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SPIDER BITES IN THE ARGENTINIAN ATLANTIC FOREST (2017-2023)

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ABSTRACT

The aim of this work was to provide information on arachnidism in northern Misiones province. We used the database (2017-2023) of the National Institute of Tropical Medicine. We recorded 62 incidents, classified as mild, only one moderate. Phoneutrism was the most frequent intoxication (66%). We present the first case of *Loxosceles hirsuta* Melo-Leitão, 1931 bite. Cases occurred throughout the year, with peaks in November and May, and occurred mainly on the hands or feet. The main affected groups were residents aged 0 to 10 and 22-32 years. Female/male ratio = 0.51. Fifty-four percent of cases occurred at home and 29% in rural areas. Stinging pain and erythema were the most frequent local symptoms. Spider bites were not correlated with climatic variables and no seasonality was evident. Arachnidism in northern Misiones involves native and frequent spiders, and is possibly facilitated by local human habits and lifestyles. Taxonomic diagnosis was beneficial in determining and monitoring the assemblage of spiders of medical interest in the region.

Key words: Epidemiology; *Loxosceles*; *Phoneutria*; Toxicology; Public health surveillance

RESUMEN

Picaduras de araña en el bosque atlántico argentino (2017-2023). El objetivo de este trabajo fue proporcionar información sobre el araneísmo del norte de la provincia de Misiones. Utilizamos la base de datos (2017-2023) del Instituto Nacional de Medicina Tropical. Registramos 62 incidentes, clasificados como leves, sólo uno moderado. El foneutrismo fue la intoxicación más frecuente (66%). Presentamos el primer caso de mordedura de *Loxosceles hirsuta* Melo-Leitão, 1931. Los casos se produjeron a lo largo de todo el año, con picos en noviembre y mayo, y se produjeron principalmente en las manos o los pies. Los principales grupos afectados fueron los residentes de 0 a 10 y 22 a 32 años. Relación mujer/hombre = 0,51. El 54% de los casos se produjeron en el hogar y el 29% en zonas rurales. El dolor punzante y eritema fueron los síntomas locales más frecuentes. Las mordeduras no se correlacionaron con las variables climáticas y no se evidenció estacionalidad. El araneísmo en el norte misionero involucra arañas nativas y frecuentes, posiblemente facilitado por los hábitos y estilos de vida humanos locales. La identificación taxonómica resultó beneficiosa en la determinación y monitoreo del ensamble de arañas de interés médico en la región.

Palabras clave: Epidemiología; *Loxosceles*; *Phoneutria*; Toxicología; Vigilancia de la salud pública.

INTRODUCTION

Aranchnidism is defined as the syndrome of poisoning caused by the inoculation of toxins by the bite of a spider (Moyano, 2008). Worldwide, 51.908 spider species distributed in 138 families and 4.375 genera have been described (World Spider Catalog, 2024), but only some species of the cosmopolitan genera *Latrodectus* Walckenaer, 1805 (Theridiidae), *Loxosceles* Heineken & Lowe, 1832 (Sicariidae) and, less frequently, *Phoneutria* Perty, 1833 (Ctenidae) in South America and *Atrax* O. Pickar-Cambridge, 1877 (Atracidae), endemic to Australia, are considered of medical importance (Porras-Villamil and Olivera, 2020).

In the Americas, *Latrodectus* spp. are widely distributed, but some species of *Loxosceles* are of major medical interest, especially in Chile, Colombia and the United States; in Brazil and Colombia,

Phoneutria spp. should also be considered (Brazil, Pinto-Leite, Almeida-Silva, Lira da Silva and Brescovit, 2009; Gómez and Gómez, 2019). According to data from the National Health Surveillance System, in Argentina there are 1200 to 2000 spider bites/year (Orduna, Lloveras, de Roodt, Costa de Oliveira and García, 2012), and occasionally serious acute intoxications occur, reporting 1-2 deaths/year (Casas, de Roodt, García and Fandiño, 2013). The species of medical importance in Argentina belong to the three genera, the most important being *Latrodectus* (the black widows), followed by *Loxosceles* (violin spider, -with *Lo. laeta* (Nicolet, 1849) causing most of the accidents-), and *Phoneutria nigriventer* (Keyserling, 1891) (banano spider) with fewer cases in northern Argentina (Cabrerizo et al., 2009; Casas, de Roodt, García and Fandiño, 2013). About 90% of the accidents with *Lo. laeta* in the country develop the mild form of cutaneous loxoscelism, although it can evolve into lesions in the form of ulcers that do not heal and require reparative surgery, leaving some esthetic sequelae (Cabrerizo et al., 2009). There are few known fatal cases of phoneutrism, the highest susceptibility is observed in children and there are few reports of sequelae of poisonings (Salvatierra and Ramos, 2018).

The province of Misiones (located in the extreme northeast of the country) ranks third in the number of spider bites, with approximately 200 cases/year, surpassed only by Santiago del Estero and Córdoba (Orduna, Lloveras, de Roodt, Costa de Oliveira and García, 2012). The city of Puerto Iguazú is located in the extreme northwest of the province of Misiones, being part of the triple border with Brazil and Paraguay, and forms the buffer area of the Iguazú National Park and its falls, one of the largest and best-preserved patches of Atlantic Forest in the world (Ribeiro, Metzger, Martensen, Ponzoni and Hirota. 2009). Recent studies show that the largest number of scorpion species of sanitary interest in the country are found in this locality (López, 2021), and Iguazú National Park has the largest number of species of venomous snakes (Giraudo, Arzamendia, Méndez and Acosta, 2009). However, the characteristics of spider bites in the city and its area of influence have not yet been described.

The present work aims to characterize the eco-epidemiology of spider envenomation, provide a brief description of the species of medical interest and propose accident prevention measures in the Argentinian extension of the Atlantic Forest.

MATERIALS AND METHODS

We conducted a descriptive observational study based on the records between 2017 to 2023 of the Taxonomy Service (TS) of the National Institute of Tropical Medicine (INMeT) based in Puerto Iguazú.

The TS has been operating since 2013, with the primary objective of offering assistance in the identification of poisonous species of health interest to the provincial and national health system. At the local level it is linked to the Infectious Diseases Service of the "Dr. Marta T. Schwarz" Hospital. It also receives consultations and provides advice to the local population on these animals. The specimens were received at INMeT, where the data of the person who delivers them (name of the collector, date, address, telephone number, etc.) and the details of the discovery of the animal (date, place, circumstances of the finding and comments) were recorded. After identification, a written report was prepared with the determination and the degree of sanitary importance of the species. Starting in 2017, the TS began using the virtual messaging service for the uninterrupted service of species determination by images, expanding the scope to other localities and provinces. For the present communication the data used were mainly from Puerto Iguazú, and also Puerto Libertad, San Antonio, Comandante Andresito, Bernardo de Irigoyen and Eldorado, all urban centers in the extreme north of the province of Misiones, within the Interior Atlantic Rainforest. Notifications of accidents are also received from medical personnel, with the species involved already identified by the attending physician (secondary data). All information, without individual's personal data, was stored and safeguarded in digital files, while biological specimens in good condition were deposited in the collection of arachnids of the TS, for didactic and research purposes (acronym: INMET#, curator: CA López). Individuals of *Loxosceles hirsuta* Mello-Leitão, 1931, 25 to 30 females and one to five males, were kept in plastic Petri dishes in laboratory conditions, to improve reproduction techniques. These individuals were fed three to four times per month mainly with ants and small grasshoppers. Males or females were entered into the female enclosures to evaluate their behaviors such as predation, courtship, copulation, egg laying, incubation and hatching.

Data analysis

For primary and secondary data, TS records were available for spider bites recorded in 2017-2023. The information was consolidated in a matrix where the selected variables were: spider species, date of the accident, geographical location of the accident, environment of the accident (categories: domicile, backyards, rural and urban), anatomical location of the bite, age, gender, activity performed by the person at the time of the accident, the symptomatology and the standardized classification of the accident determined by the physician (mild, moderate, severe). This information is available upon request via e-mail: odanielsalomon@gmail.com. The occurrence of the

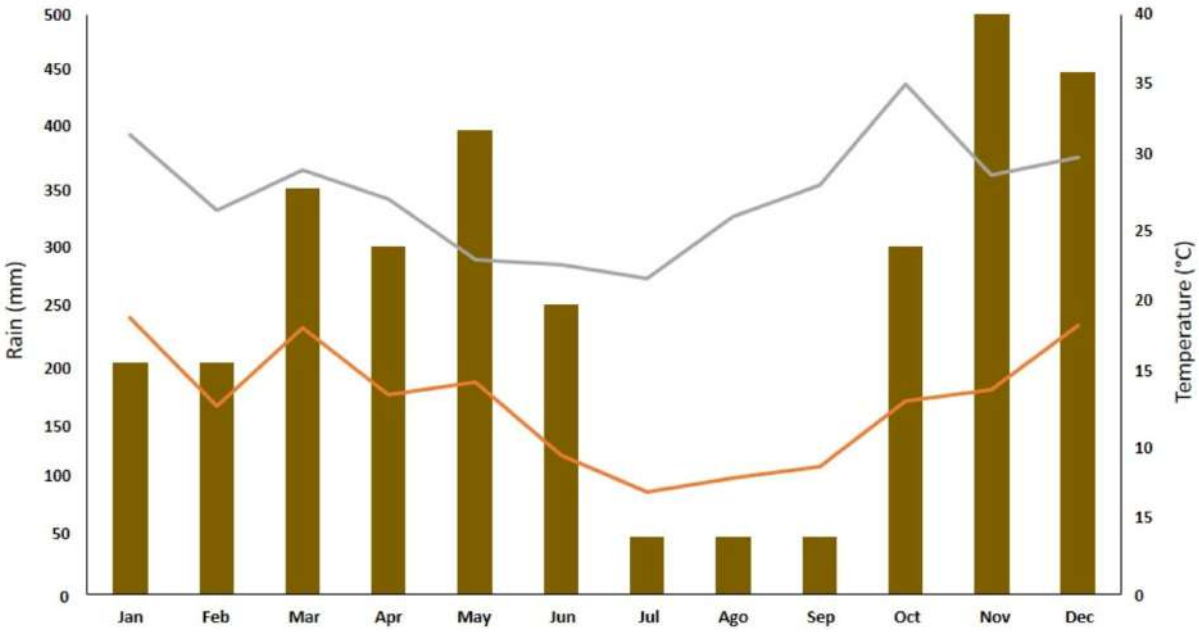

Fig. 1: Frequency of spider bites accumulated per month (multiplied x 50) between 2017-2023 in the Argentinian Atlantic Forest. Orange line: Mean monthly maximum temperatures (Celsius degrees) during the period. Gray line: Mean accumulated rainfall (in mm) per month during the study period.

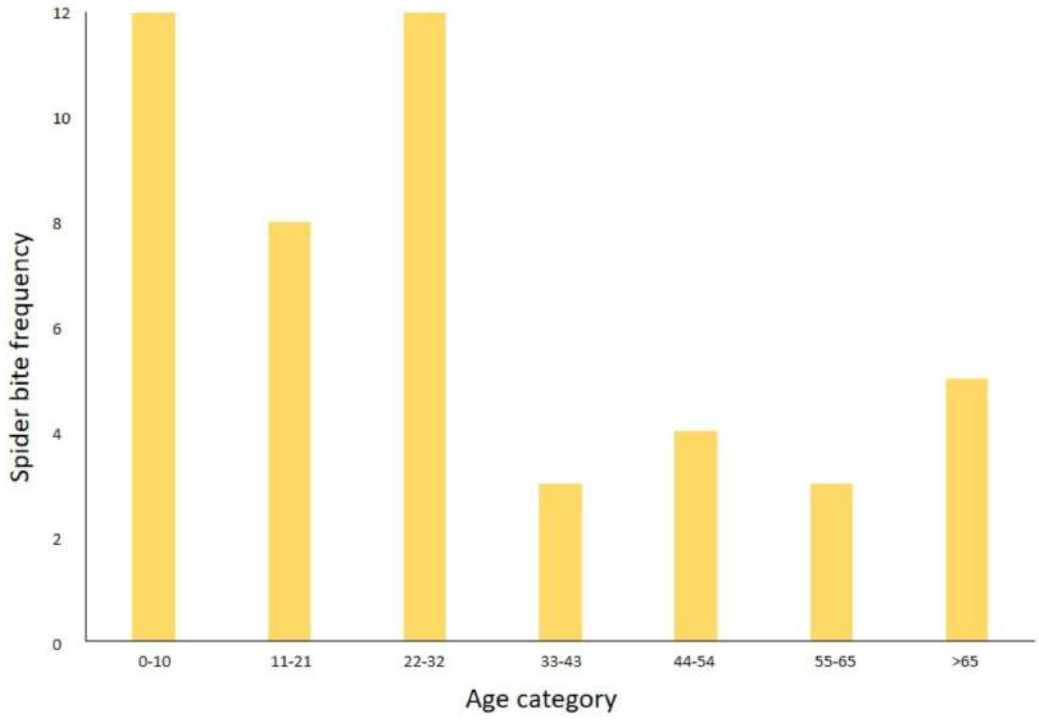

Fig. 2: Frequencies of spider bites by age category in the study period (2017-2023) in the Argentinian Atlantic Forest.

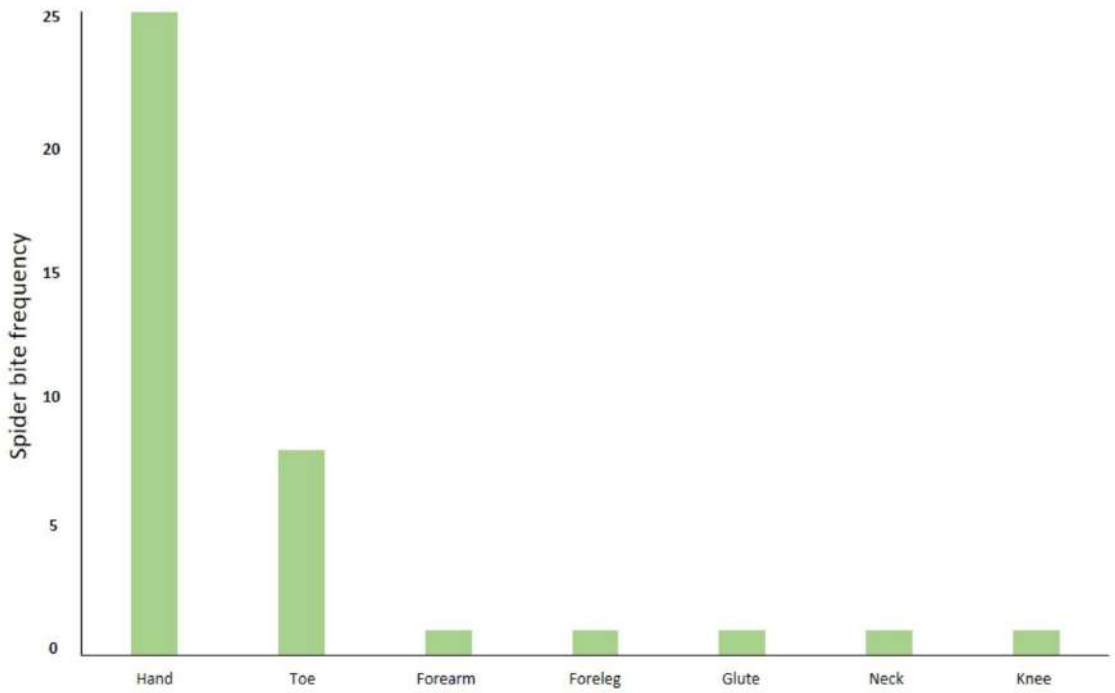

Fig. 3: Frequency of spider bites on body topography in the study period (2017-2023) in the Argentinian Atlantic Forest.

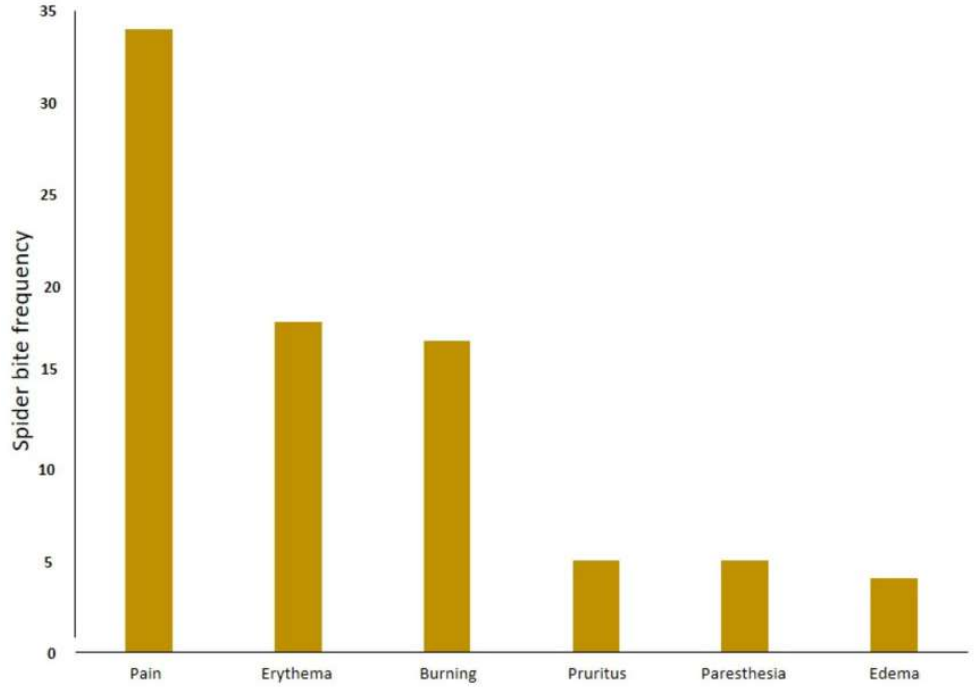

Fig. 4: Frequency of environments where spider bites occurred in the study period (2017-2023) in the Argentinian Atlantic Forest.

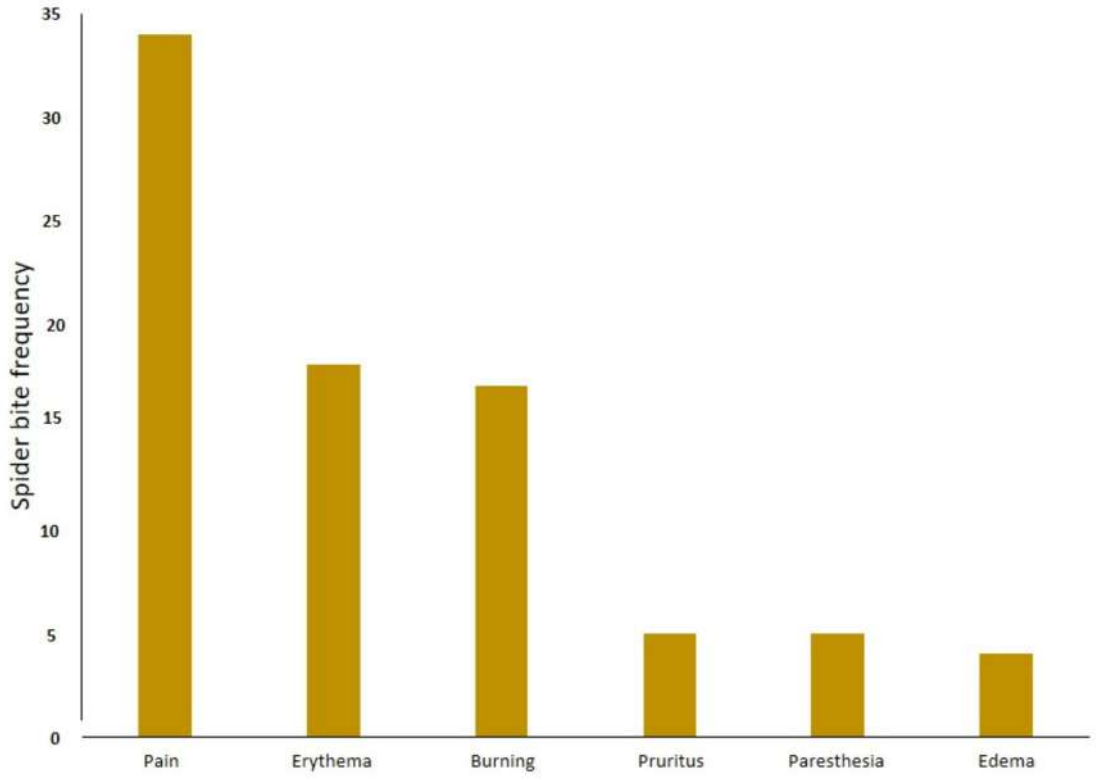

Fig. 5: Main symptoms and signs produced by spider bites in the study period (2017-2023) in the Argentinian Atlantic Forest.

accidents was analyzed with respect to average monthly maximum and minimum temperatures and monthly accumulated rainfall using a multiple linear regression model. As a proxy of seasonality, differences between observed frequencies and homogeneous distribution of accidents were tested with G- test of goodness of fit. The "stats" package was used for the linear fit and "DescTools" for G- test, both included in the R software (R Development Core Team, 2022). The meteorological data during the study period was recorded by Puerto Iguazú airport (Office of Natural Disaster Prevention - OPAD Alerta Temprana (misiones.gob.ar)

For the spider's identification, specialized literature was consulted (Gertsch, 1967; Simó and Brescovit, 2001; Martins and Bertani, 2007; Grismado, Ramírez and Izquierdo, 2014; Magalhaes, Brecovit and Santos, 2017; Caruso, Lauria, de Souza, Casais-e-Silva and Zingali, 2021; Hazzi and Hormiga, 2021) and contrasted with the geographical distribution of the species reported (WSC, 2024). A Carl Zeiss Primo Star binocular microscope was used to observe the external morphology, and a Canon SX30 digital camera was used to take photographs.

RESULTS

In the period 2017-2023, 62 spider bites were recorded, between one and ten cumulative cases/month, with an average of 8,9 cases/year. The accidents were distributed throughout the year, with peaks in May (autumn) and the highest in November (spring). Most of the bites occurred between October and December (40.3 %) (Fig. 1). *Phoneutria nigriventer* was the species involved in 66 % of the accidents, followed by species of the family Lycosidae (8 %), *Lo. hirsuta* (5 %) and others species (21 %). In 16% of the cases, the spider species was not identified. The cases with *P. nigriventer* occurred throughout the whole year, while cases with *Lo. hirsuta* occurred only during spring. Only one accident was assigned to *Lo. hirsuta* by the TS, the other case was reported by the physician, with no evidence for identification provided. The incidence was most significant among locals, being only two tourists affected. The age group 0-10 years (25 %) and 22-32 years (25 %) had the highest frequency of accidents (Fig. 2). Accidents were more frequent in men (66 %), with a female/male ratio = 0,51. Bites were more frequent on hands (65 %) and on feet

(21 %) (Fig. 3). Fifty-four percent of the accidents occurred at home when performing domestic duties, such as cleaning and handling clothing, while 29% occurred in rural areas (Fig. 4). Pain and erythema were the most frequently reported local symptom, followed by, to a lesser extent, edema, pruritus, paresthesia, paresis, nausea, hypothermia, hyperthermia, headache, myalgia, bradycardia, macula, blisters, blurred vision and dizziness (Fig. 5). The main symptoms were treated mainly with analgesics and parenteral hydration, and sometimes also with antihistamines and corticosteroids, without the need to use antivenom.

All but one bite was classified as mild; one record of *Lo. hirsuta* poisoning was classified as moderate.

The females kept individually in Petri dishes endured more than a year and a half in captivity. The females covered the bottom of the capsule with cloth that they enriched until they formed a mattress. In observations inside the houses, it is the females that choose a shelter at the entrance of which they weave a cloth that extends not far from the shelter. Males did not weave cloth either in the capsules or in the shelters where they were located inside the houses, their survival in captivity was much lower than that of females. Intraspecific predation is common in adults and juveniles. Ten males were introduced into female's capsules. One male did not interact with the female, while the rest quickly began courtship. The courtship began with the touching of the female's body with leg II of the male, then the female was placed face to face with the male, when the male began an alternating beating of the substrate with the pedipalps, so he lifted the female with legs I and II exposing the reproductive apparatus to finally introduce the sperm (Fig. 3 D). The female remains immobile during the whole process. Of the ten male exposures only four clutches hatched, the rest were mostly predated by females (mean number of eggs: 25.4, max: 33, min: 12; mean number of incubation days: 59, max: 63, min: 54) (Fig. E and F).

By using the linear multiple regression model we assessed that there was no correlation between accidents and temperature or precipitation (R^2 = 0,28, p-value= 0,78). We determined using the G-test, as a proxy of seasonality, that the error between the observed frequencies and null model of accidents where not statistically significant (G-statistic= 0,075, df= 3, p-value (X^2) = 0,99).

Morpho-ethological characterization of the species recorded:

Phoneutria nigriventer (Keyserling, 1891)

The genus *Phoneutria* includes nine species of Neotropical distribution (World Spider Catalog, 2024), mainly in Brazil; the species with the most active venom are *P. keyserlingi* (F. O. Pickard-Cambridge, 1897) and *P. nigriventer* (Vetter and Hillebrecht, 2008). The only species naturally distributed in Argentina is *P. nigriventer*, in the provinces of Misiones, Jujuy, Salta, Chaco, Corrientes, and Formosa (Grismado, Ramírez and Izquierdo, 2014). Misiones is where the largest number of cases and deaths caused by this species have been recorded (de Roodt et al., 2016). *Phoneutria nigriventer* individuals exceed 18 cm in total length (from the tips of the legs 1-5, extended). Females are more robust than males, but males have longer legs (Fig. 1 A and B). Their dorsal coloration varies in shades of brown, grayish or greenish, which makes it difficult to detect them for both prey and predators in the jungle environment. The cephalothorax is high, with a noticeable longitudinal black dorsal line, in older specimens it becomes a stain that can cover almost the entire carapace. A dark line contacts the base of each chelicera with the anterior and posterior lateral eyes, also known as "divergent marks" (Fig. 1 C). Black spines with a conspicuous light spot at their base are observed on the leg segments closest to the body, more abundant and visible on the dorsum of the femur and tibia (Fig. 1 C). The basal part of the chelicerae is covered by pinkish-orange hairs (Fig. 1 C) from which the black fangs protrude. With scopulae on the underside of the first segments of the pedipalps, tibiae and tarsi (Fig. 1 C, E and F). The abdomen has dorsally two longitudinal and parallel series of four dark spots connected by light leaf-shaped oblique spots. Ventrally the legs are black with a pair of contrasting white spots on the distal end of femur and tibia, the first two tibiae have two paired rows of five erectile spines (Fig. 1 D and E). The sternal region is reddish or black. The abdomen has a reddish-orange background with a black spot arising from the pedicel, which may be very small or absent in males or cover the entire abdomen in females (Fig. 1 D). The eight eyes are grouped in three rows -2, 4, 2-. It does not build webs, preys are captured by stalking on logs, leaves or on the ground, including insects, arachnids and also small vertebrates such as amphibians. The silk is used to build the discoidal egg sac, which can exceed 4 cm in length and contain more than 1 000 eggs, are fixed under logs or rocks by a "nursery web" with a disorganized appearance. The female remains in the care of the egg sac by positioning herself near or on the structure, aggressively defending the clutch against any threat. Its activity is nocturnal. During the day they are found in shelters, both natural (under logs, stones, in leaf axils of vegetation), as well as in human waste (debris, firewood, junk) and in dark corners of buildings. In the study area they are found in natural environments, but are also frequent in the backyards and can enter into the houses when active (Bucherl, 1968). Noteworthy, it can also display a defense behavior (shared with other species, but not with species of its own genus) consisting in the raise of its four front legs, showing the lower face and the ventral part of the abdomen (Fig. 1 D), which can be accompanied by a lateral swing, exhibiting the striking aposematic coloration and

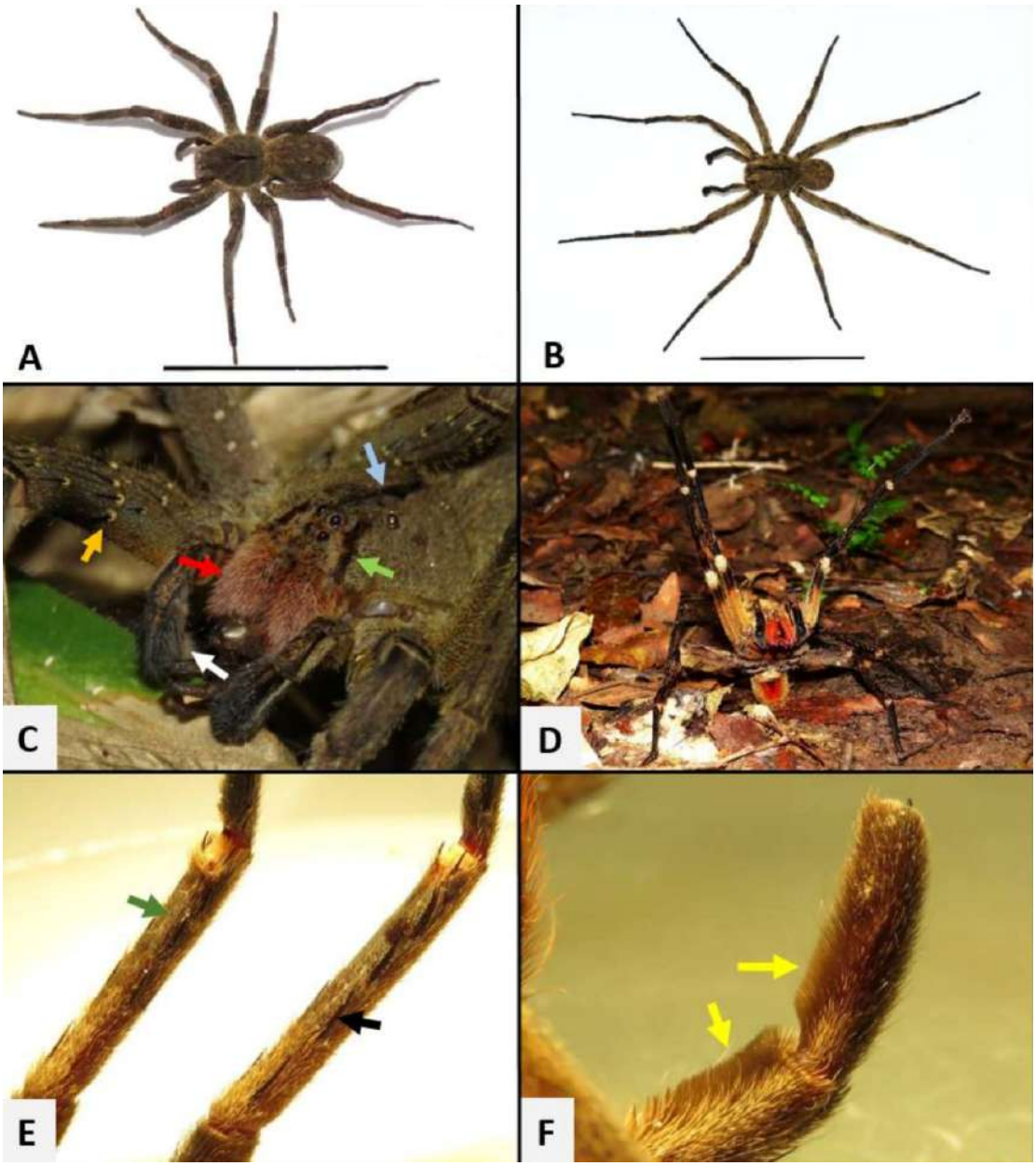

Fig. 6: A: *Phoneutria nigriventer* (♀). B: *P. nigriventer*, (♂). C: chelicerae with pinkish-orange hairs (red arrow), black line on domed cephalothorax (light blue arrow), light spots on legs with emerging spine (yellow arrow), divergent markings (green arrow), and scopulae on underside of first pedipalp segments (white arrow). D: Defensive display characteristic of the species. E: Tibia I and II with two paired rows of 5 spines (black arrow), first half with scopulae (green arrow). F: Scopulae on palps. Scale bars: 5 cm. Photographs: CAL.

appearing larger in size. If the threat persists, or if inadvertent contact is made, a rapid defensive bite may be applied. Because of these characteristics, the species is described as aggressive. Its venom is neurotoxic, consisting of more than 150 components, with active peptides and non-peptide compounds, but there are four neurotoxic complex fractions (PhTx 1-4) that act on the ion channels of Na^{+}, K^{+} and Ca^{+2} in mammals (PhTx 1-3), while PhTx 4 is toxic to insects (de Roodt et al., 2016). The poisoning syndrome is called phoneutrism (de Roodt et al., 2016; de Lima et al., 2016).

Loxosceles hirsuta Mello-Leitão, 1931

The genus *Loxosceles* comprises 148 species of cosmopolitan distribution (World Spider Catalog, 2024), four species are found in Argentina: *L. laeta* (Nicolet, 1849), *L. spadicea* Simon, 1907, *L. intermedia* Mello-Leitão, 1934 and *L. hirsuta* Mello-Leitão, 1931

(Grismado, Ramírez and Izquierdo, 2014). *Loxosceles laeta*, widely distributed in the country, is the main species of medical interest. *Loxosceles hirsuta* is distributed mainly in the province of Misiones, with some historical records in Córdoba, Salta, Tucumán and recently in Buenos Aires and La Pampa (Peralta-Seen and Diez, 2023), and is not considered of medical interest, until the present report. *Loxosceles hirsuta* females barely exceed 3 cm in total length, they are more robust than males, but these have longer limbs, mainly legs II, being able to double the total length of females (Fig. 2 A and B). The dorsal and ventral coloration is brown on the carapace and legs, while the abdomen is gray with short hairs. On the flattened cephalothorax, the cephalic region is covered with hairs, followed by the fovea, with a series of hairs arranged radially, reinforcing a darker, violin-shaped coloration ("violin spider"). The chelicerae are fused at the base. The six characteristic eyes of the family are grouped in pairs forming a "V" -2, 2, 2- (Fig. 2 C). Females construct a seemingly disorganized web of white cottony silk to capture the insects that constitute their prey, although most of the males' hunting would take place by active foraging (Cramer, 2015; Canals, Taucare-Rios, Solis and Moreno, 2016). Our preliminary observations on courtship and egg laying were similar for those of Fisher and da Silva (2001) for Brazilian populations (Fig. 2 D, E and F). *Loxosceles hirsuta* is a synanthropic species (cohabits with humans), preferring dry, undisturbed rooms or furniture, where several individuals can be found (Orduna, Lloveras, de Roodt, Costa de Oliveira and García, 2012, Cramer, 2015). It is a docile species, biting only when squeezed and, perhaps, if the egg sac is disturbed. Its venom is necrotizing and hemolytic, including more than 54 toxic protein compounds (with isoforms) such as phospholipases D, metalloproteases, hyaluronidases, serine proteases, insecticidal peptides, and non-protein compounds (Chaim et al., 2011). The poisoning syndrome is called loxoscelism (Chaves-Moreira et al., 2017).

DISCUSSION

Our results show the importance of taxonomic diagnosis in the etiological analysis for spider accidents in one of the areas of Argentina with highest diversity (Schenone, 2012; Grismado, Ramírez and Izquierdo, 2014). The methodology implemented allowed the detection of a high number of accidents involving *P. nigriventer*, being the first report of data on its relevance as species in the country and a useful tool supporting the practice of emergentology. To the best of our knowledge, we reported here the first worldwide accident caused by *Lo. hirsuta*, requiring medical attention and classified as moderate. Despite the lack of systematicity and completeness of the surveyed data items, our data provide a solid baseline for the understanding of arachnidism in the Interior Atlantic Rainforest and possible accident prevention measures, being information of crucial importance for the regional health system.

We hypothesize that our analysis may have overestimated the proportion of cases of phoneutrism due to differential diagnostic sensitivity. The diagnosis of phoneutrism is of greater sensitivity due to its characteristics (acute intense pain, imprint of the fangs, size of the animal; usually the victim brought the spider involved). While in cases of loxoscelism, access to etiological diagnosis is less sensitive due to the characteristics of the accident (low pain bite, very small animal, and patients generally do not bring the spider to the doctor's office not allowing expert determination). Taxonomic diagnosis makes it possible to dismiss the diversity of possible differential diagnoses that generate inconsistency in defining the etiology (Suchard, 2011; du Plesis and Reuter, 2021), otherwise diagnosis of loxoscelism can only be presumptive. Recent studies indicate that accident records did not correspond to the geographical distribution of the arachnid (Azevedo, Azevedo, Ramalho, Goldoni and Brescovit, 2017) and that only 22% of 134 case analysis publications met the toxicological evidence required for the diagnosis of spider bites: a) clinical effects at the time of the bite, b) capture of the spider and c) expert identification of the species (Stuber and Nentwig, 2016; Peigneur, Limab and Tytgata, 2018).

The high incidence of phoneutrism in the study area can be explained by the abundance of this species, associated with jungle environment, and the unintentional risky habits of the local population sharing its habitat. In contrast, the low involvement in accidents of *Lo. hirsuta* may be related to its docility and reserved habits, despite being frequently synanthropic, although under-reporting of cases is also possible. The profile of arachneism in northern Misiones differs from that found in the rest of the country, being similar to that observed in the Forest's landscapes in the south of Brazil. Given the presence of shared jungle habitats in the study area, these results should not be surprising. The presence of large urban centers in Brazil, in contrast to small cities in a jungle matrix in Misiones, may explain the preeminence of accidents with *Loxosceles* spp. (synanthropic) over cases involving species of the genus *Phoneutria* (wild) (Santana et al., 2020; Benedet, Brocco- Bertan, Zorzan and Tessaro, 2021).

The habits and lifestyles of the local population, influenced by a low perception of risk of arachnidism during interaction with spiders, may explain 1) that most of the accidents occurred during the day, when spider are mostly inactive, 2) that the bites are mainly on hands and feet, and 3) that the accidents occur during normal household or rural duties.

Unlike most invasive scorpions of genera *Tityus* in

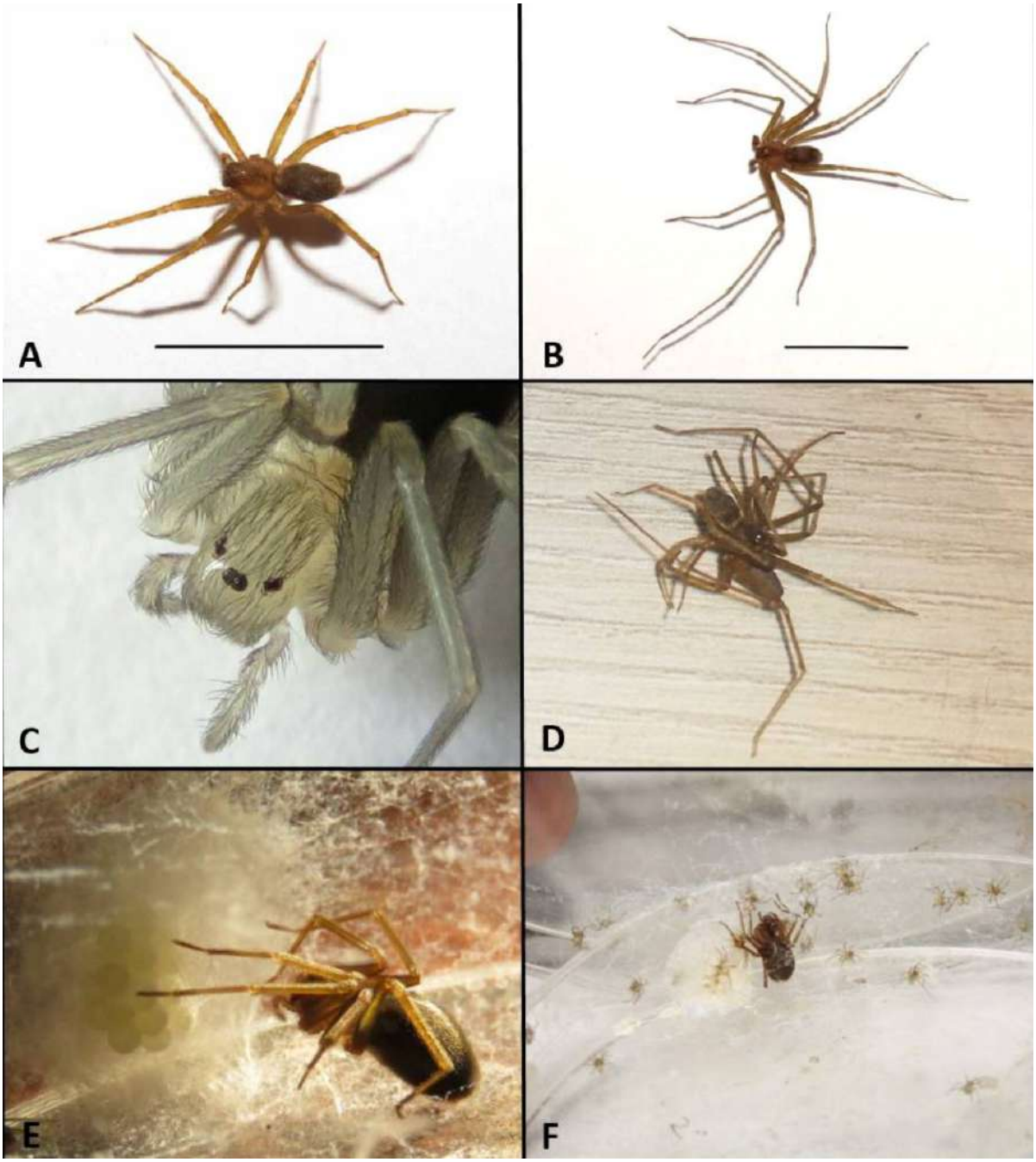

Fig. 7: A: *Loxosceles hirsuta* (♀). B: *L. hirsuta* (♂). C: After ecdisis, hairs of the cephalic region are evident, further back the radial lines of hairs of the fovea and the three pairs of black eyes forming a "V". D: Copula. E: Care of the egg sac with the clutch. F: Female and newly hatched nymphs. Scale bars: 1 cm. Laboratory photographs: CAL.

the study area (López, 2021), medically important spiders are native and frequently observed species. The conservation of native populations prevents the invasion of exotic species, while anthropogenic modifications of natural environments generate new environments potentially suitable for the invasion of arachnid species and zoonotic vectors (Taucare-Ríos, Brescovit and Canals 2013; Keesing and Ostfeld, 2021). The three genera of spiders of medical importance in South America are characterized by the constant expansion of their distribution, mainly by anthropochory (Vetter and Hillebrecht, 2008; Caruso, Lauria, de Souza, Casais-e-Silva and Zingali, 2021).

The importance of spiders also lies in their

ecosystemic roles as predators and prey of invertebrates and vertebrates (Foelix, 2011; Gualteieri, 2015). Arachnids use their venom primarily for prey capture and secondarily for defense, the expenditure of valuable amounts of venom in incidents with humans responds to a perceived threat by the animal, which triggers a defense action (Foelix, 2011). On the other hand, spider venoms can be a source of molecules with different applications in research and health (Peigneur, Limab and Tytgata, 2018; Wu et al., 2019).

Chemical control (insecticides/arachnicides and repellents) is an inadequate spider control strategy, since these compounds have a negative impact on native spider populations and the surrounding biodiversity (Ramires and Silva, 2011). On the other hand, the repellents are mostly ineffective (Isbister and Fan, 2011). The use of ant semiochemicals can provide a new effective and innocuous strategy for synanthropic spider species control (Fischer, Lee, Dong and Gries, 2021).

The environmental education, oriented to the adoption of human appropriate behaviors and habits, such as the dissemination of practical measures and ecological characteristics of local poisonous species, seems to be one of the best tools for low-risk coexistence (Malhotra et al., 2021). Basic preventive measures can be effective to mitigate spider bites in the region, as well as the prevention of scorpionism, ophidism and the proliferation of vectors (mosquitoes and phlebotomines). Among them we can recommend for 1) Outdoor environments: in gardens, keep grass short; maintain a correct management of organic waste; remove accumulation of any material; when walking, always wear closed footwear, and use flashlights at night. During rural tasks, wear high closed footwear and leather gloves. 2) In the residence: seal cracks in walls and floors; close all openings with mosquito netting, as well as external and internal drains; add skirting boards on doors that do not allow the passage of arachnids. 3) Indoors: do not accumulate objects; regularly clean floors and places with no movement such as furniture or storage rooms using gloves; do not walk barefoot; shake all clothing that is going to be used; check the bed before going to sleep; and do not sleep on the floor. Either way, maintain constant vigilance, especially at times of activity of the species of medical interest: at night and in hot weather.

It is important to highlight that the National Institute of Biological Production produces antivenoms for the poisonous species present in the country, the treatment is completely free of charge in the public health system.

CONCLUSIONS

Spider bites in the Argentinian Interior Atlantic Rainforest are produced by native species, frequent in these landscapes, and facilitated by the low human perception of risk. It is important to promote the implementation of taxonomy services linked to health system for: monitoring the composition of spider assemblages of medical interest, contribution in the training and updating of health personnel and environmental education programs and reach a taxonomic diagnosis in cases of animal poisonings. The health system should improve the systematic registration of accidents, from the admission of the bitten person, to the identification of the spider species, to the follow-up of possible sequelae.

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