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TUCUMAN BIOLOGY ASSOCIATION

LECTURES

A1
"Miguel Lillo" Lecture
A SWEET ADVENTURE FROM TUMOR-IMMUNE ESCAPE TO THE RESOLUTION OF THE INFLAMMATORY RESPONSE

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In the postgenomic era, the study of the glycome –the whole repertoire of saccharides in cells and tissues– has enabled the association of unique glycan structures with specific physiological and pathological processes. The responsibility for deciphering this biological information is assigned to endogenous glycan-binding proteins or lectins whose expression is regulated at sites of inflammation and tumor growth. Galectins, an ancient family of glycan-binding proteins, control immune and vascular signaling programs, by modulating the signaling threshold of relevant glycosylated receptors. Our laboratory investigates the molecular interactions between endogenous galectins and glycans leading to the control of immune tolerance and homeostasis. In the past years, we have identified essential roles for galectin-1 (Gal-1), a proto-type member of this family, in tolerogenic circuits operating during tumor growth, microbial invasion, and resolution of autoimmune inflammation. Mechanistically, this endogenous lectin acts by selectively dampening Th1 and Th17 responses, instructing the differentiation of tolerogenic dendritic cells, promoting the expansion of regulatory T cells, and favoring M2 macrophage polarization. Moreover, our studies identified a glycosylation-dependent, Gal-1-mediated program that links tumor hypoxia, immunosuppression, and vascularization and hinders the success of anti-angiogenic and immunotherapeutic modalities. In conclusion, our studies contributed to elucidating novel pathways via which endogenous galectins translate glycan-encoded information into unique signaling programs, findings that bring unifying principles to the diverse fields of immune regulation, oncology, and vascular biology. These observations have opened new possibilities for the development of therapeutic strategies aimed at potentiating antitumor responses, reinforcing antimicrobial immunity, and limiting autoimmune inflammation.

A2
Opening Lecture
SCIENCE AND TECHNOLOGY AT THE SERVICE OF SUSTAINABLE DEVELOPMENT

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One of the main objectives of our management at the Ministry of Science, Technology, and Innovation (MINCYT) is to strengthen the capacities of the scientific-technological system aimed at contributing to the solution of the problems that affect our society. The presentation will discuss the challenges of linking scientific research and technological development with relevant public actions and policies to find the solution to socio-environmental problems and tend towards sustainable and inclusive development. Examples of some specific actions carried out within the framework of the current management of the Ministry of Science, Technology, and Innovation will be presented.

A3
Immunocovituc Lecture
A MULTIDISCIPLINARY AND MARATHON CHALLENGE: "INMUNOCOVITUC" AT THE SERVICE OF THE COMMUNITY

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SARS-CoV-2 has caused a pandemic with drastic health and socioeconomic consequences. The coronavirus disease 2019 (COVID-19) challenges health systems to respond quickly by developing new diagnostic strategies in order to generate key tools to provide answers and help the community. In this context, we developed an "*In-House*" ELISA, called ImmunoCoviTuc (ICTuc), which is highly sensitive, specific, and precise and that detects anti-SARS-CoV-2-spike-RBD IgG (a-RBD) with which it was possible to (i) analyze humoral immune responses in 602 healthcare workers who received SPUTNIK V up to 180 days post-vaccination (dpv), (ii) study the a-RBD titers elicited after SPUTNIK V in individuals with or without previous SARS-CoV-2 infection measured up to 180 dpv, (iii) perform the neutralization activity of antibody responses elicited by the SPUTNIK V vaccine in naïve versus previously infected individual, and (iv) show the influence of basal titer and time elapsed after SARS-CoV-2 detection on SPUTNIK V humoral immune response. The ICTuc

allowed us to conclude that (a) the seroconversion was detected in 97% of individuals after 28 dpv, (b) a-RBD titers began to decrease after 60 dpv, but remained detectable in 94% of volunteers at 90 dpv, (c) the persistence of a-RBD up to 180 dpv in 31% of volunteers, (d) previous SARS-CoV-2 infection triggered an increased immune response to the first dose and increased neutralization activity against different variants of concern, (e) the second dose in previously infected individuals further increased anti-RBD titers, even after 90 dpv, (f) time elapsed between COVID-19 diagnosis and vaccination did not influence titers elicited. These findings provide essential insights into the kinetics of SPUTNIK V-induced antibodies up to six months after immunization and suggest the importance of determining baseline a-RBD titers.

SYMPOSYUM: "ANIMAL PRODUCTION"

A4
SUSTAINABLE BREEDING OF *Salvator* LIZARDS

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The genus *Salvator* comprises a group of large lizards that inhabit the South American plains. Decades ago, the intense and sustained demand for its skin, originated a severe extraction from nature, becoming one of the most commercially exploited reptiles in the world. This led to the implementation of protection programs and the development of captive breeding systems. In recent years, hunting pressure has decreased considerably. However, these lizards continue to attract the interest of the global scientific community for different reasons. On the one hand, its popularity as a pet has increased in the last two decades because it is considered an unusually high-intelligence reptile, possible to domesticate, and, moreover, one of the only lizards that seem to enjoy human company. On the other hand, dispersal outside its natural habitat raises concern about the negative ecological impact caused by this invasive species. Finally, particularly interesting is the recent finding that adult *Salvator merianae* animals have the ability to raise their body temperature 10°C above that of their environment, this being the first lizard described with facultative endothermy. Our working group has been studying the biology of these animals for more than 30 years. We studied *Salvator*'s digestive system, its nutritional capacity, and a hatchery diet was designed. Their reproductive systems (anatomically, histologically, and physiologically) and nervous (vomeronasal organ) were studied. We also carry out metabolic and hematological studies, and biochemically characterize fatty substances and meat. We are currently studying the functional bioconformation of the eggshell, associated with embryonic development and early sexing of the offspring. We are also carrying out studies related to heat generation. All this knowledge leads to a better understanding of the species, whether to preserve it, domesticate it or limit it as invasive

A5
HOMEOSTASIS OF BEES (*Apis mellifera*) AND CLIMATE-ENVIRONMENTAL CHANGE, A SUBSISTENCE RESOURCE

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The European bee, *Apis mellifera* (Am), is the most economically valuable species as a pollinator of agricultural crops worldwide, maintaining biodiversity through the pollination of numerous species. It has a great capacity for adaptation, which is why it is found almost everywhere in the world and in very diverse climates. Faced with climate change where they predict modifications in certain regions of the world, with invaded deserts, a retreating ice sheet, variation in rainfall patterns, and a greater frequency of extreme weather events, the bees used resources such as migration, changes in the cycle of life and behavior, adaptations to a great variety of predators, parasites and pathogens, also facing new tensions with new pathogens due to trade between bee species and other effects of anthropization in order to survive in new biotopes. Climate change destabilizes the relationships between flowers and pollinators, so pollinators must be protected to ensure that they continue with their function. Thus, according to the supply of natural food, there are species of *Apis* that accumulate more food than others to overcome critical stages, which is why they developed a great potential for collecting honey and are used by man to satisfy their needs. The variations in the life of *Apis mellifera* related to changes in temperature and environment show that this species has great plasticity and genetic variability, which allowed them to adapt to new environmental conditions. We do not know the precise impact of climate and environmental changes on honeybees, but we believe that they directly influence their development. Global conservation measures will need to be taken to prevent further losses of this rich genetic diversity and preserve valuable ecotypes for the world's biodiversity.

A6
SCIENCE CALLS. RESEARCH IN ANIMAL PRODUCTION AND TRANSLATIONAL MEDICINE

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South American camelids are an autochthonous productive resource used by the Andean peoples since pre-Inca times. As a consequence of the Spanish colonization, they were replaced by other mammals of productive interest, being displaced to the present day. Regarding the scientific field, knowledge of the physiology of these animals also lagged behind that of other species. This was probably due to the distance between research centers and the camelid location. The current search for sustainable production generated a renewed interest in these species, which grew as their production capacity in ecologically and economically marginal areas became more and more valuable, and their physiological particularities led to the discovery of molecules with medicinal applications. Our research group began contributing to the knowledge of the reproductive physiology of the llama and alpaca, describing mechanisms such as the sperm reservoirs formation in the oviduct, and the process of embryo implantation. We report the existence of specific molecules and their role in these events. We advanced towards the improvement of semen cryopreservation and the search for molecular markers of early pregnancy. We explored the recycling of llama manure as fertilizer through composting, vermicomposting, and combined composting and vermicomposting. We initiated studies on the llama milk quality, seeking to include it in the Argentine food code in order to contribute to the food sovereignty of the Andean peoples. Finally, we took on the challenge of finding solutions to the COVID-19 pandemic by generating a platform for the production of llama nanobodies, in consortium with members of the UNT, CONICET, and SIPROSA.

A7
RESEARCH, EXTENSION AND SERVICES OF THE DAIRY QUALITY LABORATORY OF THE FACULTY OF AGRONOMY AND ZOOTECHNICS UNT

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LACALAC is a novel laboratory dedicated to multiple lines of Teaching, Research, Development, Transfer, Extension, and Services related to dairy activity and functional foods. The objective is to describe and disseminate the lines carried out in order to be a continuous link with the needs of the companies in the environment. Lines developed: (a) Functional foods with a dairy base and the addition of prebiotic fructooligosaccharides: the processes were fine-tuned, from the harvest of the prebiotic to the obtaining of final products (chips, yacon flour, cheeses, and prebiotic yogurts) favoring weight loss and improving metabolic and biochemical parameters in preclinical models. This led to the formulation of two patents; (b) Lactic ferments for cheese: lactic bacteria were isolated, characterized, and identified, ferments were designed and pilot fabrications were carried out to evaluate their performance; (c) High-Level Technological Services (STAN): products and processes of dairy farms and dairy industries are analyzed to evaluate the quality of dairy products, through microbiological, physical-chemical, compositional analyzes, inhibitor tests, surface swabs, and somatic cell counts, among others; (d) Added value in origin of regional cheese: Quesillo Regional Cheese from NOA (IRAM Standards 140020, 14090-1 and 14090-2) and Tafí del Valle Cheese (application in process of Geographical Indication) were standardized, for which to evaluate in microbiological, compositional, physicochemical and organoleptic parameters. LACALAC's equipment and its trained professionals present a complete service evaluating and generating responses to the productive environment.

A8
CAPRINO EXPERIMENTAL CENTER OF THE FACULTY OF AGRONOMY AND ZOOTECHNICS. PRESENT AND FUTURE PROSPECTS

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Goat production in the Northwest region of Argentina (NOA) is of great regional importance, mainly for the family farmers who carry it out. Traditionally, the biotype used has been the Criollo Serrano goat, which initially suffered great erosion with the Anglo-Nubian breed and, after that, with breeds specialized in milk production. This situation generated a sustained process of absorption of the Criollo goat, initially driven by the private sector, which later had consequences for small producers, willing to improve the dairy yield of their herds. With the aim of promoting the conservation and characterization of this biotype, the Caprine Experimental Module (MEC) was created in the mid-1990s and since 2016 the Caprine Experimental Center (CEC) of the UNT-FAZ. In this line, studies are being carried out to determine the dynamics of milk production throughout lactation and the statistical models to predict it. Growth under semi-extensive management conditions is also being evaluated for modeling, determining the absolute body growth rate and the effect of various

environmental factors. Finally, other substantial contributions of the CEC are undergraduate degree education and technology exchange, particularly related to smoked cheeses and goat feedlotting.

SYMPOSIUM: "SUSTAINABLE AGRICULTURE; BIOTECHNOLOGICAL INNOVATIONS"

A9
BIOTECHNOLOGICAL INNOVATIONS BASED ON LEGUMES OF THE *Lotus* GENUS FOR THE SUSTAINABLE DEVELOPMENT OF CATTLE PRODUCTION IN THE ARGENTINEAN PAMPAS

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The Salado River Basin region is the most important livestock breeding area in Argentina and the *Lotus* species has been traditionally cultivated as forages. Most of their land surface is dominated by salt-affected soils with severe constraints for traditional crop cultivation (i.e., maize, soybean, etc.). In order to cope with that limitation, farmers have utilized species such as non-native *L. tenuis* (ex-*Lotus glaber*), which shows successful naturalization. As a result, inter-seeding of *L. tenuis* has been proposed as a strategy of choice for improving forage production in marginal areas. The increase in soil quality associated with this legume persistence is achieved by an increment of the organic matter content and improvement of soil fertility. Thus, the introduction of *L. tenuis* and/or other *Lotus* genotypes could have enormous benefits for similarly constrained lands around the world, due to their worldwide distribution. In Argentina, we have been developing an integrated analysis of the changes that occur in soils under *Lotus* species implantation analyzing the microbial diversity associated and the soil's physical and chemical characteristics and their biotechnological applications. In addition, we are identifying some genetic determinants associated with interesting agronomic traits such as plant tolerance against biotic and abiotic stresses and the content of condensed tannins. Now, we are looking forward that our research build-up a solid base for the improvement of agronomical-important legumes and the design and development of better strategies for the management of constrained lands similar to the lowlands in the Argentinean Pampas.

A10
BIOPOLYMER PEANUT SEED COATING AS A CONTRIBUTION TO CULTURE SUSTAINABILITY

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This work presents a biodegradable coating biofilm design formulated with natural macromolecules such as starch, proteins, and glycerol, for its application on peanut seeds, to increase the tegument's resistance and fluency in sowing. Its natural composition allows the incorporation of nodule-inducing rhizobacteria. Both formulations, one based on corn starch and the other on cassava starch, were characterized in their rheology and their biofilm and barrier properties. In coated seeds, biofilm technological characteristics, such as layer thickness, moisture absorption-desorption, contribution to fluency, and mechanical damage resistance were tested. Seeds coated with the biopolymer made up of 3% cassava starch showed increased mechanical resistance and enhanced fluency and barrier properties. The rhizobacteria survived up to 60 days on seeds when included in cassava starch biopolymer and were able to induce nodules in greenhouse and field assays. This work provides a formulation for the biopolymeric coating of peanut seeds, which, being composed of natural, food-grade, and biodegradable substances, has the potential to be implemented in sustainable agriculture.

A11
SUSTAINABLE USE AND ADDED VALUE IN THE PRODUCTION PROCESS OF *Pistacia vera* KERMAN

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Pistachios possess nutritional value, a balanced content of mono and polyunsaturated fatty acids, proteins, fibers, tocopherols, and phenolics. San Juan is the most important pistachio production hub. The increased production, collection, and processing produce solid waste: the outer covering (exocarp) and the woody shell (mesocarp), can be used as a by-product with added value. The aim was to add value to the residues resulting from the production of pistachio, optimizing the extraction of phenolic compounds for use in the food and/or pharmaceutical industry as a source of natural antioxidants. On the market, products with phenolic compounds are categorized into functional beverages and food additives. Given the health benefits and its strong economic position, the recovery of phenolic compounds from agri-food waste has become a topic of interest. The objective was to add value to the residues resulting from the production of pistachio, optimizing the extraction of phenolic compounds for their use in the food and/or pharmaceutical industry as a source of natural antioxidants. With the experimental data, the most efficient operating parameters for obtaining were calculated; it was prioritized to apply treatments such as little or no impact on the environment, water-ethanol in different proportions, and agitation/sonication. Phenolic compounds were extracted and quantified from the residues, and the antioxidant potential was evaluated. The modeling of response variables as a function of operating parameters made it possible to determine the operating ranges close to the optimal value of each independent variable studied.

A12
DEFENSE MECHANISMS INDUCED BY THE ENDOPHITE BACTERIA *Gluconacetobacter diazotrophicus* Pal 5 AS PART OF THE SYSTEMIC RESISTANCE RESPONSE IN *Arabidopsis thaliana* and *Solanum lycopersicum* PLANTS

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Gluconacetobacter diazotrophicus Pal5 (*Gd*), facilitates plant growth and colonizes *Arabidopsis thaliana* Col 0 and *Solanum lycopersicum* plants, inducing morpho-anatomic and physiological changes because it activates the defense system of the plant known as ISR (Induced Systemic Response). Furthermore, we evaluated the possible role of salicylic acid in *Gd*-induced changes, using *Arabidopsis sid2* mutants. The plants are grown in a culture chamber and inoculated with 10^6 CFU of *Gd*/g of soil. Plants are harvested at different dpi to count endophytic bacteria and study their anatomy. Biocontrol assays are carried out with the phytopathogenic bacterium *Ralstonia solanacearum* GMI1000 or the Argentine strain A21, which is a systemic bacterium that causes dehydration wilt in tomato plants. The resistance mechanisms caused by *Gd* in *Arabidopsis* and tomato plants involve the reinforcement of the cell walls of the root vascular cylinder components and stem vascular bundles components, observing greater lignification and thicker walls, which would prepare them to face adverse environmental conditions, such as biotic stress caused by *R. solanacearum*. In *A. thaliana* Col 0 plants, inoculation with *Gd* causes greater size and lignification in the xylem components, sclerosing in the epidermis, exodermis, endodermis, and in the pericycle of the main root; in addition, a greater amount of xylem tissue, increased lignification and sclerosed cortical parenchyma in the stem is observed. In the *sid2* mutants, these qualitative changes were not evidenced by comparing inoculated and control plants. Although *Gd* colonizes *A. thaliana sid2* plants, some of the mechanisms activated during ISR in col 0 plants were not observed in these mutants, reflecting the participation of salicylic acid in this study system.

POSTER PRESENTATIONS

A13
CAN WE USE THE MC1R MARKER IN ARGENTINIAN POPULATIONS TO DISTINGUISH BETWEEN WILD BOAR, DOMESTIC PIGS AND FERAL PIGS?

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The exon of the MC1R gene has two diagnostic sites (c.367G>A and c.729G>A) recognized by restriction enzymes, which makes it a gene widely used as an RFLP molecular marker in several species, including *Sus scrofa*, with the aim of detecting hybrids and studying gene flow between populations. The E^+ allele has been found only in wild boar and is considered wild type. The E^{D1} and E^{D2} alleles were reported in pigs with black coat; E^P in white and spotted pigs; and the e allele is recessive for red color. This work aimed to establish if this marker can be used to distinguish between wild boars, domestic pigs, and feral pigs that inhabit our country, since it has been used only in European populations. Genomic DNA was extracted from 14 samples. A PCR was performed for the exon of the MC1R gene, amplifying two fragments. Subsequently, these were treated with the restriction enzymes BspHI and BstUI and run in an electrophoresis gel. Of all the individuals analyzed, 100% had alleles congruent with their morphotype. Regarding discrimination between pure genotypes (wild

boar/domestic) and hybrids (feral), the technique allowed to confirm that (a) 9/14 morphotypes corresponded to the genotype of the animal and (b) 5/14 morphotypes, characterized as pure boars or pure pigs, turned out to be hybrids. Since it was possible to distinguish two alleles of the gene, one characterized in domestic pigs and the other in wild boars (wild type allele), and since the alleles of each individual were congruent with the morphotypes, it is considered that the molecular marker MC1R can be used to discriminate between genotypes of *Sus scrofa* that inhabit Argentina.

A14
ASYMPTOMATIC KIDNEY DISEASE IN POPULATION WITH RISK FACTORS. BEHAVIOR OF NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN

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Chronic kidney disease (CKD) is characterized by progressive loss of kidney structure and function; at early stages is asymptomatic, but without treatment, it leads to kidney failure. CKD is an important cause of premature cardiovascular morbidity and mortality. The aim of this work was to evaluate neutrophil gelatinase-associated lipocalin (NGAL), an injury tubular marker, as a predictive indicator of renal disease progression in asymptomatic patients with modifiable risk factors. An observational-analytical study was carried out with 73 adult volunteers, with excess weight (ExP), arterial hypertension (HT), and diabetes mellitus (DM). Progression risk was staged as low, moderate and high risk, with CKD-EPI creatinine and albuminuria (Au), KDIGO-2012. Serum and urinary NGAL were determined by ELISA. Albuminuria by immuno-turbidimetry method. ExP presented 64% of patients, 61% HTA, and 12% DM. With low risk of progression were staged 86% subjects and 14% with moderate risk. Serum NGAL increased with disease risk progression, behaving as a predictive progression marker. In the ExP population, a significant increase in serum NGAL was observed compared to the normal weight patients (overweight, obesity and normal weight, 35.9 ± 34.1; 23.1 ± 17.0 and 7.7 ± 5.2 mg/L, respectively, $P < 0.05$). No differences were observed in urinary NGAL. CKD detection in early stages and control of risk factors, allow implemented actions that delay its progression, preserve kidney function and avoid associated complications.

A15
REDOX BIOMARKERS SYSTEMIC ASSESSMENT IN ACUTE MYELOID LEUKEMIA PATIENTS

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Several studies have reported the oxidative stress influence on the pathogenesis and evolution of hematological neoplasms. Thus, we aimed to study redox biomarkers in acute myeloid leukemias (AML) at the systemic level and evaluate their behavior as a possible risk factor in this pathology. Between 2017 and 2019, 28 AML patients and 61 controls were evaluated (C). Malondialdehyde concentration (MDA), catalase (CAT), and superoxide dismutase (SOD) enzyme activities, and nitrites concentration (NO_2^-) were determined. Comparative analysis was performed using the Kolmogorov–Smirnov test. Association analysis, the Odds Ratio (OR) with 95% confidence intervals (CI) was calculated with Pearson's Chi-square test. MDA levels were similar between both groups, however, the NO_2^- concentration was higher than AML patients [NO_2^- µmol/L: LMA = 6.38 (1.52–26.77); C = 6.18 (0.76–19.29)]. Besides, higher CAT activity was detected in AML respect to C ($P < 0.05$) [CAT nmol/mg prot: AML = 0.49 (0.02–3.62); C = 0.25 (0.03–2.15)], while SOD activity was similar in both groups. Statically significant association was observed between having AML and high MDA levels (OR = 2.58; CI = 1.01–6.63) and CAT (OR = 2.72; CI = 1.03–7.17). The results reveal the systemic redox imbalance present in AML patients at the time of onset, indicating it as a possible risk factor for this pathology. Also provide evidence of the dynamics between oxidant-antioxidant systems underlying in this neoplasm.

A16
FERROPTOSIS, A MECHANISM OF CELL DEATH PRESENT IN β-MINOR THALASSEMIA

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β-thalassemia is an inherited hemoglobinopathy which presents inefficient erythropoiesis and a redox imbalance as a consequence of excess iron (Fe) release. This imbalance induces to the erythrocyte death mechanism called ferroptosis associated with severe lipid peroxidation. This work aimed to identify and characterize the erythrocyte membrane proteins involved in ferroptosis in patients with β-thalassemia trait (BTT). For this, the proteome of hemoglobin-depleted red blood cell membranes from 4 BTT patients and 4 controls (C) was analyzed by HPLC attached to mass spectrometry. The protein identification and analysis were carried out using Proteome Discoverer

V1.4 and Perseus software for quantification. The BlastKOALA platform was used for functional characterization of each protein. From the total proteome detected, there were identified the following proteins involved in the ferroptosis pathway, in patients with RBT: ALOX15 marker of lipid peroxidation, whose abundance was 3 times higher than in group C ($P < 0.05$); Pcbp 1 and 2, Fe chaperones that improve its deposit, were significantly increased 3.1 and 4.4 times, respectively; P67 and P40, two catalytic subunits of NADPH oxidase were overexpressed 3.3- and 4.7-times more in the BBT condition than in individual controls. Our finding of overregulated proteins involved in the ferroptosis pathway in BBT patients supports the participation of this type of non-apoptotic cell death in the pathophysiology of this hereditary anemia.

A17
THE REDOX SYSTEM IN SEMINAL PLASMA AND ITS POSSIBLE APPLICATION IN SPERM EVALUATION

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The spermogram is a useful tool in the male infertility study. It considers cytomorphology and motility gametes without considering the parameters linked to seminal plasm redox state. An excessive production of reactive species and/or a deficit in antioxidant defenses generates a state that would affect reversible or irreversible sperm function. The aim of this work was to evaluate, in seminal plasma, biomarkers involved in redox balance and to relate them to the conventional sperm parameters. For this purpose, 31 semen samples from apparently healthy men were studied and divided into two groups: proven fertility (PF) and non-proven fertility (NPF). The following were established: (a) spermogram according to WHO 2010, (b) malondialdehyde (MDA) concentration, (c) nitrate (NO_2^-) concentration, (d) superoxide dismutase (SOD) and catalase (CAT) activities. The morphological characteristics of sperms were similar in the population studied, however NFP group showed higher levels of MDA and sperm density than PF group (density $x10^6$/mL: NFP = 78.0 ± 27.6, PF = 52.2±29.9; MDA µmol/L: NFP = 3.3 ± 0.7; PF = 2.8 ± 0.4). A negative moderate association was observed between immobile sperms and SOD (r_s −0,48), and high association with NO_2- (r_s −0,69). The spermogram provides information about motility and morphology male gametes, but it does not consider oxidant-antioxidant conditions of seminal plasma. The addition of the study of these redox biomarkers would contribute to elucidate underlying imbalances which could condition their fertilizing capacity.

A18
COMBINED METHODOLOGICAL APPROACH TO THE DIAGNOSIS OF *Fasciola hepatica*

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Fasciolosis in a foodborne zoonosis caused by the fluke *Fasciola hepatica* (Fh), with increasing human cases. Its diagnosis is based on parasitological and immunological methods; the lack of diagnostic tools that cover all presentations or situations emphasizes the evident need for the combined use of techniques to obtain a reliable diagnosis. The objective was to combine different sensitive and specific methods for the diagnosis of fasciolosis. Twenty-five serologically positive people with two previous tests by rproCL1-ELISA were selected. Liver function tests, parasitological feces analysis, ultrasound, and immunological studies were performed. The PCR for Fh was carried out using fecal DNA to amplify the repetitive tandem fragment of 117 bp PFH5 of *Fasciola* sp. The primer established by FhrepF (5′-ATTCACCCATTTCTGTTAGTCC-3′) and FhrepR (5′-ACTAGGCTTAAACGGCGCG-3'). The amplicons were analyzed using electrophoresis on 2.5% agarose gels, stained with ethidium bromide, and visualized under UV illumination. Thirteen patients completed the study, 4 were asymptomatic and 9 presented symptoms of biliary colic. All repeated positive serology. Trematode eggs were not detected in feces tests. PCR for Fh was positive in 11 cases. A linear echogenic image consistent with *Fasciola* was detected in a symptomatic positive PCR case. The approach based on the combination of methods for the evaluation of fasciolosis and the implemented molecular technique allowed the detection of parasitic DNA in feces, being especially useful in infected people with low parasite loads or stages of the disease.

A19
TOXICITY EFFECTS OF A NEW BIOACTIVE GLASS ON ZEBRAFISH EMBRYOS (*Danio rerio*)

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There is a growing interest in the use of zebrafish embryos as a model animal to evaluate toxic effects of biomaterials because of their high permeability to small molecules dissolved in the incubation medium. The aim of the present work was to evaluate the toxicological effects

of the ionic dissolution products (IDPs) of the new bioactive glass 53S (53% SiO_2, 24% CaO, 23% Na_2O) on zebrafish embryos. IDPs were obtained by incubation of 53S microparticles in embryonic medium (EM) at 37ºC for 72 h. For the toxicity test, dechorionated embryos of 48 hours post-fertilization (hpf) were incubated at 28.5ºC for 3 days in six-well plates containing 5 mL of EM (control) or EM enriched with 53S IDPs. The incubation media were renewed every 48 h. Three repetitions were performed with 30 embryos per treatment. Potential developmental alterations were considered as possible consequences of the toxic effects of IDPs. The survival rate was recorded at 120 hpf. The larvae were anesthetized with tricaine, then they were rapidly subjected to cooling for euthanasia by an immersion bath at 2–4°C and fixed in paraformaldehyde 4% for the subsequent assessment of the external morphological characters. No statistically significant differences were observed in the survival of embryos treated with IDPs regarding to the control. IDPs did not generate deleterious effects on embryonic or larval development. The results obtained showed the biocompatibility of the IDPs released from the bioactive glass 53S microparticles.

A20
ANTIFUNGAL ACTIVITY OF PLANT EXTRACTS ON PATHOGENIC FUNGI OF CEREALS

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Phytopathogenic species of the genera *Fusarium* and *Aspergillus* cause diseases in cereal crops and contaminate crop products with their mycotoxins. The fungicides currently used are harmful to the environment and it is necessary to incorporate new antifungal molecules. In this work, the *in vitro* antifungal activity of extracts of aerial parts of plant species native to Northwest Argentina was evaluated: methanolic extract of vinal (*Prosopis ruscifolia*, Leguminoseae) and ethanolic extract of false jarilla (*Zuccagnia punctata*, Fabaceae). The extractive yield was 2.5 times higher in the extract of *Z. punctata* relative to that of *P. ruscifolia*. Antimicrobial activity was tested on *F. verticillioides*, *F. graminearum sensu stricto*, *A. flavus*, and *A. parasiticus*. Using microdilution assays, the 100% fungal growth inhibitory concentrations (MIC100) of the extracts were determined and compared with those obtained for the fungicides tebuconazole and Vendaval thi Carb (15% carbendazim–35% thiram), and the food preservatives calcium propionate and potassium sorbate. The MIC100 for the ethanolic extract *Z. punctata* ranged between 500–1000 µg/mL; and for the methanolic extract of *P. ruscifolia*, between 500–1500 µg/mL, with *F. graminearum sensu stricto* and *A. flavus* being the most sensitive species. Tebuconazole and Vendaval thi Carb suppressed the growth of fungal species in the range of 2.5–100 µg/mL; and preservatives in the range of 12.5–50 µg/mL. Studies are needed to identify and isolate the bioactive molecules present in both extracts and to evaluate their antifungal potential.

A21
ACTIVITY OF EXTRACTS FROM *Justicia xylosteoides* AND *Astronium balansae* ON PATHOGENS RESPONSIBLE OF MAIZE EAR ROT

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Fusarium verticillioides and *F. graminearum* are the main etiological agents of maize ear rot in Northwest Argentina. They reduce the grain yields and contaminate the grains with mycotoxins toxic for humans and animals. Chemical control is one of the strategies used to control these fungi in the field and during grain storage. However, the products currently used have several disadvantages. One alternative could be the use of plant extracts. The objective of this work was to evaluate the antifungal activity of extracts recovered from plant species native from Argentina on strains of *F. graminearum* and *F. verticillioides*. Leaves and stems of *Justicia xylosteoides* and *Astronium balansae* were dried and ground. The obtained powders were extracted sequentially with dichloromethane, ethyl acetate, and methanol. The organic fractions were evaporated to dryness. They were tested on fungal lawns by means of the disk diffusion method (2 mg dry matter/disk). The fungal lawns were prepared by spreading 50 uL of suspensions (10^3 spores/mL) on the surface of Petri dishes containing YES medium. The plates were incubated in the dark for 72 h at 25ºC (*F. graminearum*) or 30ºC (*F. verticillioides*). Growth was recorded after 24, 48, and 72 h. Halos of inhibition were observed for the methanolic leaf extract of *J. xylosteoides* on both fungal species and for the leaf dichloromethane extract and the leaf and stem ethyl acetate extracts on *F. graminearum.* Antifungal activity was only detected in some extracts of *J. xylosteoides*, so further research will be the isolation and identification of their bioactive constituents.

A22
CHARACTERIZATION OF STARCH EXTRACTED FROM RHIZOMES OF *Sechium edule* (JACQ.) SWARTZ

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Sechium edule (Jacq.) Swartz (Chayote) is an edible native species from tropical America. *S. edule* is only known as a naturalized species in the northwest and northeast of the country. We aimed to evaluate the physicochemical and functional characteristics of the starch extracted from chayote rhizomes, *albus minor* variety according to the AOAC. Rhizomes of chayotes were collected from naturalized species in the town of Lieutenant Berdina, Monteros Department in the province of Tucumán, Argentina during the months of September to November of the year 2019. The starch extraction (SCH) was carried out according to Jiménez-Hernández *et al.* (2007) and modifications. The extracted starch was characterized physicochemically (proteins, fats, ashes), and the functional properties (viscosity, clarity, swelling capacity) were evaluated taking potato starch (SPO) as a reference. The values obtained show that SCH shows similar characteristics to SPO in relation to its fat content, but with higher values in relation to protein and ash content. Regarding functional properties, SCH developed 2.5 times higher viscosity than SPO at the same concentration. The clarity evaluation showed average values of 41.72% and a swelling capacity of de 36.5. We conclude that chayote rhizomes have a high starch content and represent a potential source of this biopolymer. Functional aspects show chayote starch as a good thickening agent with minimal opacity compared to potato starch.

A23
CHARACTERIZATION OF DIETARY FIBER OBTAINED FROM FRUITS OF *Sechium edule* (JACQ.) SWARTZ

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The importance of dietary fiber (DF) in nutrition has led the industry to search for new plant sources. *Sechium edule* (Jacq.) Swartz (chayote) is an edible native species from tropical America. In Argentina, the fruit is consumed only in the northwest and northeast of the country. The present work aims to characterize the dietary fiber obtained from chayote fruits, variety *nigrum maximum.* From fresh fruits collected from plantations, western zone of Tucumán, physicochemical parameters were determined according to AOAC: humidity, ash, ether extract, crude protein content, total dietary fiber, determination of insoluble dietary fiber, soluble and insoluble dietary fiber content. Among the functional properties evaluated were: viscosity, cation exchange capacity (CEC), particle size, swelling capacity (SC), water retention capacity (WRC), organic molecule adsorption capacity (CAMO) according to Garcia Magaña *et al.* (2013). Physicochemical aspects show that the fiber samples under analysis meet the required official nutritional requirements. The FDT content found was 21.3 and 72.5 g/100 g MS with a FDI/FDS ratio between 2:1 to 3:1. SC, WRC, CAMO, CEC and viscosity values showed that chayote fiber, variety *nigrum maximum*, constitutes a natural alternative for its incorporation into food as a source of DF or due to functional properties.

A24
EVALUATION OF PHYSICAL, CHEMICAL AND MICROBIOLOGICAL PARAMETERS IN YOGURTS WITH ADDED COCONUT AND ITS DERIVATIVES

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The habitual consumption of yogurt for a wide age range, facilitates that its matrix is a good vector of aggregates that provide benefits to consumers. The objective was to evaluate in yogurts, at 21 days of elaboration, if the physical-chemical and microbiological parameters were modified by the addition of coconut and its derivatives as optional non-dairy ingredients. Five yogurts were made in five times. Y1 yogurt (control), Y2 to Y5 control yogurt plus grated coconut, flour, oil and coconut milk, respectively. Weekly determinations of syneresis, titratable acidity, were made, at 21 days of elaboration, lactic bacteria, *Staphylococci aureus*, total coliforms at 30°C and 45°C, *Escherichia coli*, molds and yeasts were analyzed. Between days 1 and 21, syneresis decreased by 44, 49, and 48% for Y1, 2, and 3 respectively, but for yogurts Y4 and Y5 it remained practically stable; the acidity range varied between 0.77 and 1.07 g lactic acid/100 g. Total coliforms at 30°C and 45°C, *Escherichia coli*, molds and yeasts <10 CFU/g in all yogurts. Lactic acid bacteria were in the order of 108 CFU/mL. Grated coconut and its flour promote a higher percentage of variation in syneresis; the oil and coconut milk would retain its value over time. Acidity falls within the provisions of the Argentine Food Code. Lactic acid bacteria developed optimally, there was no development of contaminating microorganisms. All yogurt formulations presented a good state of conservation, and their organoleptic characteristics were satisfactory until the end of the study.

A25
PURIFICATION OF ANTI-RBD ANTIBODIES OBTAINED FROM LLAMA (*Lama glama*) FOR POTENTIAL COVID-19 THERAPY

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Despite worldwide efforts to develop different treatments for SARS-CoV-2 COVID-19, the situation remains critical, requiring rapid and effective strategies. In this regard, antibodies (Ab) have demonstrated clinical potential. Among them, camelid nanoAb (VHH) arise as a possible alternative, as they recognize epitopes which are inaccessible to conventional Ab. Further advantages of VHH are their small size, high solubility, high stability, and resistance to low pH. The aim of this work is to describe a purification scheme of different isotypes of anti-SARS-CoV-2 immunoglobulin G (IgG) produced after immunizing two llamas (*Lama glama*). To achieve this, plasma was injected into an affinity chromatographic column (Protein G), and the resulting fractions were analyzed by SDS-PAGE under non-reducing conditions. The anti-RBD titers were determined by an "*in house*" ELISA, reaching titers of 52000 and 13000 for IgG_1 and IgG_3 fractions, respectively. Subsequently, an affinity column (HiTrap NHS-activated) was prepared to separate monospecific anti-RBD polyclonal Ab. RBD produced in our laboratory was covalently coupled to this column, achieving a coupling efficiency of 97%. Different isotypes of monospecific anti-RBD Ab (IgG_1: 140 kDa and IgG_3: 95 kDa) were obtained. IgG_3 represent the starting point for obtaining VHH and/or evaluating their potential use as a therapeutic or preventive alternative, which represents a notable regional contribution in the fight against COVID-19.

A26
WATER QUALITY ASSESSMENT OF THE MIRAFLORES RIVER, USING THE BENTHIC ENTOMOFAUNA AS BIOINDICATORS

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Water of the Miraflores River is collected for human consumption, irrigation, and recreation, from the localities of Miraflores and Coneta, department Capayán, Catamarca. The aim of this research was to evaluate the water quality of the Miraflores River using benthic entomofauna as bioindicators. Three sampling stations (S) were established; in each one, two samples were collected with a "Surber" type sampler (900 cm^2 surface; 300-µm mesh opening), integrated for analysis. It was calculated: Biological Monitoring Working Party (BMWP'), Average Score Per Taxon (ASPT'), Family Biotic Index (IBF) and Ephemeroptera-Plecoptera-Trichoptera Index (EPT). In the S-I, the abundance was 326 insects; richness: 8 orders and 22 families. The values of the indices were: BMWP' = 126; ASPT' = 4.40; IBF = 5.72; EPT = 50.61%. In S-II, the abundance was 436; richness: 9 orders and 22 families. The values of the indices were: BMWP' = 128; ASPT' = 4.39; IBF = 5.82; EPT = 61.01%. In the S-III, the abundance was 468; richness: 9 orders and 25 families. The values of the indices were: BMWP' = 141; ASPT' = 4.21; IBF = 5.64; EPT = 66.03%. In the three stations, BMWP' (>50) means very clean waters; ASPT' (range 4.1–5.0) means slightly impacted water; IBF (range 4.26–5.75) means good quality water, with some organic contamination. EPT showed that pollution intolerant taxa contributed more than 50.00%. Biotic indices based on benthic entomofauna are very useful for assessing the biological quality of the Miraflores River water, combining biodiversity data and tolerance/intolerance to pollution.

A27
ALTITUDINAL DISTRIBUTION OF SCORPIONES, PSEUDOSCORPIONES, SOLIFUGAE AND OPILIONES (ARTHROPODA: ARACHNIDA) IN THE AMBATO DEPARTMENT, CATAMARCA

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Scorpions, pseudoscopions, solifugae, and opilions (Arthropoda: Arachnida), have not been very studied in Catamarca. The aims of this research were to know the altitudinal distribution of the orders Scorpionida, Pseudoscorpionida, Solifugae, and Opilionida, in Ambato, Catamarca and produce a distribution map. The organisms were collected in La Puerta (LP), Las Juntas (LJ), Los Varela (LV), and El Rodeo (ER), in an altitudinal range of 910–1,464 meters above sea level. The collection was carried out on two transects (50 m *x* 20m), placing 10 pitfall traps, active for 28 days. The distribution map was developed with QGIS software. In LP (910–913 masl; N = 138), Scorpions: *Brachistosternus*, *Timogenes*, *Bothriurus* (Bothriuridae), and *Tityus confluens* (Buthidae); Pseudoscorpions: Atemnidae, Cheliferidae, Lechytiidae, and Chernetidae; Solifugae: Mummuciidae, were collected. In LV (1,191 masl; N = 31), Pseudoscorpions: Cheliferidae, Chernetidae, and Atemnidae, were collected. In ER (1,255–1,308 masl; N = 54), Pseudoscorpions: Cheliferidae and Withiidae, and Opilions: *Discocyrtus prospicuus* (Gonyleptidae) and *Metalibitia* (Cosmetidae), were collected. In LJ (1,464 masl; N = 5),

Pseudoscorpions: Chernetidae and Opiliones: *Metalibitia* (Cosmetidae), were collected. Scorpions were distributed between 910 and 913 masl; Solifugae were distributed at 910 masl; Pseudoscorpions were distributed between 910 and 1,464 masl; Opilions were distributed between 1,191 and 1,464 masl. The order with the highest altitudinal distribution range was that of pseudoscorpions, second in abundance (33%; N = 228), and the most diverse (5 families). The information generated and the distribution map contribute to the knowledge of this important group of arthropods for Catamarca.

A28
SPIDERS GUILDS (ARACHNIDA: ARANEAE) IN ASSEMBLIES OF TWO LOCALITIES OF THE AMBATO DEPARTMENT, CATAMARCA

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Araneae is one of the megadiverse orders of the animal kingdom with 129 families, 4,229 genera, and 49,564 species described so far. Taking into account the various hunting strategies, they can be ecologically subdivided into guilds, with similarity in the consumption of prey associated with a particular habitat. The aim of this research was to classify spiders in guilds, in two localities in the Ambato department. The spiders were collected in "El Rodeo" (1,250 mamsl; 28°12′55″ S–65°52′27″W) and "La Puerta" (870 mamsl; 28°10′00″S–65°47′00″W), along two transects (50 m *x* 20 m), combining manual sampling and foliage tapping (15-min sampling effort) and the placement of 10 pitfall traps, active for 28 days, renewed every 7 days. The collected organisms were preserved in 70% ethanol solution. In laboratory, the spiders were separated and taxonomically determined to the lowest possible taxon to discern. In "El Rodeo", 198 spiders were collected, among which 23 families of Araneomorphae were listed. The guilds were: orbicular fabric weavers (17.2%), laminar fabric weavers (8.6%), irregular fabric weavers (5.00%), running hunters (32.8%), and stalking hunters (36.6%). In "La Puerta", 124 spiders were collected, among which 15 families of Araneomorphae were listed. The guilds were: orbicular fabric weavers (8.1%), laminar fabric weavers (4.8%), irregular fabric weavers (10.5%), running hunters (29.9%), and stalking hunters (46.7%). The data obtained in relation to the ecological guilds present are the first of their type for the Ambato department and for the province of Catamarca.

A29
BIOLOGICAL DIVERSITY OF ODONATA LARVAE (INSECTA) IN LOS PINOS STREAM, CAPAYÁN, CATAMARCA

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Odonates are insects known as "helicopters", "sheriffs" or "damselflies". They alternate between an aero terrestrial adult stage and aquatic larval stages. The importance of their study lies in its diversity, which has not yet been studied in Catamarca; their role in trophic chains; as biological pest controllers, and as bio-indicators of environmental quality. The aim of this research was to determine the biological diversity of the order Odonata (Insecta) in Los Pinos stream, in the department of Capayán, Catamarca, and to elaborate a distribution map. To determine the biological diversity of larvae, the watercourse was sampled; the collection was carried out by combining manual sampling, wire strainers, "D" net, and "Surber" type net. The distribution map was made with the Q.Gis software, using georeferencing data obtained at the sampling site. A total of 27 larvae were collected. The suborder Anisoptera was the most abundant, representing 81.49%; Gomphidae (66.68%) was the most abundant family, followed by Aeshnidae (11.11%) and Libellulidae (3.70%). The suborder Zygoptera constituted 18.51%. The family Megapodagrionidae, represented by a single genus *Teinopodragrion* sp., was the most abundant (11.11%). Coenagrionidae and Calopterygidae accounted for 3.70%, respectively. A new family (Megapodagrionidae) and a new genus (*Teinopodagrion* sp.) were recognized, extending their distribution in Catamarca. These results contribute to the knowledge of Odonata diversity in Catamarca, which could be used in conservation strategies for aquatic ecosystems of Catamarca.

A30
PHYTOPLANKTON RICHNESS OF AN URBAN LAKE IN TUCUMAN

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Urban lakes provide physical and mental comfort to people as they reduce stress, increase a feeling of calm and provide therapeutic landscapes that have a positive impact on health. In addition, they contribute to the conservation of local, regional, and migratory fauna by generating habitat patches for local species and serving as resting, feeding, and nesting sites for birds. These environments have unique characteristics and are affected by annual climatic variability, maintenance tasks, and human activities. The aim of this work was to analyze the phycophloristic composition of San Miguel Lake, located in the 9 de Julio Park, San Miguel de Tucumán, in autumn. For this purpose,

algal sampling using plankton net was carried out in two sites of the lake mirror (S1 and S2). Also, different physicochemical variables were measured according to conventional methodologies. In this survey, 49 algal taxa were identified, including 27 green algae, 10 diatoms, 9 blue-green algae, and 3 euglenoids. Within the group of green algae, the following stood out due to their frequency: *Chara* sp., *Staurastrum* sp., *Coelastrummicroporum*, *C. reticulatum*, and *Pediastrumduplex*. The water was well oxygenated (9.2 mg/O_2), pH was alkaline and electrical conductivity was 552 µS/cm. Considering the algal biota and the physicochemical variables, good water quality could be inferred. There are few studies of urban lakes in the NOA region, so the information obtained in this first survey is original and valuable because it is part of a broader project that seeks to analyze the spatiotemporal variability of water and phytoplankton in this relevant lentic system of San Miguel de Tucumán.

A31
WETLAND BIRDS IN THE CHACO SERRANO, TRANCAS, TUCUMÁN, ARGENTINA

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Chaco Serrano is one of the most affected ecoregions in the Province of Tucumán. This is mainly due to forestry exploitation and extensive cattle rising in the native forest. The wetlands belonging to this biome suffer numerous problems, such as aggregate extraction, pollution, and clogging. The aim of this work was to study the bird community in the different wetlands existing in an important portion of the provincial Chaco Serrano and the variations in their composition and structure. Samplings were carried out in the Vipos River, Dam, and in the confluence area of the Salí River and the El Cadillal Reservoir (Trancas Department). Girdle transects surveys, fixed-radius point, and vehicle tours were carried out between the years 2018 to 2019; the number of species, individuals and habitats used by birds was recorded. The relative abundance (AR) and the relative importance index (IR) were calculated. The site with the highest relative richness and abundance of species was the Dam (N = 52, AR = 1064), followed by Vipos River (N = 40, AR = 1044) and the confluence area of the Salí River and the El Cadillal Reservoir (N = 29, AR = 277). As for the composition present in the various wetlands, a notable difference is observed. In the Vipos River, forest and grassland birds (B/P) were dominant, while in the Dam and the confluence area of the Salí River and the El Cadillal Reservoir, were the aquatic birds (A). The decrease in bird diversity is appreciable and this could be due to the impacts that this area has suffered in recent years. This work would make it possible to demonstrate the conservation value of these wetlands in the face of the progressive loss of biodiversity and establish management and conservation guidelines to improve their conditions.

A32
URBAN NESTING OF THE QUETUPI (*Pitangus sulphuratus*) IN THE GRAN SAN MIGUEL DE TUCUMÁN

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Currently, urban centers are considered one of the main generators of biodiversity loss. Birds (considered good biological indicators) face new challenges in urban centers. The quetupí or benteveo (*Pitangus sulphuratus*) is a very common bird species in many environments, including rural and urban ones. In the Gran San Miguel de Tucumán there is a very marked urbanization gradient from more (east) to less (west) urbanization. The knowledge of the reproduction of birds in natural environments is greater than that which exists in urban environments. The aim of this study is to evaluate the potential effect of the urban gradient of the Gran San Miguel de Tucumán on the nesting of quetupí. The study was conducted in three representative sectors of the Gran San Miguel de Tucumán gradient, covering San Miguel de Tucumán and Yerba Buena, during the mating season 2020–2021. In each sector, a square was chosen as the central point and a radius of approximately 10 blocks around it, to identify all the existing trees in the area and recorded the presence of nests and their reproductive success. Each area was visited once a week from September to February. A total of 46 nests were recorded, 10 in sector 1, 15 in sector 2, and 21 in sector 3. Of the total number of nests observed, the highest mating success was recorded in sector 3 (Yerba Buena). The results could indicate a greater nesting preference in the less urbanized area, which is closer to the Sierra de San Javier, who could provide greater resources (food and shelter) for the species.

A33
PHYTOCHEMICAL ANALYSIS, ANTIOXIDANT ACTIVITY AND CYTOTOXICITY OF PHENOLIC FRACTION FROM *Geoffroea decorticans* STEM BARK

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The bark of *Geoffroea decorticans* (chañar) was used in traditional medicine to cure several kinds of skin diseases. Previously, we characterized the phenolic fraction (PG) by GC-MS, related to antibacterial activity. This study evaluated the intracellular antioxidant activity (ICAOA) and the cytotoxicity (CTx) of the PG, by analyzing its chemical composition with specific phytochemical methods. Bioassays of PG (10–100 µg/mL) were performed on lymphocytes cultures (RPMI 1640, 5% CO_2) activated with lipopolysaccharide (LPS) and non-activated. ICAOA was assayed using a ROS/ERN_s sensitive fluorescent probe (DA-H_2DCF) as an indicator; cytotoxicity was analyzed according to metabolic activity measurable with MTT at 590 nm; and membrane integrity by Trypan blue staining. In addition, PG was analyzed by UV-VIS spectroscopy and two-dimensional TLC, comparing the results with reference literature and standard substances. PG showed ICAOA in a concentration-dependent manner, being more efficient at a lower concentration (5 µg/mL), and absence of CTx up to 100 µg/mL, by the tested methods. The phytochemical analysis allowed the detection of gallic acid, quercetin, kaempferol, apigenin, protocatechuic acid, methoxylated chalcones, and flavones. The phenolic compounds characterized justify the ICAOA, showing their ability to cross cell membranes, generating a purifying effect at low concentrations. The absence of CTx on normal cells, at concentrations much higher than the antioxidant concentration, suggests that the application of PG could be a viable alternative for medicinal and/or cosmetic uses.

A34
PHARMACOLOGICAL ANALYSIS OF BLUEBERRY STEM EXTRACTS (*Vaccinium myrtillus* L.) FOR USE IN GASTRIC ULCERS

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Peptic ulcer is a digestive tract pathology with high prevalence, the research of new treatments represents a challenge to current pharmacology. In previous studies, we demonstrated the gastroprotective efficacy of the 5% infusion of *Vaccinium myrtillus* L. (VM) stems. In the search for effective preparations from this plant material considered an agricultural waste, our aim is to study the gastroprotective effect of different doses of ethanolic (EE, ethanol:water, 70:30) and acetonic (EA, acetone:water, 70:30) extracts of VM stems in the ethanol-induced ulceration model in Wistar rats. In addition, to determine the NO participation in the protective mechanisms, the animals were orally administered 100° ethanol as a gastrolesive agent. Each group was previously treated with 10% EE or 10% EA at different doses (75, 150, and 300 mg/kg) and the control positive group received sucralfate (100 mg/kg). The involvement of NO was studied using the precursor arginine (600 mg/kg) and the inhibitor L-NAME (70 mg/kg) of its *in vivo* synthesis. To correlate the effects with the chemical composition of the extracts, the phenolic compounds content and the *in vitro* antioxidant activities were determined. The pretreatment of the animals with EE (75 mg/kg) and EA (150 mg/kg) significantly reduced the percentage of ulceration, preserving the stomach mucus content. Interestingly, the participation of NO in the gastroprotective mechanism was not evidenced, however, the extracts showed an effective anti-radical capacity attributable to the presence of phenolic compounds. Both extracts of VM stem extracts exert an interesting protective effect, being necessary further studies to define the mechanisms involved.

A35
MELATONIN-COATED TITANIUM IMPLANTS IN EXPERIMENTAL OSTEOPOROSIS IN OVARIECTOMIZED RATS: SERUM LEVELS. CORRELATION WITH MEDULLARY RADIOPACITY IN TIBIAE

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The ovariectomized rat (OVX) is the animal model used in studies on osteoporosis due to estrogen and calcium deficiency or postmenopausal osteoporosis which favors the weakening of bones and subsequent fractures. The neuroendocrine hormone melatonin of osteogenic activity is a potential therapeutic agent in these pathologies and as a bioactive surface in implantology. Our objectives were to evaluate changes in optical density in tibiae with implants and surface coating with melatonin, to determine variations of calcium and estradiol in the blood. For this purpose, 6-month-old Wistar rats were used. They were divided into 2 groups: Control (C) and Experimental (E). Blood was drawn from both groups. Calcium levels were analyzed by colorimetric method and estradiol by chemiluminescence. In group E, bilateral OVX was performed. A laminar implant was placed in the tibia coated with melatonin powder. Euthanasia was performed after 45 days. The tibiae were radiographed to measure radiopacity with the software Image-Pro Plus v6.0. A Student's *t*-test

was used for statistical analysis. The serum calcium values in both groups did not show statistically significant differences ($P > 4.73$). Statistically significant differences were observed with estradiol ($P < 0.0001$). Longitudinal and transverse medullary optical density did not show statistically significant differences between the groups ($P > 0.05$). An increase in density or radiopacity is observed around the implant compatible with bone regeneration, which allows us to infer that melatonin would favor bone formation around the implant.

A36
PREPARATION OF PROPOLIS GEL AS A THERAPEUTIC ALTERNATIVE FOR ALVEOLAR REPAIR POST-EXTRACTION PROCES

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Mucoadhesive gels increase the amount of time of the drug at the site of absorption, extending its effectiveness. Propolis is a natural product made by honeybees (*Apis mellifera*) from different plants. It has been used in medicine due to its properties and benefits in oral health. This work aimed to standardize the preparation of propolis mucoadhesive gels to place in post-extraction dental sockets. A gel with carboxymethyl cellulose (2 g) and propylene glycol in a sterile container was prepared. The diluent had a final gel concentration of 4% (propylene glycol and water). The required concentration of the active principle propolis at 60% was dissolved in this volume. It was left to rest for 24 h. The hydroxypropylmethyl cellulose gel was placed in a sterile container with the diluent in a final gel concentration of 4% (propylene glycol and water). The required concentration of the active principle propolis at 60% was dissolved in that volume. Hydroxypropylmethyl cellulose (2 g) was added. It was left to rest for 24 h. Both gels, carboxymethyl cellulose and hydroxypropylmethyl cellulose with the humectant, were prepared without an active ingredient. They were prepared applying good manufacturing practices and bacteriological controls: aerobic bacteria CFU/product fungi-yeast CFU/product were carried out. Both the carboxymethyl cellulose and the hydroxypropylmethylcellulose gel were negative for both bacteriological studies. We conclude that the propolis mucoadhesive gel preparation technique allows their use in an experimental protocol for alveolar repair post-extraction process.

A37
EFFECT OF DIETARY INTERVENTION WITH CHIA SEED AND CHIA OIL ON VASCULAR FUNCTION AND CARBOHYDRATE METABOLISM

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Previously, we have demonstrated the beneficial effects of a functional food enriched with 10% chia oil, equivalent to 4.8 g/day of alpha-linolenic acid (ALA) on vascular function. However, this "%" of oil generated glucose intolerance. The objective of this work was to evaluate whether chia seed supplementation, in a proportion equivalent to 10% of the oil in ALA content, has beneficial effects on vascular function without altering glucose metabolism. 18 male rabbits were divided into 3 groups, fed on a control diet (CD), fed on CD supplemented with 10% chia oil (CD-ACh), and fed on CD supplemented with 224.10 g of chia seed (CD-SCh). After 6 weeks, they were sacrificed and biochemical, clinical, and vascular function parameters were determined. No changes were observed in plasma lipids, weight, blood pressure or abdominal-visceral fat between the treated and CD groups. CD-SCh did not improve the glucose tolerance test relative to CD-ACh. The percentage of relaxation to acetylcholine decreased in CD-SCh with respect to CD-ACh and CD. Treatment with chia seed or chia oil significantly decreased the contractile response to angiotensin II with respect to CD. The contractile response to norepinephrine was significantly decreased in CD-ACh compared to CD-SCh and CD. We conclude that although both chia oil and chia seed have some beneficial effects on vascular function, it is important to take into account the daily intake, since an excess could generate alterations in glucose metabolism.

A38
FAT EXCESS IN DIET WOULD INHIBIT ORAL ADMINISTRATION-EFFECTS OF *Zuccagnia punctacta* EXTRACT ON THE ALTERATIONS INDUCED BY HYPERCHOLESTEROLEMIA

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Oral administration of 2.5 mg/day of a standardized extract of *Zuccagnia punctacta* (E-Zp) has lipid-lowering effects and improves vascular function in an experimental model of hypercholesterolemia induced by a high cholesterol diet. Our objective was to evaluate the effects of the oral administration of E-Zp in an animal model of high fat and high cholesterol diet simulating the Western-type diet. For this purpose, male rabbits were separated into 4 groups: (1) fed on regular diet (CD), (2) fed on diet rich in 18% fat and 0.3% cholesterol (M),

(3) fed on M orally administered 2.5 mg/day of E-Zp, and (4) fed on M orally administered 2.5 mg/day of ezetimibe (cholesterol intestinal transporter inhibitor). After 6 weeks of treatments, biochemical, clinical and vascular parameters were analyzed. The second group, compared with the CD animals, showed abnormal glucose and insulin tolerance curves, increased total cholesterol (TC) and visceral abdominal fat (VAF) values, decreased responses to HDL-C, acetylcholine, angiotensin II and norepinephrine. The administration of E-Zp (group 3) did not modify any of these alterations. Ezetimibe treatment (group 4) significantly decreased TC and normalized relaxation to acetylcholine and response to norepinephrine. However, it did not modify VAF or glucose intolerance. In conclusion, these preliminary results suggest that (a) excess of fat in diet would inhibit the lipid-lowering and beneficial on vascular function effects of E-Zp, and (b) mechanism of E-Zp action would not involve cholesterol intestinal transporter.

A39
A STATISTICAL MODEL TO ASSESS THE VARIABLES AFFECTING THE WEIGHT OF NEWBORNS

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Newborn weight (*NW*) is a variable of multifactorial nature used to assess health status. This variable is influenced by maternal gestational age (*GA*), weight gain (*WG*), body mass index (*BMI*), previous pregnancies (*PP*), alterations in blood glucose (*G*), hemoglobin (*H*), thyroxine (*T4*), and thyroid-stimulating hormone (*TSH*) levels. Our goal is to propose a multiple linear regression statistical model (MLRM) that incorporates significant variables affecting *NW*. A descriptive, retrospective, cross-sectional study of the clinical histories of pregnant women and newborns was carried out using data from Hospital Los Sarmientos (Tucumán, Argentina). The AIC criterion was applied for the selection of measured variables included in the model (*GA*, *WG*, *BMI*, *PP*, maternal age, level of education, and analytical data for the 3rd quarter *H*, *G*, *TSH*, and *T4*). Data analysis was performed using the R Core Team (2020). Predictor variables *GA*, *WG*, *BMI* and regression coefficients (*b0, b1, b2, b3*) determine the model $NW = b0 + b1GA + b2WG + b3BMI$ ($R2 = 0.53$; $F = 32.94$ (3.86); $P < 0.001$). The partial coefficients of the MLRM indicate that *NW* increases on average in *GA b1* = 148.31 g/week, in *GP b2* = 16.53 g/kg, and in *BMI b3* = 22.42 g/(kg/m^2). Additionally, a second MLRM includes the values of analytical data for the 3rd quarter (*H*, *G*, *TSH*, and *T4*) and determines *GA*, *WG*, *BMI*, *TSH*, and T4 as predictor variables. To conclude, in both models the predictors *GA*, *BMI* and *WG* affect *NW*.

A40
CHRONOBIOLOGY AND ENVIRONMENT: STUDY OF CASES IN HABITANTS FROM THE PUNA OF JUJUY

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The altitudinal gradient and the topography diversity of Jujuy generate a big variety of environmental factors that the human populations distributed in them are exposed, corresponding to the Puna 2/3 of the provincial surface. The Puna presents a hostile environment, so there is a low population density, and, therefore, few studies were done. We studied the relationship between light-environment-quality of life perceived in people of the Puna. Geographic-climatic-environmental variables were analyzed (environmental light, photoperiod, heliophany, and light intensity, through the seasons), in order to be contrasted with well-being data, throw WHOQOL-BREF (W-B) questionnaire. The hypothesis was: the environmental light influences people's behavior and well-being. 32 individuals were analyzed with a neutral chronotype (evening-morning questionnaire, 20 and 50 years old). Seasonal data were collected, generating four-dimensional profiles (physical health, mental health, social relationships and environment) and 2 items on the perception of life´s quality and personal´s health. The results of the W-B questionnaire showed psychometric resolution power, accentuated in opposite seasons of the year. Statistical analysis (ANAVA-Tukey Test) concluded that there are no significant differences for the analyzed variables between spring-summer and between autumn-winter, coinciding with the values of photoperiod and maximum light intensity measured. However, statistical differences were found between contrasting seasons (summer–winter). The trend shows that the values of all the variables studied decrease towards the winter solstice, and rise towards the summer solstice, adjusting to the expected chronobiological models, showing altitudinal weighting.

A41

NATIVE ENZYMES PRESENT IN THE MILK OF *Tapirus terrestris*

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Knowing the composition of wild animals' milk is important to understand the offspring's nutritional needs, especially for threatened species whose offspring are born in captivity or semi-captivity conditions. One of these species is the South American tapir (*Tapirus terrestris*), which is an endangered animal in Argentina. In addition to various analyzes about general composition, the presence and kinetics of some native enzymes (amylase, alkaline phosphatase (ALP), and γ-glutamyl transpeptidase (GGT)) were analyzed in the tapir milk secretion. Tapir whey samples were used (N = 6) and enzyme activity was monitored at different stages of lactation. Amylase activity was determined at different pH and different temperatures by a kinetic method (commercial kit). GGT activity was determined in the same way, while FAL activity was measured by an end-point colorimetric method. For GGT, an average activity of 13.37 ± 2.15 U/L was obtained in colostrum and 1.17 ± 0.03 U/L in mature milk. The results of the FAL activity were 44.67 ± 13.95 U/L in colostrum and 21.67 ± 1.25 U/L in mature milk. The average amylase activity was 900.4 ± 656.20 U/L and 126.8 ± 14.85 U/L, respectively for colostrum and mature milk. The highest activity values found in tapir´s milk correspond to colostrum, specifically on the day of the calf's birth, where values were much higher than those of mature milk. This could be due to the activation of milk secretory mechanisms at this stage. These enzymes are part of the glandular cells' plasma membrane; therefore, during the formation of fat globules in milk, they present their greatest activity.

A42
PILOT STUDY WITH BIOLOGICAL TREATMENT OF FIXED FILM AND *Salvinia rotundifolia* FOR VINAZA PURIFICATION

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Stillage is an effluent generated in obtaining ethanol from cane molasses. It is considered highly polluting due to its organic load, acid pH, and high COD and BOD values, as well as total solids. In previous studies, *Salvinia rotundifolia* showed great capacity to sanitize aquatic environments, so it could be used in effluent treatment systems due to its phytoremediation capacity. In order to evaluate an adsorption method as an alternative to improve the quality of the vinasse before it is turned over, adsorption tests were carried out on a laboratory scale, using biofilters and *S. rotundifolia*. The effect of the effluent on photosynthetic pigments and phenolic compounds of *S. rotundifolia* and the content of phenols in vinasse before and after treatment was evaluated. The results showed that the passage through the biofilter produced clearance of the effluent and an increase in pH. *S. rotundifolia* tolerated the conditions of the filtered effluent, although it showed decreases in the content of both chlorophylls and an increase in the carotenoids of the fronds. On the other hand, the content of soluble phenols increased both in fronds and in lacinias, while the insoluble ones showed an increase only in the lacinias exposed to the effluent. The phenols present in the vinasse decreased by 25% when passing through the biofilter and after treatment with *S. rotundifolia* the reduction was 50%. It can be concluded that the use of the proposed system (biofilter-macrophyte) would be a viable solution to improve the quality of stillage before its discharge, although it requires further studies.

A43
DYNAMICS OF THE DEVELOPMENT OF REPRODUCTIVE STRUCTURES OF THE LEMON TREE DURING THE SEASON 2020/2021

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Tucuman produces 81.5% of Argentine lemon. Information about lemon tree ecophysiological behavior in the Argentinian northwestern region is limited. Our study was conducted to shed light on the evolution of lemon reproductive structures in response to the weather conditions of the 2020/21 season. The research was carried out in a commercial orchard planted with 13 years old Genova/Troyer lemon trees, in San Pablo, Tucumán, without irrigation conditions. Six non-lignified branches (50 cm) were labeled on 5 randomly chosen trees and their nodes (N) were counted. The number of flower buds (B), flowers (F), petal drops (PD), and fruits (Fr), were also recorded. The weather data was obtained from a weather station in the area. During the first 19 days, the amount of B was 32.6/100 N, increasing 4.3 times in the following 7 days (134.4 B/ 100 N). Afterward, the number of B decreased while F, PD, and Fr increased. The highest values of F and PD were in September (15/100 N). The 1st fruit set was at the end of August. October showed the highest number of Fr (50/100 N), but no new B, F, or PD, were found in that month. In December, the number of Fr stabilized until the harvest. Considering the average temperatures, the highest ones were between November 2020 and February 2021, and the highest rainfall happened between November 20–March 21 (1200 mm). An atypical drought occurred between the end of the winter and the beginning of the spring (2020) matching with

the normal rise in temperature. We conclude that the relationship between Fr at the harvest and the highest number of B was 2.7%, this value was possibly affected by the low rainfall records in winter and spring.

A44
DETECTION OF ROTAVIRUS AND INFLUENZA VIRUS ON PAPER

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A clinical sample is both a biotic and abiotic system that allows the survival of a virus for transmission to another host and its diagnosis. Currently, we do not have methodologies for virus detection on paper as a mechanical transfer medium, and we do not know whether commercially available methods are helpful for this purpose. This study aimed to determine the presence of Rotavirus and Influenza virus in paper and their detection rates concerning the clinical sample using molecular and immunological methods. To reach the objective, the fecal material for rotavirus G1P8 strains and nasopharyngeal secretion were tested for the Influenza virus. Immunological detection was performed for both viruses by immunochromatography for the detection of viral antigens. Molecular detection used RT-PCR for the detection of rotavirus gene 9 and influenza virus M protein gene. The tests were run at room temperature of 25°C and 30% humidity. 100 µL of the samples were placed on the 90 g/m^2 paper for 5 min. Then a sample titration of the absorbed samples with paper rehydration is performed according to the protocol of the commercial method. The paper titer was compared with the titer of the specimen. The titer obtained from the clinical sample resulted in 100% viral detection. The results show that rotavirus was detectable in 66.67% of the paper compared to the clinical specimen by immunological methods and 77.00% by molecular methods. Influenza virus was detectable in 100% by both methods studied for the clinical specimen. In conclusion, Rotavirus and Influenza virus can be detected on paper by molecular and immunological methods considering the variation in detection rates. Further studies on this topic are necessary to establish paper as a support for viral detection.

A45
COVID 19 CASES AND ENVIRONMENTAL PARAMETERS IN FOUR DEPARTMENTS OF CATAMARCA PROVINCE. PRELIMINARY RESULTS

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Respiratory viral infections are related to environmental parameters, especially Influenza viruses. There are no studies on this subject in Argentina. The objective of the study is to investigate the relationship between the presence of COVID19 cases and environmental parameters in 4 departments of the province of Catamarca, from March 2 to June 31, 2021, to establish the importance of the environment in the spread of viral infection. A descriptive cross-sectional study was conducted in Ambato, Capital, Paclín, and Andalgalá. A total of 17,142 positive cases were taken, in a temperature range (T) between −3.1ºC and 39.6ºC, and relative humidity of 75%. The data treatment was carried out with the Infostat statistical software, through a linear regression for the numerical variables. The results showed that the average ambient temperature has an indirect relationship with the number of cases in Capital where the average temperature decreased from 28.3 to 5ºC, increasing from 13 to 345 cases; in Ambato, the average temperature decreased from 22.2 to 0.9ºC with an increase from 0 to 16 cases, in Paclín the average temperature decreased from 22.3 to 1.5ºC with an increase from 0 to 9 cases, and Andalgalá, where the ambient temperature has a direct relationship with the number of cases, where the number of cases increased from 0 to 70. Relative humidity did not vary in any of the departments studied. In conclusion, preliminary results suggest that the number of COVID19 cases is related to environmental temperature but not to average humidity. Further study of environmental parameters to virosis is relevant for our region and the rest of the country.

A46
KINETIC OF THE PRESENCE OF ROTAVIRUS AND INFLUENZA VIRUS ON PAPER

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Viruses may remain on some surfaces, such as plastics, iron, and wood, although they do not always remain infective on them. Viral viability outside its host is essential to allow its spread. The objective of this work was to study the presence of rotavirus and influenza virus on paper to obtain information that would allow the establishment of measures to prevent viral infections. Fecal matter of rotavirus G1P8 strains (1000 particles/mL) and nasopharyngeal secretion with influenza virus (100000 particles/mL) were analyzed. Immunological

detection was performed for both viruses by immunochromatography for the detection of viral antigens. Molecular detection by end-point RT-PCR for the detection of rotavirus gene 9 and influenza virus protein gene M was performed. The tests were performed at room temperature of 25°C and 30% humidity. 100 µL of the samples were placed on the paper of 90 g/m^2 between 0 and 300 min. Then a viral detection with rehydration of the paper is performed according to the protocol of the commercial method. Influenza virus was found to remain positive on paper for 60 min and rotavirus 240 min (4 h) for the amount of virus tested. In conclusion, rotavirus and influenza virus remain on paper for a while indicating that it could be a viral capability that allows transmission through this support. Deepening this topic is a tool for the prevention of viral diseases.

A47

PERMANENCE OF CLINICAL SAMPLES IN PAPERS WITH DIFFERENT GRAMMAGES

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Clinical sample persistence on paper is of microbiological importance and fundamental to allowing the spread of infectious diseases. The present work aimed to study the permanence of clinical samples of different weights. In the experiment, the residence time of fecal matter, nasopharyngeal secretion, and drinking water was determined on paper from 12 clinical samples. The residence time is determined as the difference between the absorption time and the drying time of the samples on the paper, by direct visualization of the same operator. Times were determined with a stopwatch. The tests were carried out in the following volumes: 100, 50, 10, 1 µL, in triplicate for each sample. The weights of the papers were 70, 80, and 90 g/m^2 at room temperature of 25°C, 40% humidity. Results show that in the 70, 80, and 90 g/m^2 paper, the fecal matter can remain between 9, 14, and 18 min with 1 µL and 1.48, 2.38, and 3.00 h with 100 µL of the sample. Nasopharyngeal secretion can remain between 5.6 and 7 min with 1 µL and 1.40, 1.38 and 1.07 h with 100 µL; and the water can remain between 6, 9, and 11 min with 1 µL and 3.18, 3.23, and 3.27 h with 100 µL. In conclusion, we observe that at higher volumes, the one that remains on the paper the most is the drinking water, then the fecal matter, and finally the nasopharyngeal secretion. At lower volumes, the more fecal matter remains, then drinking water, and finally nasopharyngeal secretion. The results show that the papers could make up a vector for the transmission of infections.

A48

ZEARALENONE PRODUCTION BY *Fusarium boothii* AND *Fusarium meridionale* STRAINS IN CORN GRAINS UNDER DIFFERENT ENVIRONMENTAL CONDITIONS

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Fusarium meridional (Fm) and *F. boothii* (Fb) generate maize ear rotting in the NOA region, reducing the yield of grain, and contaminating it with zearalenone (ZEA). This toxin has a mutagenic, hemotoxic, and hepatotoxic activity, and it triggers disorders in humans and animals associated with its high estrogenic power. ZEA's presence makes up an obstacle for grain and grain products export when its level exceeds 1 ppm. ZEA production capacity of Fb and Fm in corn grains is unknown. In this work, we evaluated the influence of water activity (a_w) and temperature on the ZEA production in corn grains inoculated with Fb and Fm strains. We tested Fb and Fm on autoclaved corn grain monolayers adjusted at 0.95, 0.97, and 0.995 a_w. We incubated them at 15, 25, and 30°C for 28 days. For comparative proposes, *F. graminearum sensu stricto* (Fgss) strains were included. For ZEA's quantification, RIDASCREEN® FAST Zearalenone was used. We analyzed the data through ANOVA. The maximum levels of ZEA production were 0,995a_w/15–25°C for Fgss (4.08 ± 0.10 and 3.94 ± 0.07 ppm), 0.995 a_w /15° C for Fb (3.81 ± 0.05 ppm) and 0.95 a_w/30°C for Fm (4.10 ± 0.10 ppm). Minimum levels were 0.995 a_w/30°C for all species. The a_w and its interaction with temperature had a greater influence on ZEA production. Species differentiated in environmental conditions in which they showed a significant increase in their toxigenic capacity. Results suggest it may be critical to diagnosing, before storage and under prevailing conditions, this species in grains to predict the ZEA contamination risk level.

A49

LACTIC ACID BACTERIA CHARACTERIZATION ACCORDING TO INPUT OF ARTISAN GOAT CHEESE PRODUCTION

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Lactic acid bacteria (LAB) give rise to sensory characteristics that distinguish goat cheeses. The objective was to characterize LAB from cheeses and inputs needed to goat cheese elaboration. The samples were collected from Amblayo (Salta, Argentina): 12 samples of goat milk, 4 artisan goat rennet (AGR), and 6 pieces of goat cheese. Isolated LAB (45 from milk samples, 33 from AGR, and 27 from cheese)

were randomly selected for safety tests: vancomycin resistance, hemolytic activity, and gelatinase. Then, harmless LABs were divided into 2 groups: one group was associated with starter ferment due to its acidification and coagulation capacity, and the other group was associated with an adjunct ferment by the use of citrate and diacetyl production. Genetic characterization was done with 16S rRNA. 783 colonies were isolated, 52% were LAB (21% in milk samples, 16% in AGR, and 15% in cheese). They showed resistance to vancomycin: 73% of LAB from milk samples, 64% and 93% in AGR and cheese samples respectively; none had hemolytic nor gelatinase activity. In milk samples, 100% were *Enterococcus* (*faecium*, *durans*, and *lactis*), in AGR were 86% (*faecium* and *durans*), and the remaining 14% were *Lactobacillus* (*brevis*, *acidophillus*, and *plantarum*), in cheese 99% were *Lactobacillus* (*brevis*, *casei*, *coriniformes*, and *plantarum*). LABs isolated from AGR were associated with an adjunct ferment, cheese LABs with a starter and starter-adjunct ferment, and milk LABs showed a low technological profile according to the parameters studied. The microbiological diversity found in cheese was not detected in milk. The effect of concentration during the cheese-making process could be an important factor in the selection of microorganisms. High resistance to vancomycin could be attributed to the intrinsic characteristics of the strains.

A50
ALTERNATIVES FOR THE CONTROL OF PHYTOPATHOGENS: ANTIFUNGAL EFFECT OF ESSENTIAL OILS

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Verticillium dahliae and *Phaeoacremonuim parasiticum* are two phytopathogenic fungi responsible for losses in olive trees and vineyards, traditionally controlled using synthetic compounds. Currently, environmentally friendly pest control alternatives are being sought, such as natural fungicides derived from plants. Our objective was (i) to determine the antifungal activity of five essential oils (EOs) from La Rioja native plants and (ii) to evaluate if the combined EOs can interact with each other, enhancing the antifungal effect. The EOs was obtained by hydrodistillation of the aerial parts of *Lippia turbinata*, *Lippia integrifolia*, *Clinopodium gilliesii*, *Zuccagnia punctata*, and *Senecio subulatus* var. *salsus*. EOs antifungal activity was evaluated against *V. dahliae* and *P. parasiticum* by the spore germination inhibition test. Benomil was used as a positive control. Combinations (EOs / EOs and EOs / antifungal) with EOs that reached 100% inhibition of MIC (minimum inhibitory concentration) were prepared and their antifungal effect was determined. To know the type of interaction of the combinations, the FIC index (fractional inhibitory concentration) was calculated. None of the EOs evaluated were able to control the germination of *P. parasiticum* spores. In contrast, *V. dahliae* was completely inhibited by EOs from *Z. punctata* and *C. gilliesii* (MIC = 3 mg/mL). The combinations *Z. punctata / C. gilliesii*, *Benomil / Z. punctata* and *Benomil / C. gilliesii* had an additive antifungal effect. The results obtained suggest that the EOs of *Z. punctata* and *C. gilliesii* have fungicidal potential for the control of verticilosis in olive trees.

A51
MORPHOLOGICAL CHARACTERIZATION AND IDENTIFICATION OF BACTERIA ISOLATED FROM SURFACES AT THE “DR. CÉSAR GUERRA” CENTRAL BLOOD BANK OF TUCUMÁN

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The microbiomes of the medical-care environment play an important role as reservoirs of infectious diseases. Our goal was to study microbial communities at the Central Blood Bank. Surfaces from the Production and Molecular Biology services were swabbed and seeded into plates (LB pH7). The identification of the isolated strains was done by MALDI-TOF and morphological characterization by Scanning Electron Microscopy (SEM). The obtained species have clinical importance: as opportunistic pathogens (*Staphylococcus haemolyticus*, *Staphylococcus warneri*, *Clostridium subterminale*, *Brevibacterium casei*, *Staphylococcus saprophyticus*), multi resistance to antibiotics (*Staphylococcus cohnii* ssp. *cohnii*), spore formation (*Bacillus cereus group*, *Bacillus* sp.), or responsible for serious biofilm-related infections (*Micrococcus luteus*, *Burkholderia cenocepacia*, *Pseudomonas stutzeri*). Some isolated bacteria are important in bioremediation (*Dietzia cinnamea*, *Dietzia maris*, *Bacillus subtilis/amyloliquefaciens/vallismortis*, *Pseudomonas stutzeri*, *Bacillus altitudinis/pumilus*); enzyme production (*Bacillus megaterium*). The analysis with MEB revealed in some strains the presence of tubular structures, possibly nanotubes, linked to biofilm production and antimicrobial resistance. Our findings show the predominant bacterial diversity in the blood bank and describe structures possibly involved in pathogenicity mechanisms.

A52

NEUTROPHIL/LYMPHOCYTE AND PLATELET/LYMPHOCYTE RATIOS IN OBESE CHILDREN

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Inflammation plays a key role in obesity, where adipose tissue secretes pro-inflammatory substances that promote insulin resistance and atherosclerosis. Currently, neutrophil/lymphocyte ratio (NLR) and lymphocyte/platelet ratio (PLR) have been proposed as inflammatory markers. However, their role in obese children remains unclear. The aim of this work was to investigate NLR and PLR ratios and their correlation with proinflammatory molecules (soluble CD-40 ligand (sCD40L), monocyte chemoattractant protein 1 (MCP-1), and hs-CRP) in obese children. Forty-five obese children, from 7 to 14 years old (BMI > pº97) and 20 healthy children (pº15–84) according to age and sex, from Hospital del Niño Jesús, were studied. Age, weight, height, BMI, and waist circumference (WC) were recorded. The parameters evaluated were: NLR and PLR ratios, sCD40L, MCP-1, and hs-CRP. The data were expressed as mean ± SD and Pearson's coefficient was used to investigate correlations. Obese children showed significantly higher values of sCD40L (947 ± 272 *vs*. 109 ± 17 pg/mL; P = 0.0001), MCP-1 (157 ± 48 *vs*. 95 ± 18 pg/mL, P = 0.0001), hs-CRP (2.2 ± 1.7 *vs.* 0.53 ± 0.45 mg/L, P = 0.0001) compared to control group. However, NRL (1.50 ± 0.57 *vs*. 1.25 ± 0.57; P = 0.470) and PRL (113.00 ± 35.44 *vs*. 107.85 ± 42.25; P = 0.330) ratios exhibited no significant differences and there was no positive correlation between ratios and proinflammatory molecules. We concluded that NLR and PLR ratios were not useful as proinflammatory and cardiovascular risk biomarkers in obese children.

A53
LLAMA (*Lama glama*) ANTISERUM AGAINST SARS-CoV-2

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The receptor-binding domain (RBD) of SARS-CoV-2 Spike protein constitutes the key access for the virus inside the host cell. A positive correlation between titers of anti-RBD immunoglobulin G and antibodies (Ab) capable of neutralizing the virus has been demonstrated. In this context, passive immunotherapies such as convalescent plasma and hyperimmune equine serum have gained relevance as therapies against COVID-19. Another promising alternative is the use of polyclonal Ab from llamas (*Lama glama*), because of their unique features. For this reason, we aimed to obtain recombinant RBD as an immunogen to generate anti-RBD Ab in llamas. To achieve this, HEK 293 cells were transfected and transduced with the RDB encoding sequence, resulting in higher yields with this last method. The RBD was purified by affinity chromatography. An immunization schedule was designed and evaluated on two male animals, which were initially inoculated with RBD, followed by periodical boosters. Exploratory bleedings were performed in order to evaluate the reached titers, and larger bleedings in order to obtain enriched plasma with anti-RBD Ac. Ac quantification was accomplished by an "*in-house*" ELISA. Results showed that the immunization scheme was successful, achieving a maximum titer of 168000 at 28 days post-immunization. The results lay the foundations for the production of polyclonal anti-RBD Ab.

A54
BALANCED MICROMINERALS OF GESTATION AND LACTATION SOWS IN A SANTA FE FARM

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In order to achieve better management of animals and to obtain numerous litters with better weights at the time of weaning, microminerals composition in the balanced diet of gestation and lactation sows, at a farm in Santa Fe, was analyzed. A diet on corn, soy expeller, and enriched with the mineral-vitamin nucleus of inorganic origin was made. The minerals of nutritional importance such as copper (Cu), iron (Fe), and zinc (Zn), were analyzed by atomic absorption spectrophotometry (FAAS). All measurements were made in triplicate and the average value in each of the determinations was considered when comparing results. The mean values and standard deviations of the balance composition were: Fe (ppm) 201 -0.81; 170.3 -1.24; Cu (ppm) 10 -0.17; 16.1 -0.16; Zn (ppm) 168.3 -2.49; 102 -0.81 for physiological stages of gestation and lactation of sows in production respectively. Average values of Cu in the two stages are within the recommended values for several authors. The statistical differences (P < 0.05) in Fe and Zn between gestation and lactation, are due to the fact that these are minerals supplied in excess to avoid deficiencies and/or pathologies in fetal development. When compared with reference values available in international literature, the average values of minerals are higher than those recommended. The next step to investigate is a diet with microminerals from organic sources, for sows in both categories.

A55

EVALUATION OF TEMPERATE HYBRIDS OF MAIZE (*Zea mays* L.) IN EARLY PLANTING IN MONTEROS-TUCUMÁN

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Maize cultivation plays an important role in the NOA region. In Tucumán, in the area of the depressed plain that is not saline, there is the possibility of early plantings, with temperate hybrids. The objective of this work was to evaluate temperate hybrids at different early planting dates. The tests were conducted in the town of La Isla, Monteros, Tucumán. Yield (REN), prolificacy (PRO), and percentage overtaking (%VUEL) of six temperate hybrids of the KWS® company, KM 4580 VT3P (H1), KM 3916 GLStack/VIP3 (H2), KM 4020 GLStack/VIP3 (H3), KM 3821 VIP3 (H4), KM 4321 HR/LCL/FULL (H5), and Experimental VIP3 (H6), were evaluated on 3 planting dates (FS), September 7, 2020 (1°FS), September 26, 2020 (2°FS), and October 16, 2020 (3°FS), in rain-fed. Plots of 4 rows of 5 m, at 70 cm between furrows. The two central furrows were harvested. The design was completely randomized blocks. The ANOVA for REN and PRO showed a highly significant difference for H ($P < 0.0001$; $P < 0.0006$) and FS ($P < 0.0008$; $P < 0.0045$), and for %VUEL only in H ($P < 0.0025$). For REN, the H1 (14,140.60 kg/ha) and H6 (12,784.29 kg/ha) and the 2°FS (12,636.25 kg/ha) and the 3°FS (12,470.83 kg/ha), were the best. In PRO, the H3 (1.11 ears/plants) and H1 (1.05 ears/plants) and the 2°FS (1.07 ears/plants) and 3°FS 1.03 ears/plants), had the highest value. The H3 (9.67%), was the worst performance for %VUEL. Temperate hybrids in early dry seeding showed good yields. The highest REN and PRO, of 2°FS and 3°FS, are explained by rainfall in the critical flowering period.

A56
JOINT EFFECT OF POTASSIUM SORBATE AND ALCOHOLIC EXTRACTS OF VINAL AGAINST *Aspergillus flavus*

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Aflatoxin contamination has strong health and economic impact on the agri-food industry. Prevention of *Aspergillus* growth is the main way to avoid aflatoxin contamination. Food preservatives such as potassium sorbate (PS) are fungistatic and often stimulate aflatoxin accumulation. New antifungals need to be incorporated to replace the intensive use of PS. We demonstrated that vinal (*Prosopis ruscifolia*) aerial parts contain alcohol-soluble antifungals. The objective of this work was to investigate the joint antifungal activity of PS and the alcoholic extracts from aerial parts of vinal obtained with ethanol (VEtOH) or methanol (VMeOH) against *A. flavus*. The plant material was extracted with ethanol or methanol. The solvent was evaporated, and the dry extract was dissolved in water. Antifungal activity was evaluated through the minimum inhibitory concentration (MIC). The combined effect of alcoholic extracts (EA) and SP mixtures was evaluated by microdilution with a checkerboard design. Fractionated inhibitory concentrations for the EA and SP in the mixtures and the fractional inhibitory concentration index (ICIF) were calculated. The lethal concentration of 50% (LC50) of EA on *A. salina* was also evaluated. The EA did not differ in their synergic effect on SP. The mixture of EA+SP at the MIC showed an SP concentration of 250 µg/mL, which was 18-fold lower than the concentration recorded when it was tested alone. The LC50 values on *A. salina* were 1104 µg/mL (VEtOH) and 1829 µg/mL (VMeOH), which included both AE as a non-toxic compound. We will continue working on the potential use of VEtOH against *A. flavus* because ethanol is safer and cheaper than methanol.

A57
EVALUATION OF QUALITY PARAMETERS OF THE MAJORITY AND MINORITY COMPOUNDS OF TWO VARIETIES OF OLIVE OIL: ARBEQUINA AND CORATINA FROM THE ANTINACO- LOS COLORADOS VALLEY

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The presence of different chemical compounds in virgin olive oil (VOO) is influenced by different factors, such as the edaphoclimatic conditions of the production area, the maturity at the time of the olive harvest, oil extraction methods, and its preservation. In recent years, it is having a special interest in the compounds that are found in a small proportion. Our goal was to evaluate quality parameters referring to the majority and minority compounds of two varieties of olive oil (Arbequina and Coratina) produced in the Antinaco – Los Colorados Valley, to be able to compare them in terms of quality and antioxidant activity. Six samples of each variety were used from four olive oil companies in the valley. The following parameters were measured: acidity, peroxide index, ultraviolet absorbance (K232 and K270), the profile of fatty acids, as parameters corresponding to the majority compounds. Phenols and total flavonoids determinations, as well as pigments, belong to the minority compounds. The antioxidant potential was affected by the DPPH method, and it was correlated to the evaluated compounds. According to the quality parameters analyzed, four oils can be classified as extra virgin. The Coratina variety presented higher content of oleic, phenols, and pigments, as well as better antioxidant activity ($P < 0.05$). The antioxidant power of

Arbequina VOO would depend mainly on the concentration of carotenoids and the content of phenols in the Coratina variety (r^2: $P < 0.01$). The VOO of the Coratina variety would present better quality and antioxidant properties than the Arbequina VOO.

A58

STUDY OF THE APPLICATION OF HUMIC AND FULVIC ACIDS IN STRAWBERRY CROP

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The application of humic and fulvic acids has been shown to increase the uptake of nutrients from plants, stimulate the growth of root biomass, and decrease the effects of saline stress. The objective of this work was to evaluate the effects of the application of humic and fulvic acids on the dynamics of carbon in the soil and the plant growth of strawberry cultivation. The trial was conducted in a 70.4 ha strawberry field in the department of Lules, Tucumán. The field was divided into 6 sectors (S1, S2..., S6). All sectors except S1 received contributions of humic and fulvic acids. Soil samples were taken from each sector 6 times between April and October 2020. Organic matter, soil basal respiration, biomass carbon, and metabolic quotient were determined. In addition, a satellite monitoring of the crop vegetation index (Satellite Sentinel 2, Field 360-GeoAgro by TEK software) was performed. S1 had the highest vegetation index during the first 100 days of cultivation but showed a decline towards the end of the cycle. This behavior was consistent with baseline respiration and metabolic ratio in S1. In the other sectors, there was no decrease in the vegetation index. In addition, S1 was the only sector that did not have "very high" vegetation indices. Contrary to expectations, S1 was one of the sectors that accumulated the most organic matter during the cycle (1.01%). These results suggest that humic and fulvic acid inputs benefit strawberry crop growth, but their effects on soil carbon dynamics are unclear and require further research.

A59

ETHANOLIC EXTRACT OF *Senecio rudbeckiafolious* IN PEST CONTROL OF *Diatraea saccharalis*

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Species of the genus *Senecio* contain a wide variety of secondary metabolites. The toxicity demonstrated against insects and vertebrates by many of them is attributed to the production of pyrrolizidine alkaloids. Previous studies have shown toxic effects of the alkaloidal fraction of a methanolic extract of *Senecio rudbeckiaefolious* on larvae of *Diatraea saccharalis*, the main pest affecting sugarcane in Tucumán. Sustainable agricultural practices demand more research on easily prepared pest control bioproducts with the lowest possible environmental impact. This work aimed to study the lethal and sublethal effects of an ethanolic extract (EE) obtained from *S. rudbeckiaefolious* on *D. saccharalis* larvae. Toxicity assays by forced intake were made with batches of 32 neonate larvae fed on an EE-impregnated diet (500–4000 mg/L) and an unimpregnated diet for control. Three repetitions were performed. At 14 days, the number of live larvae, dead larvae, larval stage, and sublethal effects were recorded throughout the cycle. Toxic concentration-dependent effects were observed with a high percentage of mortality (70–80%) and growth inhibition. Only 3.45% of the 500 mg/L treatment larvae reached the adult stage; the remaining treated specimens did not exceed the larval stage. These data are promising for the formulation of an accessible, inexpensive, and low toxicity natural product for *D. saccharalis* control.

A60

TOXIC EFFECTS OF *Senecio rudbeckia* FOLIUS METHANOL EXTRACT (EM) ON INSECTS-PLAGUE OF THE *Spodoptera* COMPLEX

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The caterpillars of the *Spodoptera* complex are polyphagous species that cause significant economic damage to regional crops. To the well-known *Spodoptera frugiperda* "late military caterpillar" in soybeans or "armyworm caterpillar" in corn crops, *Spodoptera cosmioides*, "red weed caterpillar" is added. *Senecio rudbeckiaefolius* ("maicha", "huira-huira") is a shrub that grows in the mountains of southern Peru, Bolivia, and Northwest Argentina. It is chemically characterized by its content of pyrrolizidine alkaloids, of known toxicity against various animal species. Our objective was to evaluate the lethal and sublethal effects of the methanolic extract of *S. rudbeckiaefolius* on larvae of *S. frugiperda* and *S. cosmioides*. Obligatory ingestion toxicity bioassays were performed with batches of 32 neonatal larvae fed a diet impregnated with aqueous solutions prepared from EM (500 to 4000 mg/L). At 14 days, the percentage of dead larvae and the larval stage

were recorded and sublethal effects were controlled until pupal formation. Interesting lethal effects were obtained: at the maximum concentration of EM tested (4,000 mg/L), 100% mortality was achieved in *S. frugiperda* larvae and 56% in *S. cosmioides* larvae. In both species a marked inhibitory effect on larval development was observed. Our results show that the larvae of the *Spodoptera* complex are susceptible to the natural product tested. These data serve as the basis for the formulation of a biopesticide for the control of pests of economic implication in the region.

A61
POTENTIAL SEEDLING EMERGENCY OF TWO SPONTANEOUS POPULATIONS OF *Pappophorum vaginatum* FROM LA PAMPA DEPRIMIDA

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The halophyte steppes of *la Pampa Deprimida* (BA) have limitations (e.g., saline soils) for the non-native forage species. Reincorporation selected native germplasm is important to favor cattle rising and grassland biodiversity. *Pappophorum vaginatum* (Pv) is a native C4 perennial grass species adapted to such conditions. This work aimed to analyze variability in the potential of the percentage and speed of emergency in seedlings of two spontaneous populations of Pv from halophyte steppes of *la Pampa Deprimida.* October 10, 2019, 4 seeds per cell, from the collected populations (P1 y P2) in Punta Indio and Magdalena (BA), respectively; were sown in trays of 30 cells (180 cm^3) with typic Argiudoll soil as substrate (2 populations x 100 cells x 4 seeds = 800 seeds) in a completely randomized design (N = 10; experimental unit = 10 cells with 20 seeds) in a greenhouse. The emergency of the seedlings (apex of the 1st visible leaf on the surface), as well as its register, started 3 days after sowing and continued every 3 days for one month. The speed (VE) and the percentage of emergency (E) were determined. The VE= E1/T1 + E2/T2+…+ Gn/Tn, where E: emerged seedlings; T: day of emergency; n: last day of emergency control. Intra- and inter-population variability were analyzed by means of the average, s, range, and %CV parameters, and Student´s *t*-test ($P \leq 0,05$), respectively. The P1 showed greater VE than P2 but similar E. Intra population variability was found (%CV: E: P1=20.2, P2=21.5; VE: P1=31.3, P2=25.2). Both populations showed positive significant correlations ($P \leq 0,05$) between E and VE. Considering these are the first studied populations, variability found in Pv suggests a promissory scenario for the genetic improvement of the implantation.

A62
POTENTIAL SEEDLING EMERGENCE OF TWO SPONTANEOUS POPULATIONS OF *Stapfochloa berroi* FROM LA PAMPA DEPRIMIDA

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Stapfochloa berroi (Sb) is a key warm-season native perennial grass species in the halophyte steppes of *la Pampa Deprimida* (BA) due to its forage value and adaptation to these environments. Incorporating the selected germplasm of this species would be useful for cattle raising and grassland biodiversity to analyze variability in the potential of the percentage and speed of emergence in seedlings of two spontaneous populations of Sb from halophyte steppes of *la Pampa Deprimida*. On October 10, 2019, 2 seeds per cell from the collected populations (P1 y P2) in Magdalena and Punta Indio (BA), respectively, and were sown in trays of 30 cells (180 cm^3) with Argiudoll soil as substrate (2 populations x 100 cells x 2 seeds = 400 seeds) in a CRD (N = 10; experimental unit = ten cells with 20 seeds) in a greenhouse. The seedling emergence (apex of the 1st visible leaf on the surface) and its register started three days after sowing, and it continued every three days for one month. The speed (VE) and the percentage of accumulated emergence (E) were determined. The VE = E1/T1 + E2/T2+…+ Gn/Tn, where E: emerged seedlings; T: day of emergence; n: last day of emergence control. Respectively, intra-population and inter-population variability were analyzed employing the average, s, range, and %CV parameters, and Student's *t*-test ($P \leq 0.05$). The VE was greater in P1 than P2 but similar to E. Intra population variability was found (%CV: E: P1=15.8, P2=12.4; VE: P1=19.3, P2=27). Both populations showed positive significant correlations ($P \leq 0.05$) between E and VE. Variability found in Sb populations would be promissory for selection in this first stage of the implantation phase breeding.

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