicles that contain an electron-dense core which suggests they are catecholaminergic vesicles. For the first time are described in amphibians the ultrastructure of intragonadal neurons. These cells exhibit a euchromatic nucleus, with heterochromatin located at the peripheral side

and with a prominent nucleolus. In the cytoplasm, rough endoplasmic reticulum cisterns and flattened sacs associated with numerous vesicles that correspond to the Golgi complex stand out. The study, using immunohistochemical techniques, developed with streptavidin-biotin, showed the presence of tyrosine hydroxylase, an enzyme involved in the synthesis of catecholamines and neuropeptide Y both in nerve fibers that innervate the gonad and in intragonadal neuron somas. The results suggest that, as in mammals, in the amphibian ovary, both extrinsic innervation and intragonadal neurons are sources of catecholamines, which would coexist with high molecular weight neurotransmitters (neuropeptide Y).

A29

EFFECT OF GROWTH FACTORS ON MATURATION *IN VITRO* OF BOVINE CUMULUS-OOCYTE COMPLEXES

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The study of molecular factors that contribute to the maturation and quality of bovine oocytes is essential to optimize the *in vitro* production of high-quality embryos. The objective of this work was to evaluate the effect of the growth factors VEGF-D and BMP-5 on the *in vitro* maturation (IVM) of bovine cumulus-oocyte complexes (COCs) analyzing the expansion index; the percentage of nuclear maturation and gene expression in cumulus cells (CC). Immature COCs were obtained by aspiration of ovarian follicles from slaughtered heifers and matured *in vitro* in the presence of VEGF-D or BMP-5 in different concentrations (0, 1, 10, and 100 ng/mL). To evaluate the cumulus expansion rate, areas of the COCs at the beginning (T0) and after 22 h of the IVM, were registered. In addition, the oocytes of each treatment were fixed, stained with Hoechst and the percentages of oocytes in metaphase II (MII) were determined. In the presence of the molecules analyzed, the cumulus expansion was similar between the different treatments. Both VEGF-D and BMP-5 induced an increase in the percentage of oocytes in MII, reaching the highest values with the concentration of 100 ng / ml of VEGF-D and 10 ng/mL of BMP-5. These concentrations were selected for gene expression assays. Through RT-PCR, the expression of genes related to the cell cycle (*CCNB1*) and apoptosis (*BAX* and *BCL2*) was evaluated in CC. An increase in the expression of *CCNB1* and *BCL2* and a decrease in *BAX* were detected; the *BCL2* / *BAX* relation was increased in the CC stimulated with both factors. Finally, the inclusion of VEGF-D and BMP-5 in the IVM medium exerts a positive effect on the percentages of nuclear maturation and would increase the survival of CC.

A30

GENES EXPRESSION INVOLVED IN THE MIGRATION OF BOVINE OVIDUCTAL EPITHELIAL CELLS

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The oviduct is a highly specialized organ that plays a fundamental role in the early stages of mammalian reproduction. Its integrity and functionality depend on the interaction of multiple molecular components and the influence of steroid hormones. Among the molecules involved in the cell/extracellular matrix interaction are the focal adhesion kinase (FAK) and paxillin (PXN), implicated in processes such as cell migration. The aim of this work was to evaluate the expression of the genes that encode FAK (PTK2) and PXN in bovine oviductal epithelial cells of different stages of the estrous cycle and in several *in vitro* culture conditions. Oviductal cells were obtained by mechanical pressure of oviducts from slaughtered heifers corresponding to the pre- and post-ovulatory stages. The expression of PTK2 and PXN was determined by RT-PCR in *ex vivo* oviductal epithelial cells, explant, and monolayers cultures. The presence of transcripts in the pre-ovulatory stage was detected in both oviductal regions (ampulla and isthmus) but not in cells that belong from the post-ovulatory stage. Both genes are expressed in the explant cultures of both stages as well as in cells of monolayer cultures. Nevertheless, in explant cultures stimulated for 24 h with a combination of estrogen and progesterone (P4) the expression level of PTK2 and PXN decreased. The results suggest that the expressions of these genes are regulated by the presence of steroid hormones, and P4 would exert a negative influence on the transcription of PTK2 and PXN.

A31

EFFECT OF MELATONIN ON TRAINING AND ACROSOME REACTION OF *Chinchilla lanigera* SPERM

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Circulating melatonin in vertebrates secreted by the pineal gland in response to the photoperiod, shows a circadian rhythm with a maximum basal night level, regulating cycles such as sleep and body temperature. There is an extrapineal synthesis, with *in situ* activity in different tissues. Concentrations higher than plasma are in follicular and oviductal fluid, inflating a chemotactic effect, and receptors (MT1-MT2) were found in the sperm plasma membrane of several mammals. *Chinchilla* has seasonal reproduction that depends on photoperiods. The relationship with ambient light changes is a critical point in the reproductive management of the species in captivity. The objective is to study its effect on capacitation (CA) and acrosome reaction (RA) in *Chinchilla* sperm. Epididymal sperm from mature animals were washed at 1000 rpm for 10 min in PBS. CA: PBS and TH3-human tubal fluid-3 hours, 37.5 °C, 5% CO₂ adding melatonin (0.01, 0.1, 0.5, and 1 μM). Induction of RA with progesterone 20 μM (40 min). RA: sperm fractions in TH3 were exposed to 0.01, 0.1, 0.5, and 1 μM of melatonin for 40 min. Samples were titrated with Coomassie Blue G250. Tests conducted on CA showed that lower concentrations of melatonin the gametes present up to 55% RA. However, the results on RA showed an induction only in 0.1 and 0.5 μM. This behavior could be due to differences in sensitivity, location, relocation, and internalization of MT1-MT2 during CA and RA. Its participation in the process is evident, although it is not essential. Several studies in the area are required to understand its participation in the regulation of seasonal reproductive cycles.

A32

ACTION OF MELATONIN OVER SPERMATIC PHYSIOLOGY

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The hormone melatonin (MT) acts through receptors and through antioxidant signaling mechanisms. It is produced in the pineal gland and ectopically, as in the ovarian follicle and the testis. There are reports of the presence of MT receptors in sperm (SP), but the effect of MT is contradictory, and its role at the reproductive level is still unclear. The objective of this work was to study the ovule-EZ interaction, evaluating the effect of MT at the level of migration and sperm binding on pellucid areas (ZP) of oocytes (hemizones). SP from normozoospermic donors with proven fertility was used. The SP were washed in PBS and subsequently incubated in human synthetic tubal fluid (HTF) for 15 min in the presence of MT (50 pM) and MT receptor inhibitors (20 nM Luzindol, a general inhibitor of MT1, MT2, and MT3; 20 nM S20928, an inhibitor of MT1 and MT2). Migration tests were performed on microcapillaries adapted to slides. For the binding, SP was incubated in the inhibitors and subsequently in HTF + 50 pM MT. Said sperm suspension was inseminated on hemizones. At 45 min, the ZP were subjected to gentle agitation and finally to the action of pronase. SP exposed to inhibitors showed a reduction in the speed of migration with respect to the control (Luzindole: 27 μm/s vs 60 μm/s; S20928: 53 μm/s vs 60 μm/s). The presence of inhibitors reduced the binding to ZP, being the most intense effect in the presence of Luzindole, with a reduction of 51.25%. These results allow MT3 to be identified as the necessary receptor for MT activity in SP, modulating sperm functionality, and its interaction with ZP.

A33

DEVELOPMENT OF A MODEL OF INFECTION OF COMMON BACTERIOSIS IN BEANS (*Phaseolus vulgaris* L.) IN GREENHOUSE CONDITIONS

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In the phytopathology area, epidemiology requires models to describe diseases. The cultivation of bean (*Phaseolus vulgaris* L.) is an important economic activity in NOA and common bacteriosis, caused by *Xanthomonas axonopodis* pv. *phaseoli* (Smith) (XA) and *Xanthomonas fuscans* subsp. *fuscans* (XF) cause important losses. Eco-friendly therapeutic alternatives based on natural products (NP) could prevent it, although it is necessary to design study models. We proposed to develop in greenhouse (fluorescent light 36 W + warm halogen R63 42 W) controlled infections with XA and XF to fit a model of infection. Seeds of the varieties Perla and NAG12 were sown in a commercial organic substrate (El Jardinero[®]) at 25 ± 3 °C and 60% humidity (monitoring with digital thermohygrometer) until the appearance of unifoliate primary leaves (stage V2) and first trifoliate leaves (V3). These were infected (106 CFU/mL) by means of standardized techniques evaluating daily the appearance of symptoms up to 14 days (data processing: ImageJ[®] software). Symptoms appeared in both varieties, from 10 days progressively until day 14, being NAG12 the most sensitive. The multiple puncture technique presented > infection effectiveness (16–100%) with respect to simple puncture-PS (5–80%) and immersion (0%) mainly in stage V2 (>16%) with respect to V3 (<35%). However, the PS technique allowed better monitoring of the trial. XA showed development of infection >5%

while XF <16%. The results obtained would allow optimizing the infection conditions to evaluate therapeutic treatments that prevent common bacteriosis in bean with PN of vegetal origin in *in vivo* tests.

A34

OBTAINING AMARANTH SPROUTS UNDER COLD AND SALTY CONDITIONS

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Amaranth (*Amaranthus caudatus*), known as kiwicha, is a pseudocereal of Andean origin, tolerant to arid conditions, high radiation, and poor soils. The nutritional and functional value of the seeds (gluten-free) is known; however, quality studies of sprouts are scarce. The objective was to evaluate the yield and length of amaranth sprouts of different origin, obtained under cold and salty conditions. Commercial quality amaranth seeds (CQ) from "El Cerrito, Santa María, Catamarca" (SM) were used. The same ones were germinated in Petri box on paper, in darkness during 72 h, to 27 °C, with distilled water (control); with NaCl (0.05, 0.10 and 0.15 M) (salinity) and exposed during 6 h to 6 °C in the hours 42 and 65, with distilled water (cold). The length and yield of fresh and dry shoots (g shoots/g seeds) were determined. The length of SM shoots decreased by 24% in 0.10 and 0.15 M NaCl, while CQ shoots decreased by 17% in 0.05 and 0.10 M NaCl and by 25% in cold and in 0.15 M NaCl. The yield of fresh control shoots was around 4.4 g shoots/g of seeds for SM and CQ, decreasing between 10 and 20 % with saline treatments. The opposite happened with the yield of dry shoots, increasing under saline treatments between 10 and 20 %, with values of 0.6 g shoots/g of seeds in the controls. The SM and CQ sprouts show different sensitivity to cold and NaCl, with alterations in the hydric potential with salinity, which would influence their quality or composition.

A35

RELATIVE HUMIDITY DETERMINES THE OCCURRENCE OF THE RUST IN CROPS OF MINT IN SANTIAGO DEL ESTERO

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Mint rust, caused by the fungus *Puccinia menthae* Pers., affects leaves and stems, producing yellow pustules, causing strong defoliation and a decrease in the efficiency of biomass and essential oils. There are no references on the incidence of this disease in mint crops, in Santiago del Estero. This work aims to relate the occurrence of the disease with the meteorological variables. From 2009, *Mentha spicata* L. has been cultivated in the town of El Zanjón –an irrigation area in Santiago del Estero– in a total area of 576 m². Sampling was carried out from September to December. A hundred stems randomly chosen were observed in order to register the number of leaves with pustules per stem. The meteorological data have been obtained at the Estación Experimental INTA Santiago del Estero (experimental station). The disease was recorded during 2011 and 2018 seasons, with incidences ranging between 20 and 60 %, respectively. The magnitude of the incidence of the disease was not determined by the temperature, because in every season the average temperature during the months of study fluctuated between 20 and 25 °C. The highest incidence was recorded at spring with RH values greater than 60%. It is concluded that in the irrigation zone of Dulce River, the RH –greater than 60%– increases the susceptibility of *M. spicata* to rust.

A36

IMBIBITION OF QUINOA SEEDS IN AGAR AND ALOE MACULATA GEL

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'Quínoa' (*Chenopodium quinoa* Willd.) is a farming rich in lysine, cysteine, methionine, arginine, and histidine. Aloe M (*Aloe maculata*) contains methionine (in large quantities) and other amino acids. Exudates and gel are extracted from its leaves. Seed germination is defined as a series of events that result in the transformation of an embryo into a seedling. The first step is the absorption of water by the seed (imbibition phase) that depends on the chemical composition of the seeds, the permeability of the seminal envelope, and the availability of water in the environment. The entry of water is due to the difference in water potential between the cell and the surrounding environment, both the quinoa and the aloe gel have amino acids in common, the water molecules cross the semipermeable membrane from the solution of lower concentration to the one with the highest concentration until the concentrations are equalized. To monitor the germination, curves of imbibition of quinoa seeds on 1% agar-water and on Aloe M gel were performed. For this, 10 heavy seeds (Pi) were placed in a Petri dish, in triplicate (n = 30), on agar-water, and another equal batch on aloe gel, the final weight (Pf) was obtained at different times between 5 and 1440 min. The velocity curves of water entry to the seeds as a function of time show similarity in the first phases for both experiments, but after 6 h in the case of agar the protrusion of the root occurs, with an abrupt fall in the water absorption speed. In the case

of those studied on the gel, the radicle was only observed at 24 h. This is due to the fact that the gel contains amino acids among other substances, which makes it difficult for the absorption of water by the seeds.

A37

ATTACK RATE OF *Spodoptera frugiperda* SMITH, IN TWO SEEDING SYSTEMS OF TWO CORN VARIETIES IN A COUNTRY PRODUCTION SYSTEM, IN SANTIAGO DEL ESTERO, ARGENTINA

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In Santiago del Estero, the “fence” is a traditional production system that associates several crops. The most used is corn-crookneck pumpkin. Studies have shown that the “fall armyworm” *Spodoptera frugiperda* S. is one of the most harmful pests for this polyculture. There are no bibliographical references on studies carried out in the province of Santiago del Estero that indicate the levels of attack of *S. frugiperda* in corn crops, in monoculture systems, or in association with other crops. The objective of this work was to analyze the attack rate of *S. frugiperda* in two varieties of corn by two sowing systems. The association between the crookneck pumpkin, *Cucurbita moschata* (Duchesne ex Lam.), and two types of corn (Leales 25plus variety and Criollo type variety) were evaluated. The trials were carried out in two towns: 1) EEA Francisco Cantos INTA La Abrita, Silipica Department and 2) in a Field in Vaca Huañuna, Figueroa Department; the sowing was carried out in the second half of January 2019; The treatments were: monoculture Leales 25 (T1); Polyculture Leales 25-Crookneck pumpkin (T2); monoculture Criollo (T3); Polyculture Criollo-Crookneck pumpkin (T4). We worked on an experimental design of randomized blocks with 5 blocks. For the assessment of the damage, 1 m was taken at random to record the number of damaged plants and the total number of plants. The attack rate was calculated as follows: Affected plants/Examined plants, as long as the larva was present. The highest attack rate values corresponded to monoculture treatments showing 100% of attacked plants coinciding with the critical period of the crop.

A38

INFLAMMATION MARKERS AND LIPID PROFILE IN ADULT OBESE PATIENTS

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Obesity is a metabolic disease associated with insulin resistance (IR) and a proinflammatory state, constituting a risk factor for type 2 diabetes and cardiovascular disease. In an obesity state, the adipose tissue suffers a reshuffle that promotes the synthesis of proinflammatory adipokines and acute phase reactants provoking a chronic low-grade inflammation. The objective of this work was to study the plasma levels of Fibrinogen (Fg), high sensitivity CRP (hsCRP), TNF- α , and myeloperoxidase (MPO) in obese patients and the correlation with IR and anthropometric indexes. Fifty-four obese patients (20 M/34 W) were studied, with an average age of 48 ± 11 years that were compared with 20 healthy individuals of similar sex and ages. In both groups, weight, height, waist circumference (WC) were measured, body mass index (BMI) was calculated and it was determined: fasting blood glucose, lipid profile (Wiener Lab), TNF- α (R&D Systems), MPO (Binding Site Ltd.), Fg (Diagnostic Stago), insulin (Siemens) and HOMA index was calculated. The data were analyzed with SPSS 25 software and expressed as mean \pm SD. $P < 0.05$ value was considered significant. Obese patients present increased levels of: Fg (385 ± 117 vs. 275 ± 32 mg/dL; $p = 0.004$), hsCRP (7.4 ± 5.6 vs. 1.4 ± 1.6 mg/L; $p = 0.001$), Insulin (23 ± 16 vs. 7.2 ± 2.4 μ UI/mL; $p = 0.001$), HOMA index (5.2 ± 3.9 vs. 2.1 ± 0.3 ; $p = 0.001$), Total cholesterol (223 ± 47 vs. 187 ± 22 mg/dL; $p = 0.04$), LDL-C (150 ± 45 vs. 118 ± 49 mg/dL; $p = 0.046$). However, TNF- α and MPO showed no significant differences with control subjects. It was found that BMI was positively correlated with insulin, HOMA, Fg, and hsCRP, while CC with insulin, HOMA, and hsCRP. These results suggest the presence of a low-grade inflammatory state associated with insulin resistance in obese patients.

A39

INFLUENZA B VIRUS ASSOCIATED WITH SERIOUS ACUTE RESPIRATORY DISEASE IN HOSPITALIZED CHILDREN

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Influenza A (IA) and B (IB) viruses are one of the leading causes of respiratory tract infection worldwide. IA is the most frequently associated with severity conditions. However, a recent study by the CDC showed that, in hospitalized adults, IB caused equally serious diseases and has clinical characteristics like IA. This work aimed (1) to assess the prevalence of IA and IB viruses in children <12 years old admitted to private health services of S.M. of Tucumán from March to December 2018, and (2) to analyze the association of IB with severe

pathology, sex, and age. 480 respiratory samples were studied by Immunofluorescence (IF), 328 were positive (+) for: Respiratory Syncytial Virus (34%), Metapneumovirus (8.1%), Parainfluenza 1,2,3 (5.2%), IA (4.4 %), IB (4%), Adenovirus (0.6%). Eight negative (-) IF samples were + by real-time PCR for Influenza. Of 38 patients + (men=55%, women=45%), 20 were IA and 18 IB, 66% corresponded to children aged 4 to 11 years. Due to their severity, 16 children required intensive care and 10 were IB. The main clinical entities were Pneumonia and Influenza-like disease. This work shows the severity of acute respiratory symptoms in children, associated with Influenza B and highlights the importance of rapid virological diagnosis for the early onset of treatment. The tetravalent vaccine formulated annually and available in our country allows to achieve coverage for 2 subtypes of IA (H1 and H3) and 2 lineages of IB: Yamagata and Victoria. It is recommended to specific groups of people and constitutes an effective strategy in Public Health for the prevention of serious complications of Influenza.

A40

EXPERIMENTAL OSTEOPOROSIS IN OVARIECTOMIZED ADULT RATS: SERUM LEVELS OF CALCIUM AND ESTRADIOL. CORRELATION WITH MEDULAR RADIOPACITY IN TIBIAE

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The ovariectomized rat (OVX) is the animal model used in studies on osteoporosis (OP) due to postmenopausal estrogen and calcium (Ca) or (OP) deficiency which favors the weakening of bones and fractures. Estrogens maintain bone density. Ca accumulates in bone tissue and participates in its formation, remodeling, and mineralization. Objectives: -determine variations of (Ca) and estradiol in blood and changes of optical density in tibiae in an experimental (OP) model. Methodology: 6-month-old Wistar rats divided into two groups were used: Control (C) and Experimental (E). Blood was drawn by tail puncture to analyze levels of Ca by colorimetric method and estradiol by chemiluminescence method. In group (E) bilateral OVX was practiced. New blood extraction was performed 45 days post-ovariectomy and subsequent euthanasia. The tibiae were radiographed to measure spinal radiopacity with ImagePro Plus v6.0 software. For statistical analysis Student Test was used. Results: The serum values of (Ca) in both groups did not show statistically significant differences ($p>4.73$). Statistically significant differences were observed with estradiol ($p<0.0001$). Longitudinal and transversal medullary optic density did not show statistically significant differences between the groups ($p>0.05$). It is concluded by reaffirming the suitability of the OP model. In OVX rats, a decrease in estradiol levels is observed. There is no correlation with densitometry measurements nor with serum Ca levels in the experimental times of our study.

A41

EVALUATION OF THE DEGREE OF RETENTION OF 3rd MOLAR INFERIOR IN PANORAMIC RX, IN A YOUNG POPULATION OF SAN MIGUEL DE TUCUMÁN

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3rd molar eruption accidents are common in the Dental Clinic with a high difficulty index for its extirpation. The Rx study must provide information on the degree of retention, relationship with the lower 2nd molar, and with the Dental Duct. Recognize in Panoramic Rx the difficulties of the eruption of the 3rd lower molar, allows the specialist to perform a correct surgical treatment. A retrospective study was carried out in 90 panoramic Rx of young patients, male and female, observing 3.8 and 4.8. Age: between 16 and 21 years, from the Radiology Service archive. The variables that were recorded: age, sex, the position of the 3rd molar, surrounding bone, relationship with the 2nd lower molar, and with the Lower Dental Duct. Need for complementary studies and associated pathologies. The data were evaluated with the statistical package SPSS version 11 for Windows, with an α error of 5%. 169 dental elements were evaluated. There is no significant difference between sex and age, nor between sex and prevalence of elements (3.8–4.8), nor with bone retention (29.6%, $n=50$). In 53% of cases, the distal bone is present. The most recurrent position is the mesio-angle 33.1% ($n=56$). As for the relationship with the 2nd lower mole, there is contact at 29.6% ($n=50$). As with the Lower Dental Duct in 32% ($n=54$). There is a need to complement with other studies in 58.6% ($n=99$). Relating sex with associated pathologies, 53.3% ($n=90$) is higher in women, with the common pathology being pericoronitis. The prevalence of retained 3rd molars and their relationships was evidenced in the sample. Only if the relationship with the Lower Dental Nerve needs to be known, Cone Beam Tomography would be used.

A42

WATER SAMPLES ANALYSIS FROM PIG FARMS IN SANTA FE AND ENTRE RIOS

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Water is a vital nutrient. Few producers know which are the water requirements and the factors that influence water consumption. Our objective was to analyze the drinking water quality to ensure good pig production. Water samples were taken from watering troughs of two commercial farms located in the provinces of Santa Fe (A) and Entre Rios (B). The samples were conserved for physicochemical and bacteriological analysis. Sulfates were determined by turbidimetry and the Association of Official Analytical Methods were applied. Measurements were made in triplicate and the average value was considered. The water samples results were: chloride (mg/L): 420–118, sulfate: (mg/L) 763.5–490, nitrates (mg/L): 30.5–9, nitrites (mg/L): 0,06–<0,02, fluorides (mg/L): 1.19–0.88, ammonium (mg/L) <0.05–<0.05, arsenic (mg/L): 0.05–<0.01, iron (mg/L): 0.055–0.03, calcium (mg/L): 64–121, magnesium (mg/L): 47–9, sodium (mg/L): 645–210, total hardness (mg/L): 254–337, alkalinity (mg/L): 445–330, pH: 7.77–7.61, and conductivity (µS/cm): 3085–1430; in A and B, respectively. Bacteriological water analysis: aerobic bacteria (n %mL) 72–90 in A and B, total coliform bacteria were less than 2.2 NMP/100 mL and *Pseudomonas aeruginosa* was not present in both farms. Except for nitrites, ammonium, arsenic, and iron, the remaining variables were different in the farms. The pH was within the acceptable range for the consumption of pigs, but their values differ since it depends on the soil mineral composition. The physicochemical and bacteriological analysis variables were found within animal reference values. We can say that the water supply in both farms is suitable for the consumption of pigs.

A43

SERUM TRACE MINERALS OF PREGNANT AND LACTATING SOWS FROM A FARM

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Minerals constitute a small proportion of an animal organism, but they have a very important role as structural components and coenzymes of numerous organic processes. In addition, it is important to consider the following interactions: mineral-mineral and mineral-organic compounds of a diet. In practice, when formulating a food, minimum processing cost is sought in order to achieve maximum utilization. For this reason, animals are fed with inorganic minerals which are cheaper and less assimilable for their organisms. The objective was to determine the microminerals profile in sow serum in gestation and lactation stages when they are fed with an inorganic source of minerals. Blood was drawn from 53 females of crosses Yorkshire, Landrace and Pietrain, which were randomly selected in 2018. The balanced diet was based on corn and soybean expeller with formulas and requirements for the inorganic mineral core category. Serum samples were processed by the atomic absorption spectrophotometry method. ANOVA was applied with Infostat program. The average values and standard deviations were in pregnancy (n = 34) and lactation (n = 19), respectively: Iron (Fe) µg/dL 70.647 ± 15.033, 62.737 ± 6.072; copper (Cu) ppm 1.231 ± 0.388, 1.632 ± 0.351; and zinc (Zn) ppm 1.607 ± 0.431, 1.820 ± 0.503. Average values of Fe in the two stages, of Cu in lactation and Zn in gestation were normal. Copper values in gestation were lower and zinc slightly higher in lactation, with significant differences ($p < 0.05$) in Fe and Cu. Observations can be due to possible interactions with other components of diet and high demand for sows in production.

A44

ENVIRONMENTAL ENRICHMENT OF GRAY FOXES (*Lycalopex griseus*) IN HORCO MOLLE EXPERIMENTAL RESERVE

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Animals in captivity express abnormal behaviors, in particular stereotypes, because of a lack of welfare. Horco Molle Experimental Reserve (REHM) has two gray foxes that cannot be released, and that expressed abnormal behaviors such as stereotyped locomotion, lack of interest in food, and low levels of activity. The objective of the work was to evaluate the impact of various environmental enrichments during 2016, 2018, and 2019 on the behavior of gray foxes (*Lycalopex griseus*), 1 male and 1 female. Food enrichments (new foods and changes in the presentation of them) and structural were placed. The female showed an increase in displacement (from 23 to 34 %) and a decrease in resting time (from 35 to 30 %) and agonist interactions (18% to 12%). In the male there was a greater increase in displacement activities (from 27 to 47), increasing interactions with the environment (from 27 to 34 %), and decreasing agonist interactions (from 15 to 8 %). The nutritional enrichments caused an increase in interaction with the environment. Structural enrichment caused an increase in displacements only in the male. Social enrichments had a small effect. Nutritional enrichment with the incorporation of new items and changes in their distribution is the most effective. Changes of elements in the enclosure must be carried out periodically to avoid

locomotive stereotypies. In addition, this in chances of furniture stimulates a more effective use of space. In the future, it is proposed to establish enrichments that stimulate interactive games between the two animals.

A45

NON-POLAR METABOLITES FROM NATIVE PLANTS AS BIO-REPELLENTS

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Insect pests cause substantial losses to food crops, stored grains, and their by-products worldwide. In addition, they are vectors of diseases of domestic and human animals. The need to control pest insects leads to improper and excessive use of chemical insecticides. An eco-friendlier alternative is the application of plant metabolites that can act as bio-repellents. In this paper, we evaluate the repellent and insecticidal activities of non-polar natural products, isolated from native plant species of different families. The aim was to link the chemical composition with the bioactivity for the selection of a promissory product against *Tribolium castaneum* Herbst and *Armadillidium vulgare* Latreille models. Diethyl ether and hexane extracts from the fresh aerial parts of native species *Merremia dissecta* (Jacq.) Hallier f., *Lepidaploa remotiflora* Rich. and *Adiantum lorentzii* Hieron were processed by silica gel column chromatography. Fractions were analyzed using the hyphenized technique GC-MS that showed the presence of bioactive pentacyclic triterpenes identified as α and β -amirin in *M. dissecta*, lupeol in *L. remotiflora* and olean-13 (18)-ene in *A. lorentzii*. Triterpenes-rich fractions displayed repellent and antifeedant properties against *T. castaneum*. These effects were comparable to those of citronella and lemon essential oils. No acute toxic effects were observed on *A. vulgare*; however, fractions exerted sub-lethal effects such as the inhibition of egg-hatching and marsupial development. This strategy would control ecologically the overpopulation of this isopod, preventing its conversion into a pest.

A46

SEMISYNTHETIC BIS AND MONO-CHALCONES WITH TOXIC EFFECTS ON *Spodoptera frugiperda*

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Chalcones are biologically active molecules. They are bactericide, antifungal, and insecticidal. The exploration of molecules, already selected by nature to play a role in ecological defense, appears as an essential starting point to search for new products for pest control. We selected 6 mono-chalcones for this trial: A, B, A001, C001, G001, H001, and 8 bis-chalcones: B1, C1, D1, F1, G1, H1, J1, K1, which were evaluated for their antifeedant, toxic and nutritional effects on larvae of *Spodoptera frugiperda*. The antifeedant activity was calculated when 50% of the larvae control ate 50% of the diet through the RF factor. Toxicity was assessed through larval and pupal mortality, and the emergence of adults and nutritional effects with consumption rates, growth, and consumption efficiency. Bis and mono-chalcones tested on an artificial diet at 100 μ g/g, did not cause an antifeedant effect on larvae of *S. frugiperda*. The bis-chalcones C1, G1, H1, and K1, caused a lethal effect on *S. frugiperda* in the first larval stages, being C1 the most toxic (85%). Adults who survived showed malformations and decreased size, which led to death. The larvae fed with aggregate in bis-chalcones diet: C1, G1, and H1 had the highest percentage of intake and the poorest conversion of nutrient absorption, which suggests that the larva metabolizes food for energy and results in a decrease of growth and death in early stages. Bis-chalcones showed greater toxicity than mono-chalcones and C1 causes the highest toxicity and nutritional alteration.

A47

BIOTRANSFORMATIONS OF SESQUITERPENE LACTONE LUDARTIN. SELECTIVE CYTOTOXIC ACTIVITY AGAINST *Artemia salina*

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Ludartin is a guaiane-type sesquiterpene lactone with several reported biological activities. This compound was isolated from plants of the *Stevia* genus, which are native from northwestern Argentina. Biotransformations using microorganisms have managed to perform chemical reactions on naturally occurring substrates. In this work, it was proposed to obtain ludartin derivatives using filamentous fungi of the genera *Penicillium* and *Aspergillus* as biocatalysts; and isolated extremophilic actinobacteria strains of Andean lagoons of Catamarca's puna. Biotransformation tests were carried out under the whole-cell modality, cultivating the microbial species in liquid medium with orbital agitation (28 °C, 180 rpm). After ten days of bioconversion, the media were extracted and purified by chromatographic methods obtaining four derivatives, two of them without previous bibliographic reports. The corresponding compounds were elucidated and

characterized by spectroscopic methods and presented modifications related to epoxide hydrolysis, double bond reduction, and stereoselective hydroxylations. The subsequent evaluation of cytotoxic activity on *Artemia salina* showed that two of the majority derivatives obtained exhibit selective toxicity with respect to the ludartin substrate. In conclusion, the biocatalytic strategies described on ludartin represent effective and environmentally friendly alternatives to obtain novel derivatives with selective cytotoxic activity.

A48

USE OF BLUEBERRY WASTE FOR OBTAINING BIOACTIVE COMPOUNDS

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Agroindustrial wastes represent significant amounts and high disposal costs transform them into an environmental and economic problem. In previous studies, we demonstrated that extracts of *Vaccinium myrtillus* L. (blueberry) stem present secondary metabolites with promising biological activities. The aim of this work was to obtain sub-extracts from a polar extract of blueberry stems and determine the chemical composition, antioxidant activity (AAO), and the possible antihyperglycemic effect. The acetonic extract (AE) of blueberry stems was partitioned with solvents of increasing polarity, obtaining hexane, methylene chloride, ethyl acetate, and hydroalcoholic fractions. Using the AE and the respective fractions, a chemical profile and the quantification of constituents was performed by spectrophotometric methods. The AAO was determined by scavenging of the ABTS^{•+} and DPPH[•] radicals, iron and molybdenum reduction, and the inhibition of lipid peroxidation. The antihyperglycemic effect was evaluated *in vitro* by inhibition of the α -glucosidase enzyme. The fraction ethyl acetate showed an important AAO probably due to the greater amount of phenolic compounds present (mainly flavonoids) respect to the other sub-extracts analyzed. In addition, this fraction significantly ($p \leq 0,05$) inhibited the activity of the α -glucosidase enzyme in a dose-dependent manner. The partition of EA allowed to concentrate the metabolites according to their polarity and enhance both the antioxidant and antihyperglycemic activity. *V. myrtillus* stems represent a source of metabolites with promising bioactivity.

A49

EXTRACTS FROM BLUEBERRY AERIAL PARTS: POTENTIAL IN THE CONTROL OF ETIOLOGICAL AGENTS OF CEREAL EAR ROTS

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Fusarium graminearum (Fg) and *F. verticillioides* (Fv) cause ear rot in corn and wheat, which reduce grain yields by contaminating them with mycotoxins harmful to humans and animals. New antifungal agents are required to control these fungi, which could be provided by plant sources. In Tucumán, blueberry production has expanded significantly in recent years. The pruning of this crop, mainly stems and leaves, is discarded and has no commercial use. The objective of the present work is (1) to select extracts of blueberry leaves and stems useful in the control of Fg and Fv, and (2) to evaluate the general toxicity of the inhibitory extracts on both fungal species. Blueberry leaves and stems were separated, dried at room temperature in darkness, crushed and used to prepare decoctions at 5%, tinctures at 10%, and infusions at 5% (leaves) and 10% (stems). The antifungal activity was evaluated by dot blot bioautography, determining the minimum inhibitory dose (DIM). The lethal dose of 50% (LD₅₀) was evaluated on *Artemia Salina*. Infusions and tinctures inhibited the growth of both fungal species (DIM = 31.25–500 μ g). The lowest DIM (31.25 μ g) was observed on Fg (stem and leaf tinctures) and Fv (leaf infusion). Infusions and tinctures showed no toxicity (LD₅₀ >1000 μ g/mL). Our results indicate that the infusions and tinctures of stems and leaves presented high to moderate antifungal activity, without manifesting toxicity. The isolation of the molecules responsible for the observed activity will be continued.

A50

INHIBITORY ACTIVITY OF EXTRACTS OBTAINED FROM NATIVE *Tibouchina* SPECIES FROM ARGENTINE NORTHWEST (NOA) ON BIOFILM PRODUCER CLINICAL PATHOGENS

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Biofilm formation in hospital settings is associated with numerous infections. Increased antimicrobial resistance leads to the search for alternative infection control agents, such as natural products of plant origin. *Tibouchina longifolia* (Tl), *T. paratropica* (Tp) and *T. alpestris* (Ta) present in NOA have a history of antimicrobial activity. Thus, the proposal was to evaluate the inhibitory activity of ethyl acetate

extracts of EA *Tl*, *Tp*, and *Ta* against strains of *Klebsiella pneumonia* (*Kp*), *Pseudomonas aeruginosa* (*Pa*) and *Staphylococcus aureus* (*Sa*), isolated from clinical samples and biofilm producers. Dried EA extracts were resuspended in DMSO-water (1:4) (Range= 50-400 µg/mL) and added (15 µL) to sterile monodisks over exponential phase cultures (10⁶ CFU/mL) of indicator microorganisms in BHI agar plates (1.5%). To confirm biofilm formation, the production kinetics in BHI broth were evaluated by using violet crystal (OD = 590 nm). Results indicated that all microorganisms showed sensitivity ≤400 µg/mL being *Kp* the most sensitive strain (≥57 µg/mL). Considering the extracts, *Ta* presented a higher inhibitory effect. Regarding biofilm formation, *Pa* reached 80% of its total production after 1 h of incubation, while *Sa* and *Kp* at 5.5 and 6 h, respectively. The results obtained allow to establish criteria to advance in the design of a natural product from autochthonous plants, for the control of clinical pathogens.

A51

COMPARATIVE EVALUATION OF EXTRACTS AND SUB-EXTRACTS OF *Heliotropium curassavicum* and *H. veronicifolium* FROM ARGENTINE

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The exploitation of goats in our province represents 15% of the national final production. Among the main factors that affect this activity are infectious diseases caused by *Escherichia coli* (EC). The genus *Heliotropium*, family *Boraginaceae* has a notable background of biological activities potentially useful to design a biocontroller product in goat production. Thus, evaluation of the presence of functional groups, antioxidant and antimicrobial activity against native goat isolated EC (EC ATCC 25922 as control) of extracts from *Heliotropium* species was the aim of this work. Extracts-Ex (ethyl ether and isopropanol-H₂O) and sub-extracts-SE (CH₂Cl₂, ethyl acetate and aqueous) were obtained from *H. curassavicum*-HC from Tapia (Burruyacu)-TB and Santa María (Catamarca)-SM and *H. veronicifolium*-HV-TB. The extraction yield was between 0.36–5.44 % for HC-TB, 1.49–9.43 % for HV-TB, and 0.52–3.56 % for HC-SM showing species-dependent effect. Cultures in exponential phase (10⁶ CFU/mL) of EC in BHI agar plates (0.7%) were inoculated (15 µL) of S and Se in concentrations of 125, 250, and 500 µg/mL of to evaluate the inhibitory effect. Also, using IR spectroscopy and standardized protocols, the presence of flavonoids, triterpenes, steroids, and alkaloids in Ex and SE was verified. Non-presence of quinines was detected. Antimicrobial activity was observed in both Ex and SE being EC-control the most sensitive strain. Antioxidant activity (DPPH) was evidenced mainly in HC-SM. Based on the analysis of interactions/Ex-SE/strain/zone ($p < 0.05$), promising combinations of active fractions could be selected to develop a biocontroller additive to prevent infectious diseases in goat production.

A52

EVALUATION OF IRRIGATION WATER QUALITY FROM LOS ALISOS RIVER, TAFÍ DEL VALLE, TUCUMÁN

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The town Las Carreras belongs to Tafí del Valle department (Tucumán). Its population develops an agricultural activity based on handmade cultivation of lettuce, corn, legumes, and seed potatoes, developed in small plots. Los Alisos River is the main water resource that supplied the water for the irrigation of crops. The objective of this work was to evaluate the quality of Los Alisos River water for agricultural use. Water samples were taken at three points in the river during 2018. The Na⁺, K⁺, Ca²⁺, Mg²⁺ cations and the anions Cl⁻, HCO₃⁻, SO₄²⁻ were determined. The parameters of Electrical Conductivity and pH were also determined. The results allowed classifying the water according to suitability water estimators for irrigation: (1) electrical conductivity, (2) effective salinity, (3) potential salinity, (4) sodium adsorption ratio, (5) sodium percent. The data were analyzed by different diagrams. The Piper diagram allowed classifying the water based on their soluble salts content, observing the predominance of bicarbonate calcium. Using the Wilcox diagram, the water suitability for agricultural use was evaluated by “electrical conductivity” and “sodium adsorption index.” It was determined that the waters, had low salinity and low sodium content, so they are considered suitable for crops in the area. Currently, we continue with the sampling to complete the study of the water suitability for irrigation in this area.

A53

SURVEY OF A SUBTROPICAL RIVER UNDER THE EFFECTS OF THE CLIMATIC PHENOMENON “EL NIÑO”

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The systematic destruction of aquatic ecosystems leads to doubling the studies on their functioning. Benthic macroinvertebrates, respond quickly to environmental variations, reflecting the degree of the ecological integrity of the system. The biotic indicators (BI) are a tool based on the sensitivity of several groups to pollutants and allow expressing a measure of the biological quality of a river using numerical values. Abrupt changes in the flow rate will be observed as changes in the Richness of fish. Students of “Limnology” (Faculty of Natural Sciences of the National University of Tucumán, UNT) go on fieldwork and use what they have learned to apply that in the Lules River. This work aimed to learn and analyze physicochemical and biological parameters in a section of the Lules river during the dry season of 2019 and in the last month of the climatic phenomenon “El Niño”, and to compare the results with those obtained in other investigations carried out in the years 2005–2007. Measurements on physicochemical parameters, macro-benthic samples using D-network, and ichthyological samples by electric fishing were taken in situ. The Taxa Richness of macroinvertebrate was averaged at 8 (lower than expected) and the quality of the river with an IBY4 (the Yungas Biotic Index based on 4 taxa, IBY-4) index was “very good”. The fish community presented variations only in the diversity of species; the specimens found are typical of the dry season. We infer that the results are coincident with what was expected because the samples were collected at the end of the climatic phenomenon. Even though, they presented interesting variations, which we point out in this work.

A54

BIOLOGICAL AND CHEMICAL PROPERTIES OF AN ETHANOLIC EXTRACT OF *Senecio nutans* (EESn) WITH INSECTICIDAL PROPERTIES

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Due to the worrying environmental impact caused by the use of synthetic insecticides, natural products of plant origin represent a sustainable alternative for the control of pest insects. Although natural products are, in advanced, harmless about the environment and non-target species, it is necessary to carry out biological tests that confirm it, in addition to knowing the active constituent principles. In previous work, our research group has verified the toxic effects of the EESn on pests of economic importance. The objective of this work was to evaluate the capacity of endocrine disruption of the EESn and qualitatively determine the main metabolites present. To control whether the EESn behaves as an endocrine disruptor, an in vitro maturation bioassay of *Rhinella arenarum* oocytes was performed. To do this, ovarian follicles of *R. arenarum* were pre-incubated in Ringer solution containing EESn for 2 h and then maturation with progesterone 10^{-6} M was induced. The rupture of the germ vesicle was monitored for 20 h and the data were statistically analyzed. General analytical progress was also carried out to obtain a qualitative phytochemical profile of the extract. These preliminary results indicate that the EESn does not interfere with ovarian functionality and that it contains phenolic compounds, flavonoids, sesquiterpene lactones, steroidal triterpenes, proteins, and lipids. Specific methods will allow quantifying the majority compounds of the EESn responsible for bioactivity.

A55

INSECTS OF PHYTOTELMIC ENVIRONMENTS OF *Aechmea distichantha* (BROMELIACEAE) IN YUNGAS OF CATAMARCA, ARGENTINA

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Phytotelmata are aquatic microenvironments formed by modified leaves of plants, leaf axils, flowers, stems, etc, which store water and organic matter, creating a favorable environment for the habitat, growth, and development of various organisms. The aim of this research was to know the diversity of insects present in phytotelmata of *Aechmea distichantha*. Plants were analyzed from the locality of Las Higuerrillas (Paclín, Catamarca), in an area of Selva Montana (Yungas). The sampling was carried out during the summer (rainy season). Twenty samples were collected at five sampling points at different altitudes. Organisms were separated and determined taxonomically. Abundance, faunal richness, Shannon-Wiener diversity index (H'), Simpson's Dominance index (D), and Jaccard's Similarity index were reported. 853 individuals were registered from 12 taxa. The best-represented group was Chironomidae Msp. 1 (57.30%), followed by Ceratopogonidae Msp. 1 (11.02%). The sampling sites that obtained the greatest abundance were those that were found at a lower altitude above sea level. Samples with the greatest richness were 19 and 18, with 10 and 7 taxa, respectively. The most diverse site was 3 ($H' \log^2 = 2.6$). Sites with the highest dominance were 4 and 5 (DS = 0.59 and 0.56). The Jaccard's similarity index showed 70% for sites 2 and 5. The

insect diversity found showed a high and novel faunal richness. The results obtained thus contributed to the knowledge of fauna phytotelmata in the Yungas environments of Catamarca, Argentina.

A56

PHYTOPLANKTON OF CHORRILLOS RIVER (TUCUMÁN, ARGENTINA)

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The lack of physiological studies in the hydrographic basins of the Northeastern Hills (Burruyacu Department, Tucumán) led us to make this work. In this context, the objective of this research was to contribute to the knowledge of the phytoplankton diversity of the Chorrillos River. The confluence of the N ó and Chorrillos rivers originates Tajamar River, the most important lotic course of this endorheic basin. The study area is characterized by a continental subtropical climate, with approximately 900 mm of annual rainfall, especially in summer. Between 2016 and 2018, two annual samplings (high and low waters) were carried out to collect samples for physicochemical analysis according to conventional protocols. In addition, qualitative algae samples were obtained with a 20 µm pore plankton network and quantitative by direct sampling, both fixed *in situ* with 4% formaldehyde and observed under binocular and inverted microscopes. The results revealed well-oxygenated, neutral to slightly alkaline waters and electrical conductivity values between 635–1220 µS/cm. The phycoflora was composed of 65 taxa: Cyanophyta (8), Chlorophyta (18), and Heterokontophyta (diatoms) (37). The diatoms were more represented in the quantitative results, standing out *Diatoma vulgare* (147 ind/mL). It was followed by cyanobacteria and chlorophytes, with *Phormidium breve* and *Chlamydomonas* sp. with densities equal to or less than 6 ind/ml. Diversity values were high (3.0–3.5), except to June 2018 where it decreased to 2.0 due to the proliferation of *Diatoma*.

A57

SPACE-SEASONAL VARIATION OF EPIGEOUS ARACHNIDS (ARACHNIDA) IN THE PREPUNA JUJEÑA

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The objective of the study is to know the composition and abundance of arachnids in an altitude and seasonal gradient of the Prepuna jujeña. Four seasonal samples were carried out (autumn, winter, and spring 2016, and summer 2017), in Tumbaya, Chucalezna, Coraya, and Tres Cruces, whose altitudes above sea level are respectively: 2156, 2787, 3069 and 3693. On each date, 9 pitfalls were placed per sampling site separated by at least 100 m. The 500 mL containers contained 50% propylene glycol and 50% water. The traps were active for three days. The collected material was kept in flasks with 70% alcohol and the arachnids were identified at the family level by specific keys. 177 arachnids distributed in the orders Araneae (53.67%), Solifugae (38.42%), and Scorpionide (7.91%) were collected. According to the altitudinal variation, the maximum abundances of Arachnida were recorded in Coraya (36.93%) and Chucalezna (31.82%), followed by Tumbaya (16.38%) and Tres Cruces (12.43%). The family that was represented on all sites was Zodariidae (Araneae), while Ammotrechidae (Soliphuga) in Coraya and Chucalezna and Theridiidae (Araneae) only in Coraya. As for seasonality, summer was the period with the highest number of individuals (41.21%), decreasing in spring (35.3%), and winter and autumn (11.86%). Ammotrechidae was mostly represented in summer, spring and winter; Zodariidae in spring, summer and autumn, and Theridiidae only in summer. Taking everything into account, it is necessary to continue the studies of this group, especially spiders, because of their usefulness as potential bioindicators of environmental quality in semi-arid areas of Jujuy.

A58

Zuccagnia punctata EXTRACT INHIBITS THE PANCREATIC LIPASE AND REDUCES TRIGLYCERIDES LEVELS IN A METABOLIC SYNDROME MODEL

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Hypertriglyceridemia (HTG) is one of the main metabolic syndrome (MS) characteristics that increase atherosclerosis risk. Pancreatic lipase (PL) plays an important role in the digestion of triglycerides (TG) from the diet, and its inhibition constitutes a key therapeutic target. *Zuccagnia punctata* (Zp), an Argentinean endemic species, is rich in flavonoids, mainly chalcones, which, according to *in vitro* studies, are PL inhibitors. The aim of this investigation is to determine the effect and mechanism of action of oral administration of two doses of Zp

standardized extract (ZpE) on TG levels in an MS model developed by the consumption of a high-fat diet at 18% (HFD). Male rabbits were separated into four groups: control diet (CD), HFD, HFD treated with 2.5 mg/day of ZpE (HFD + 2.5Zp), and HFD treated with 5 mg/day of ZpE (HFD + 5Zp) for 6 weeks. Serum TG was determined. PL extract was obtained from the pancreas, and the inhibitory activity of ZpE and ZpE rich in chalcones (ZpE_{ch}) was determined by using olive oil as substrate and orlistat (PL inhibitor) as the positive control. HFD group showed high TG levels compared to CD (mg/dL): CD: 113.0 ± 14.3 vs. HFD: 191.0 ± 29.9. The administration of 2.5 mg/day of ZpE had no effect, but the higher dose decreased TG values (HFD + 5Zp: 113.0 ± 3.4 mg/dL). ZpE, ZpE_{ch} and orlistat inhibited PL (ZpE: 33.4 ± 5.4 %; ZpE_{ch}: 32.5 ± 13.8 %; Orlistat: 55.2 ± 9.5 %). These results suggested that the daily intake of ZpE can prevent HTG and its associated effects. The mechanism involved the inhibition of PL, and the lack of difference between ZpE and ZpE_{ch} indicated that chalcones would not be the only one responsible for this effect.

A59

ANTIBACTERIAL ACTIVITY OF FRACTIONS OBTAINED FROM STEM BARK OF *Geoffroea decorticans* TINCTURE

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Geoffroea decorticans, popularly known as "chañar", traditionally as an anti-inflammatory, to treat infected wounds and dysentery. The chañar bark is an external tissue known for its medicinal properties, but its bioactive components have not yet been reported. To evaluate the antibacterial activity of polyphenolic (PG) and triterpenic (TG) enriched fractions obtained from *Geoffroea decorticans* bark (CC) on the *Escherichia coli* and *Staphylococcus aureus*. CC grounded powder was washed with an n-hexane and extracted with methanol. The extract was dried and fractionated by acetone precipitation to remove TG from PG. Antibacterial activity was tested on *E. coli* (ATCC 25922) and *S. aureus* (ATCC 29213) (105 CFU/mL) by dot-blot bioautography and disk diffusion assay. The samples were assayed at 250–750 µg of EM and Ciprofloxacin was used as a form of control. The plates were incubated at 37 °C for 24 h. The bioactive fractions were analyzed by GC-MS. PG (250 µg) was active against both strains. The inhibitory halo obtained against *S. aureus* was significantly higher than for *E. coli* ($p > 0.05$). TG did not show activity against the assayed strains. The GC-MS experiments performed for PG showed the presence of Dihydroquercetin, 3,4'-Dimethoxy-5,7,3'-trihydroxyflavone, and protocatechuic acid. The CC exhibited antibacterial activity against Gram-positive and Gram-negative strains, which support ethnomedicinal use. This activity could be attributed to its phenolic compounds constituents.

A60

EFFECTS OF *Smallanthus sonchifolius* LEAVES DECOCTION IN THE PROTECTION OF GASTRIC MUCOSA FROM ETHANOL-INDUCED DAMAGE IN RATS

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Smallanthus sonchifolius [Poepp. & Ende.] H. Robinson is a perennial herb widely distributed in South America. Their leaves have been used for centuries to treat digestive diseases. The peptic ulcer is an increasing disorder resulting from the imbalance between protective and aggressive factors in the gastric mucosa. A protective factor enhancer therapy would be an interesting approach to prevent gastric ulcers. The aim of the present study was to evaluate the *in vivo* gastroprotective effect of the 10% decoction of *S. sonchifolius* leaves. An ethanol-induced gastric ulcer model in Wistar rats was used. The experimental groups (n=6 animals) were: Normal control group, Negative control group, (NaCl 0.9%), Positive control group (Sucralfate 100 mg/kg orally), and Treated group (*S. sonchifolius* 10% leaves decoction 150 mg/kg orally). Mucus content and ulceration parameters were determined. Histological and histochemical studies of gastric tissue were performed. The activity of catalase and the levels of reduced glutathione and malondialdehyde were quantified in gastric homogenates. *S. sonchifolius* extract caused a significant ($p < 0.05$) decrease of the ulcerated area, the severity and number of ulcers, and an increase in mucus content compared with the negative control group. There was also an improvement in the parameters of oxidative stress. These results suggest that yacón has beneficial gastroprotective effects, which is due in part to an *in vivo* antioxidant outcome and the conservation of the mucus wall. Nevertheless, additional studies are needed to determine the active compounds and mechanisms involved.

A61

LEISHMANICIDAL ACTIVITY OF MESO COMPOUNDS

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Leishmaniasis is a serious disease that so far has no vaccine and the existing drugs are very expensive. Given these difficulties, there is an urgent need to develop new therapeutic alternatives. In previous work, we have designed and performed structural modifications of the 1,8-cineol monoterpene ether, obtaining encouraging results. Therefore, three meso derivatives in C3 and C5 positions of cineol have been prepared in this work. In addition to this, the *in vitro* leishmanicidal activity on promastigotes and intracellular amastigotes of *Leishmania infantum* and *L. donovani* of the obtained meso compounds was studied. 500 µM of each synthesized compounds were added to a log-phase promastigote culture (10⁶ parasites/mL). In addition, 5x10³ J774 cells/well were placed in Labtek plates of culture to determine amastigote activity. Once the macrophages adhered, promastigotes in the stationary phase were incorporated (1:10) and it was kept overnight at 33 °C. Subsequently, the dilutions of the esters (100 µM) were added. The number of amastigotes/100 cells and the percentage of infection were determined after 48 h of incubation at 33 °C. Amphotericin B was used as the reference drug. All derivatives were able to reduce the multiplication of promastigotes between 50 and 60%. Against intracellular amastigotes, the compounds tested showed no difference in activity in the parasitic load and the infection rate, eliminating almost all of them. No significant differences in leishmanicidal activity were observed against *L. donovani* and *L. infantum*. These *in vitro* results show the potential utility of these compounds *in vivo* as antiparasitic agents against Leishmania disease.

A62

ACUTE TOXICITY AND ANTI-ULCEROGENIC ACTIVITY OF INFUSION OF *Vaccinium myrtillus* L. STEM at 5%

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Gastric ulcer is a gastrointestinal disease with high prevalence worldwide. Our research group studies the possible gastroprotective effects of natural compounds extracted from *Vaccinium myrtillus* (VM) stems, an agricultural solid waste with potential bioactivity. The aim of this work was to study the possible mechanisms of action involved in the gastroprotective effect of the infusion at 5% (I) of VM stems in an ethanol-induced gastric ulcer model in Wistar rats. The toxicity profile of the aqueous extract of VM stems was also established by bioassays with *Artemia salina* and by acute toxicity tests in rats. The phytochemical characterization of the I of VM stems demonstrated the presence of flavonoids, phenols, and tannins as major components. The oral administration of I-VM stems at different doses (50–150 mg/kg) produces a significant reduction in the severity and percentage of ulceration, maintaining the normal histological structure of the stomach. These effects are linked to the production of mucus as a protective element. The pre-treatment with I-VM stems presented an effective antioxidant effect and a lipid peroxidation inhibition capacity. The use of a model with both, a nitric oxide (NO) synthase inhibitor and a NO precursor suggests the indirect participation of NO in the gastroprotective effect of the extract. No toxicity signs were observed in both, *A. salina* and rats at doses assays. The findings presented in this work allow us to postulate that this extract of simple elaboration presents an effective anti-ulcerogenic activity without adverse effects.

A63

BIOCONTROL OF *Diaphorina citri* ON JUJUY LEMON SYSTEMS

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Diaphorina citri Kuwayama (Hemiptera: Liviidae) is one of the vectors of the bacterium (Candidatus *Liberibacter SP.*) which causes the disease Huanglongbing (HLB) in citrus fruits. Detection of the pathogen in the Argentine Coast, Chaco, Formosa, and Santiago del Estero, in juveniles and adults of the vector, Myrtle and citrus plants, determine the progression of the disease to our region, therefore, the chemical control of the insect is the tool more recommended and used. However, the action of environmental microbiological factors on *D. citri* was little explored. The objective of the work was to identify potential microorganisms for biocontrol of *D. citri* in lemon systems of Jujuy. The studies were carried out in commercial plantations of lemon Genoa 19 years old located in the town of Santa Clara during the 2018–2019 campaign. A sampling of eight branches of 15 cm of length/tree (two/cardinal point) on a total of 10 plants/batch extractive was carried out once per season. Samples conditioned and identified were taken to the laboratory where reviewed branches and leaves, under binocular Loupe, recording and spreading juvenile and adult forms of *D. citri* dead with signs of mummification. From bodies micosados were insulation in APG and monosporic in APD. Multiplication was rice and identification, morphometry, and specific key usage. *Hirsutella*

citriformis Speare (Hypocreales: Ophiocordycipitaceae) is determined as a potential biocontrol of *D. citri* in lemon commercial systems of Jujuy, this being the first mention of the entomopathogen associated to the vector in the province, which shall be carried out tests of pathogens under controlled conditions.

A64

ABUNDANCE OF MITES PRESENT IN CITRUS PLANTATIONS OF JUJUY PROVINCE

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Jujuy meets the ideal ecological conditions for the development of citrus crops. Among the main groups of arthropods that cause damage of economic importance are mites. However, in this agroecosystem, there are species of beneficial mites that exert natural control over the populations of harmful mites. The objective of this work was to determine the abundance of acarofauna in commercial farms of lemon, orange, and grapefruit in Libertador General San Martín and Santa Clara, Jujuy, whose destination is the industry with low impact of agrochemicals. Sampling was carried out during the 2018–2019 campaign with a frequency of one repetition per season. They consisted of the extraction of 10 branches and 8 fruits for every 20 trees. In the Agricultural and Forest Zoology laboratory of EECT, the plant material was observed under a stereoscopic magnifying glass. The collected mite specimens were analyzed and preserved. About orange, 2558 individuals were collected: 84% to the Tydeidae family, 4% Tenuipalpidae, 3% Eriophyidae, Phytoseiidae and Stigmaeidae, and less than 1% Tetranychidae, Tarsonemidae, Bdellidae, Ascidae and Oribatida. In lemon 1595 were quantified: 49% Tenuipalpidae, 21% Tetranychidae, 15% Phytoseiidae, 7% Eriophyidae and Tarsonemidae, lower than 1% Cheyletidae, Acaridae and Oribatida and in grapefruit 989 copies: 49% Tydeidae, 32% Phytoseiidae, 7% Tenuipalpidae, 5% Tetranychidae, 4% Tarsonemidae, and less than 2% Acaridae, Eriophyidae, Cheyletidae and Oribatida. It is proposed to continue with the identification of these organisms present in these systems.

A65

ANTIOXIDANT POTENTIAL BETWEEN TWO VARIETIES OF OLIVE OIL: ARBEQUINA AND CORATINA OF ANTINACO VALLEY– LOS COLORADOS

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The Mediterranean diet is associated with a lower incidence of pathologies of cardiovascular origin and greater longevity in humans. These health benefits have been attributed partly to the consumption of olive oil. In Argentina and particularly in La Rioja province, there is little information about the biological activity of olive oil and its beneficial health potential in the literature. Our objectives were (1) to compare the antioxidant potential of two varieties of olive oil, Arbequina and Coratina, from the Antinaco-Los Colorados Valley, Chilecito-La Rioja, and (2) to evaluate the correlation between the polyphenol content of oils and their antioxidant activity. Three samples of each variety were taken from three olive oil enterprises in the valley. Antioxidant potential was determined by the DPPH method. BHT, quercetin, and ascorbic acid were used as reference antioxidants. The content of total polyphenols was evaluated by the Folin-Ciocalteu method. In addition, the total flavonoid content was estimated. Correlation analyses were performed using INFOSTAT. Coratina variety showed significantly greater antioxidant activity than Arbequina. In addition, Coratina variety had a higher content of polyphenols and flavonoids ($p < 0.05$). Based on correlation analyzes, Arbequina antioxidant activity had a significant correlation with its flavonoid content. Coratina showed a significant correlation between the antioxidant potential and the phenol and flavonoid content. The higher antioxidant activity of Coratina could result from its higher polyphenol content. Coratina variety has better antioxidant activity that could be beneficial for human health.

A66

ANTIFUNGAL EFFECT OF ETHANOLIC EXTRACTS FROM NATIVE PLANTS OF LA RIOJA

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In La Rioja, olive and grapevine crops are affected by phytopathogenic fungi such as *Verticillium dahliae* and *Phaeoacremonium parasiticum*, which decrease their quality and yield. Our objective was to study the ethanol extracts (EE) antifungal effect of La Rioja native plants on the phytopathogens: *V. dahliae* and *Pm. Parasiticum*. The EE were obtained by maceration of dry plant material from *Zuccagnia punctata*, *Clinopodium gilliesii*, *Lippia turbinata*, *Lippia integrifolia*, *Argemone subsiformes*, *Caesalpinia gilliesii*, and *Senecio nutans*. The antifungal activity was determined by the percentage of mycelial growth inhibition of *V. dahliae* (7 and 9 days) and *Pm. parasiticum* (7, 9, and 12 days). Benomyl was used as a reference antifungal. The results were expressed as MIC (minimum inhibitory

concentration of 100% of mycelia growth). *Z. punctata* EE was able to inhibit *V. dahliae* growth at 7 and 9 days (MIC = 1.5 mg/mL). *C. gilliesii* EE presented antifungal activity against *V. dahliae* at day 7 (MIC = 2.5 mg/mL) and at day 9 (MIC = 3 mg/mL). *Z. punctata* EE was effective in inhibiting the growth of *Pm. parasiticum* at day 7 (MIC = 1.5 mg/mL) and at days 9 and 12 (MIC = 2 mg/mL). Another extract that showed inhibitory activity against *Pm. parasiticum* was *L. turbinata* at day 7 (MIC = 2 mg/mL) and at day 9 (MIC = 3 mg/mL). The antifungal activity of *C. gilliesii* and *L. turbinata* EE decreases over time, so they could have a fungistatic effect. The EE *Z. punctata* resulted in the highest inhibitory potential of the two phytopathogens. The inhibitory activity of this EE on *V. dahliae* was kept at steady time rates, however, on *Pm. parasiticum* fungistatic effect was produced.

A67

EFFECT OF VARIOUS EXTRACTION METHODOLOGIES IN THE RECOVERY OF BIOACTIVE METABOLITES OF NATIVE PLANTS FROM LA RIOJA

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The use of different extraction techniques determines the chemical composition of plant extracts and consequently their biological activities. The objective was to compare the biological activity of metabolites of native plants from La Rioja obtained by two different methodologies (hydrodistillation and maceration). Essential oils (EO) and ethanolic extracts (EE) were obtained from *Lippia turbinata*, *Clinopodium gilliesii*, *Lippia integrifolia*, *Zuccagnia punctata*, and *Senecio nutans*. The antioxidant activity was evaluated by DPPH radical scavenging assay and the anti-inflammatory activity was determined by a cyclooxygenase (COX-2) inhibition assay. BHT and indomethacin were used as reference compounds. The *L. turbinata* EO showed good DPPH antiradical ability while the other oils evaluated showed a low antioxidants potency. The *L. turbinata*, *C. gilliesii*, and *Z. punctata* EE presented the best antiradical activity, thus being this activity similar to that of the reference BHT antioxidant. The most effective in inhibiting the COX-2 were *C. gilliesii* and *L. integrifolia* EOs (300 µg/mL), reaching inhibition values of 60% and 54%, respectively. The EE had a weak inhibitory activity on COX-2 assay conditions, being the inhibition percentages lower than 20%. The Biological property knowledge of native plants is the basis for future applied research. Our results showed that the *L. turbinata*, *C. gilliesii*, and *Z. punctata* EE have better antioxidant capacity than their corresponding EO. In addition, the ability of *C. gilliesii* and *L. integrifolia* EOs to inhibit the COX-2 enzyme was higher than their EE. This would indicate that the antioxidant activity is concentrated in the non-volatile fraction of the plants, while the anti-inflammatory activity in the volatile.

A68

STUDY OF THE ENVIRONMENT OF A COMMON LABORATORY FOR THE ELABORATION OF FOOD

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According to the Argentine Food Code (AFC), Good Manufacturing Practices (GMP) are required by the establishments that market food, in order to prevent Foodborne Illness (FI); in those practices, facilities are contemplated, where the air plays an important role in the health of the individual and in food safety for being these vehicles of pathogenic microorganisms, whereby it must be studied and controlled. The objective of this work was to qualitatively assess the environmental fungal load, in two different circumstances in a common laboratory, used to prepare food. For this, artisanal yogurts were made with and without nuts (F1 and F2), without preservatives, in two situations, (A) immediately after the concurrence for three months of students who attended a subject, and (D) after the use of an environmental disinfectant in the laboratory. For F1 and F2, in (A), 15 days after the yogurts were made, fungal development was observed on its surface. The colonies were seeded in glycated potato agar (GPA). The genera identified were *Mucor* sp., *Cladosporium* sp., *Penicillium* sp., and *Mycelia sterilia* sp., (saprophytes characteristic of environments). For F1 and F2 in (D), there was no colony development and microbiological fitness was of 35 days. These results demonstrate the importance of environmental control in places where food products are made, although the genera found in these yogurts are not pathogenic, they negatively influence the macroscopic aspect of the processed food.

A69

FIRST REPORT OF *Botryodiplodia* sp. CAUSING CANKER IN *Cedrela balansae* IN NOA-ARGENTINA

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Cedrela balansae is a forest species of the Argentine Yungas with woods of high economic value. In its natural habitat, it is a species that does not present important pathologies cited so far. However, outside of its protected environment (open sky) and under conditions of stress, the tree evidenced symptoms of a disorder that affects cortical tissues. As of 2017, we have observed elongated cankers of different magnitude in young and lignified tissues that developed to produce necrosis and decay of the plants. To identify the causative agent of this symptom, samples were taken in a 7-year-old *C. balansae* plantation located in the depressed plain of Famaillá Tucumán. Samples of wood with cankers were collected and carried to the laboratory of Phytopathology of the EEA-INTA Famaillá. Small pieces of diseased tissue were superficially disinfected with ethanol 70% and sodium hypochlorite 5% and seeded in Petri dishes with potato dextrose agar (PDA). The colonies were initially white changing to dark grayish-green. Globose pycnidia were developed with conidiophores attached to the walls of the fruiting body. For all these reasons and the arguments described in Barnett and Hunter (1998), genus *Botryodiplodia* was identified as responsible for the described symptoms. This constitutes the first report in the NOA (Argentine Norwest) referring to the death of branches and plants of *C. balansae* outside the optimal cultivation zone that is associated with *Botryodiplodia*. The information generated will allow the adjustment of subsequent epidemiological studies and their control.

A70

USE OF LIOFILIZATION IN OBTAINING MICROBIOLOGICALLY INOCUOUS OVOPRODUCTS RICH IN OMEGA-3 FATTY ACIDS.

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Previous researches performed by this team have reported obtaining fresh eggs enriched in omega 3 through the supplementation of chicken feeding. Currently, there are products on the market that fulfill the same characteristics as fresh eggs, although they last longer, facilitate the food preparation process, are more economical and hygienic: “egg products” and more specifically the “egg powder”. The objective of this work was to obtain egg products from eggs riched in omega-3, lyophilized egg whites and yolks, using lyophilization; to study its potential advantages over spray drying, regarding the content of omega-3 and the microbiological quality of the product obtained. Lyophilized egg whites and yolks were obtained, the acid in yolk was analyzed, the moisture and the total microbial quantity of the samples were determined. All determinations were performed in duplicate. The omega-3 content of the riched lyophilized yolk was significant $\geq 1.3\%$. The moisture content was $3.5 \pm 0.5\%$ for the white and $0.6 \pm 0.1\%$ for the yolk. The aerobic mesophilic flora was $< 10000/g$ for each of the samples analyzed. These results confirm that the lyophilization conditions used were sufficient to obtain a low moisture powder, microbiologically harmless, maintaining a high content of omega-3. The moisture values obtained are lower than those reported in egg products obtained by spray drying and fulfill the requirements of this product on the international market.

A71

ADVANCES IN THE GENETICS IDENTIFICATION OF *Pelargonium x citrosum* VANLEENII

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Geraniaceae family has a great number of species with antifungus, anti-microbiological, larvicidal, and insecticidal activity. *Pelargonium x citrosum* Vanleenii (c.n. “citronella”) is cited as a hybrid obtained by genetic engineering. It has interesting properties as a repellent and larvicide because of their essential oils, like geraniol and citronellal which adds an economical value to the industry. Respect to its reproductive biology, the existence of protandry, self-incompatibility, and a normal chromosomal behavior was pointed. On the other hand, it was previously reported high pollen viability but with difficulties in the production of fertile seeds. Basic numbers of $x = 6, 8, 10, 11$ y 19 have been cytogenetically informed. The objective of this work is to determine the chromosomal number and ploidy level of accession of *P. x citrosum*, coming from San Miguel de Tucumán city. Conventional techniques were used for making the mitosis cytogenetic analysis. Results gave a chromosomal complement of $2n = 88$, indicating it is an octoploid species with $x = 11$ and a small chromosome size ($1.5 \mu m$ approx.). These results are according to the bibliography data. Taking into account its polyploidy condition and the lack of fertile seeds, it is difficult the crop propagation. For this reason, *P. x citrosum* is clonally multiplied. *In vitro* multiplication is greatly used, resulting in genetically uniform populations. Because of the possibility of somaclonal variations in the *in vitro* multiplication, it is recommended the confirmation of the chromosomal number.

A72

NUTRITIONAL QUALITY OF CORN STOVER. IT'S USE IN THE FEEDING OF LIVESTOCK

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In order to promote sustainability, bovine breeding is usually performed on mixed farms. During certain periods of the year, pastures of excellent nutritional value are obtained there to cover the requirements of the cows. In winter and early spring, there is a decline in the fodder supply and the nutritional quality of the pastures. During the first months of pregnancy, the nutritional requirements of these animals are at maintenance level. Given this physiological-nutritional condition and in order to cover the fodder deficit, residues of agricultural crops or stover can be used to feed the livestock. Crop residues, especially corn stover, are available in many facilities dedicated to breeding. The aim of this work was to evaluate the nutritional quality of corn stover in the different parts that compose it. Whole stover, stems, leaves, and corn residues were analyzed. We worked with the standardized analytical methods of the AOAC. The results showed: (1) Whole stover: %Crude Protein (CP) = 6.58 ± 0.7 , %Ethereal Extract (EtEx) = 1.35 ± 0.35 , %Crude Fiber (CF) = 28.11 ± 0.35 , %Ash = 12.02 ± 1.31 , %Extract Non-nitrogen (ENN) = $51.93 \pm 2.76.2$); (2) Sheets: % PB = 5.33 ± 0.13 , %EtEx = 1.03 ± 0.01 , %CF = 28.46 ± 0.66 , %Ash = 10.41 ± 1.49 , %ENN = 54.76 ± 2.3 .; (3) Stems : %PB = 2.16 ± 0.03 , %EtEx = 1.26 ± 0.01 , %CF = 38.08 ± 0.08 , %Ash = 7.73 ± 0.39 , %ENN = $50, 76 \pm 0.28$; and (4) Corn remains: %CP = 8.19 ± 0.34 , %EtEx = 3.20 ± 0.07 , %CF = 8.34 ± 0.02 , %Ash = 2.16 ± 0.005 , %ENN = 78.09 ± 0.29 . According to the results obtained, the animals would not meet the nutritional maintenance requirements if the stocking rate is high. Therefore, a supplemented diet is recommended.

A73

NEOTROPICAL LIMNEIDOS MOLLUSCS IN CATAMARCA

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Mollusks of the Lymnaeidae family participate as intermediate vectors in the biological cycle of the trematode *Fasciola hepatica*, the etiological agent of fascioliasis. Among the lymnaeids, some groups, as in the case of Galba/Fossaria, are treated as subgenres of the genus *Lymnaea sensu lato* that embraces the greatest number of species. The objective was to characterize molecularly the snails of different aquatic habitats of Catamarca. Samples were collected in the 18 departments of the province. The lymnaeids were characterized by the sequences of the complete proteins of rDNA ITS-2 and ITS-1 and fragments of mtDNA 16S and *cox1*. Each of these four markers was amplified by PCR independently for each sample and each product was sequenced for the characterization of the haplotype. The comparison of the sequences was performed using all the data downloaded from GenBank. The DNA sequences demonstrated the presence of *Lymnaea neotropica* and *Lymnaea viator*. Two new haplotypes were found in *Ln* (ITS-1 and *cox1*), which is characterized by having identical sequences for the four markers used and four in *Lv*, in a single population of lymnaeids, detecting a new haplotype in each marker studied. By interspecific differentiation, ITS-1 and 16S showed the highest and lowest resolution respectively. For intraspecific analysis, *cox1* was the best marker and ITS-1 was the worst. The analyzes revealed that the Catamarca specimens present identical sequences to *Ln* (= *L. viatrix* variety "elongata") and *Lv* suggesting that these are the species present in the province. Species *Lv* and *Ln*, intermediate hosts of *F. hepatica*, cohabit in the same biotopes. *Lv* was not related to non-sporadic human infections and *Ln* constitutes the registration of the species in the northwest Argentina region.

A74

TEMPORAL EVOLUTION OF PHYSIOLOGICAL PARAMETERS USED AS STRESS MARKERS DURING THE EXPOSITION OF *Salvinia minima* TO HEXAVALENT CHROME

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It is widely documented that the exposure of plants to heavy metals (HM), induces the appearance of various metabolic and physiological responses with changes in certain parameters, among which are the phenolic compounds (PC). The objective of this work was to analyze the patterns of temporary accumulation of PC that can be used as stress/tolerance markers during the exposure of *S. minima* plants to Cr(VI). For carrying out the tests, *S. minima* plants were grown in the presence of K₂Cr₂O₇, as a source of Cr(VI), at a concentration of 20 mg/L per 7 days. The percentage of metal removal every two days was determined using diphenylcarbazide (DPC). Soluble phenols (SP) and insoluble phenols (IP) were quantified with the Folin-Ciocalteu reagent. The results showed that in plants exposed to Cr(VI), the SP decreased due to the effect of the metal independently of the organ analyzed. Otherwise, the IP showed a pattern of inverse accumulation to that observed for the SP, with a maximum peak of accumulation on day 4. The removal profile coincided with the increase in IP. The results suggest that the PC would be a good marker to be used in the evaluation of the physiological state of *S. minima* during its exposure to Cr(VI) since they could function as molecules antioxidants and/or chelators, so that their accumulation could constitute an additional tolerance mechanism that this plant would have to grow in contaminated environments.

A75

COMPARATIVE STUDY OF ANTIRRADICAL CAPACITY AND COMPOSITION OF PHENOLIC COMPOUNDS IN *Morus nigra* AND *Morus alba*

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Consuming fruits and vegetables, with high phenolic compounds, reduces the incidence of heart and cerebrovascular diseases, reducing cancer mortality according to epidemiological studies. *Morus* is a genus whose fruits contain phenolic compounds such as anthocyanins and flavonoids, with chemopreventive action. The objective was to compare phenolic components and the antiradical capacity in extracts of these fruits. *Morus nigra* and *Morus alba* were collected in Tucumán. We worked with dry lyophilized extracts, obtained by maceration, in hydroalcoholic mixtures, ethyl acetate, and dichloromethane. Phenols (mg/100g), flavonoids (mg/100g), anthocyanins (mg/100g), and antiradical capacity were quantified: PPHD* (%) and ABTS*+ (%). *Morus nigra*. Hydroalcoholic extract: Phenols: 1058.23. Flavonoids: 1116.00. Anthocyanins: 340.96. DPPH*: 49.16. ABTS*+: 34.21. Ethyl acetate extract: Phenols: 1012.23. Flavonoids: 1105.74. Anthocyanins: 324.28. DPPH*: 46.38. ABTS*+: 35.42. Dichloromethane extract: Phenols: 668.04. Flavonoids: 157.77. Anthocyanins: 3.34. DPPH*: 19.15. ABTS*+: 16.30. *Morus alba*: Hydroalcoholic extract: Phenols: 1048.58. Flavonoids: 773.85. Anthocyanins: 76.86. DPPH*: 12.35. ABTS*+: 9.64. Ethyl acetate extract: Phenols: 1003.13. Flavonoids: 750.71. Anthocyanins: 63.51. DPPH*: 10.61. ABTS*+: 9.03. Dichloromethane extract: Phenols: 622.13, Flavonoids: 253.56. Anthocyanins: 0.05, DPPH*: 2.26. ABTS*+: 318. The hydroalcoholic extracts have more antioxidants. The free radical scavenging capacity is moderate in hydroalcoholic and ethyl acetate extracts, correlating with antioxidant capacity.

A76

Cr(III), PH AND SEASONAL NATURE EFFECT ON MDA CONTENT IN TWO *Salvinia* SPECIES

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The toxicity of heavy metals disrupts the balance between the creation and elimination of reactive oxygen species (ROS), which might lead to lipid peroxidation with the consequent accumulation of malondialdehyde (MDA) in plant tissues. The objective of this study was to estimate oxidative stress in *S. minima* and *S. rotundifolia* exposed to Cr(III) and at different pH values. The MDA content was determined spectrophotometrically using thiobarbituric acid and the integrity of membranes was estimated through electrolyte leakage trials. The results exposed that in both *Salvinia* species, the higher concentrations of Cr(III) and the increase in the pH of the medium in both summer and winter, led to a significant increase in MDA content in fronds. On the contrary, in lacinias, a significant decrease in MDA was observed at pH 4 and 7.6 in *S. minima* and all pH values in *S. rotundifolia*. Similarly, increases in the percentage of electrolyte leakage were also observed by increasing the metal concentration and the pH in the culture medium. These results indicated that the accumulation of Cr(III) and the pH value acted together to produce marked oxidative stress only in fronds and that the lacinias had a more efficient protection mechanism than the cells of the fronds. Likewise, it can be observed that *S. minima* and *S. rotundifolia* respond differently, according to the organ considered, to the application of Cr(III), and to the increase in pH of the culture medium.

A77

EVALUATION OF IRON COMPLEXING ACTIVITY AND TOXICITY OF PUNICALLIN

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Punicallin (PUN) combines with fluconazole (FLU) exerting fungicidal activity against *Candida albicans*. Action mode of PUN could be attributed to an iron complexing activity. The iron complexing activity was assessed through bathophenanthroline assay to attain the chelating concentration 50 (QC₅₀). *Artemia salina* and *Bacillus subtilis* rec assays were employed to assess the general toxicity and genotoxicity, respectively. PUN exhibited iron complexing activity: CQ50 = 6 µg/mL, moderate toxicity on *Artemia salina* (LC50 = 602 µg/mL), and absence of genotoxicity on *Bacillus subtilis* (S-probit between -0.123 and 0.199). The results contribute to the understanding of the antifungal action of PUN and its toxicity, laying the foundations that justify deepening studies on this metabolite.

A78

PRELIMINARY PHYTOCHEMICAL STUDY AND POTENTIAL *IN VITRO* ANTIFUNGIC STUDY OF THE FRACTION IN DICHLOROMETHANE OF *Flourensia blakeana* ON *Aspergillus ochraceus*

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The genus *Flourensia* (Asteraceae) is distributed throughout the cordilleran region of North and South America with six species in Argentina. There is a record of antifungal, anthelmintic, anti-algae properties in some species studied. The objective of this work was to explore the effect of the dichloromethane fraction (DCM) of *Flourensia blakeana* on strains of *Aspergillus ochraceus* and carry out a preliminary phytochemical study of the extract. Vegetal material was collected in Tafí del Valle department, Tucumán. The DCM fraction was obtained by dividing the ethanolic extract of leaves and flowers. A combination of TLC, CC, CCV chromatographic techniques was used in the phytochemical study, a flavanone and costic acid derivatives were identified in principle. The structural elucidations of the compounds were determined by NMR spectroscopy in one and two dimensions (¹H, ¹³C, HSQC, HMBC). The antifungal activity was carried out by the method of inhibition of radial growth in plates, in culture medium Potato Dextrose Agar (PDA), with different concentrations of extracts (10, 50, 100, and 200 µg/mL) inoculated with *A. ochraceus*. The DCM fraction had a significant inhibitory activity on *A. ochraceus*. In relation to the phytochemical study, 3 compounds were identified: 3,5,5'-trihydroxy-7,3'-dimethoxylavanone, 2 α -hydroxy-costic, and 2 α -angeloylo-costic acid. The results obtained allow us to predict that this species of *Flourensia* may be of interest in the search for natural fungicides. Work continues in order to isolate and identify the antifungal compounds in the DCM fraction.

A79

TOXIC EFFECTS OF NATURAL PRODUCTS OF VEGETABLE ORIGIN ON *Oryzaephilus surinamensis* (COLEOPTERA: SILVANIDAE)

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Walnut production in the province of La Rioja is an important economic activity, particularly in Chilecito and Famatina Departments. The nuts and other agri-food product storages are frequently affected by insects of great reproductive capacity. Pest control during storage depends mainly on fumigants and/or insecticides. Natural products of plant origin are an interesting alternative due to their repellent and/or insecticidal properties. The objective of this work was to evaluate the toxic effects of ethanolic extracts obtained from vegetable species of regional native flora on larvae and adult specimens of *O. surinamensis*, one of the stored nut pests. The toxicity tests by topication with the ethanol extracts of *Lippia turbinata*, *Argemone subfusiformis*, *Zuccagnia punctata*, *Caesalpinia gillesii*, and *Clinopodium gillesii* were performed at concentrations of 1000, 3000 and 5000 mg/L. Essays were performed in triplicate using groups of 15 individuals (larvae or adults). They were topified with 0.5 µL of each of the extracts and transferred to a breeding chamber with nuts previously treated at low temperatures as food. Mortality data were recorded for 72 h. Concentration-dependent lethal effects were obtained with the ethanolic extracts of *L. turbinata* and *A. subfusiformis*, reaching mortality rates of 71.1% and 42% on larvae, respectively. Both natural products are promising for the control of *O. surinamensis* in nut stores in the region

A80

DETERMINATION OF Ca AND P IN BLOOD OF BRAFORD HEIFERS COMPARING TWO PRODUCTION SYSTEMS, PASTORAL AND SILVOPASTORAL, IN THE “DEPRESSED SALINE PLAIN”, LEALES DEPARTMENT, TUCUMAN – ARGENTINA

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Blood metabolic profiles are an appropriate tool to determine the effectiveness of nutrients and minerals in cattle. The aim of this work was to determine if the production systems and the time of the year influence the calcemia (Ca) and the phosphatemia (P) of Braford heifers in the area of Leales Department-Tucumán. It is important to compare the contributions of different production systems, in this case, Silvopastoral (SPS) and Pastoral Pure (PS). This work was carried out in IIACS-INTA-Leales and the FAZ-UNT. We worked with 24 heifers in each System. The pasture in both systems is implanted *Chlorisgayana* cv *Epica*, and there are *Prosopis alba* trees in the SPS. The animals were supplemented with silage and corn grain during the period of low forage supply. Eight blood extractions were performed from June to September, dry pasture period, and from November to February, active pasture growth period. Samples were processed in laboratories of the FAZ-UNT. An ANOVA was performed ($p \leq 0.05$). The average values for Ca (mg/dL) showed differences between the

systems and periods evaluated, being for SPS 9.82 mg/dL and for PS 9.55 mg/dL, dry 9.55 mg/dL, green 9.87 mg/dL. As for P, there were no differences between treatments. The levels obtained from these minerals are within normal ranges.

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