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MAGISTRAL CONFERENCE ABSTRACTS

Origin and evolution of the scorpion fauna of North America

Origen y evolución de la escorpiofauna de América del Norte

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Scorpions are an ancient group of arachnids dating from the Silurian but diversified during the Permian. Morphologically present an example of a stable, successful bauplan specialized to a particular substrate, which promoted ecological diversification. North America contains ten families of scorpions originating in the Nearctic and Neotropics. México encompasses the territory where these faunas meet and mix around tropical, subtropical, semi-desertic, and desertic habitats. Characteristically, the bulk of taxonomic diversity inhabits the deserts, following a different pattern from other arthropods. The dominant pattern in the diversity of scorpions appeared to be a constant movement from the Neotropics towards the Nearctic latitudes. Despite that, six families originated in the Nearctic, four neotropical managed to colonize North America. As expected, North America is home of relictual families originating most likely during the Cretaceous. This talk will cover taxonomic, distributional, and timing of diversification of this fauna.

Key words: Origin, Evolution, colonization, diversity, ecomorphotype
Palabras claves: Origen, evolución, colonización, diversidad, ecomorfotipo

“Snapshots” of a tarantula life history (*Aphonopelma hentzi*): spiderlings and end of life (for males)

“Instantáneas” de la historia de vida de una tarántula (*Aphonopelma hentzi*): crías y final de vida (para machos)

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With its northernmost range in southeastern Colorado, *Aphonopelma hentzi* is the most widespread and abundant tarantula species in the US. Well-documented in the popular media for the mating season when hundreds of mature males are found crossing roads, less is known about the years leading to this event or what happens as the season draws to an end. My research lab has spent several years working with populations at the Comanche National Grasslands. As we attempt to document natal dispersal, I will provide literal peeks into the maternal burrow as females care for first the egg-sac and then emerged spiderlings. Next, moving our focus to male activity during the mating season and finally their senescence (measured as changes in metabolic rate) at the end of the season.

Key words: tarantula life history, senescence
Palabras claves: historia de vida de la tarántula, senescencia

Advances in the study of the genus *Loxosceles* (Araneae, Sicariidae) in Mexico.

Avances en el estudio del género *Loxosceles* (Araneae, Sicariidae) en México.

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El género de arañas *Loxosceles*, está conformado por 149 especies, siendo México el país con la mayor diversidad en el mundo con 40 especies descritas. Actualmente, no hay un estudio que explique la alta diversidad de especies y los procesos que influyeron en su diversificación en México. Además, algunas especies presentan una amplia variación morfológica en receptáculos seminales, aunado a su morfología general conservada lo cual dificulta su identificación en algunos casos. Por consiguiente, la diversidad de especies en Norteamérica esta aun subestimada, por lo que se necesitan trabajos taxonómicos integradores. De esta manera, el objetivo principal de este trabajo consiste en explicar cómo pudo haber sido la diversificación de las especies del género *Loxosceles* en Norteamérica, bajo un marco biogeográfico y geológico, aunado a la delimitación de linajes (especies) y bajo un contexto de taxonomía integradora (evidencia morfológica y molecular). Se utilizaron tres genes para los análisis moleculares: COI (mitocondrial), ITS2 y 28S (nucleares). Se implementaron el criterio del 2% de distancias *p* no corregidas, así como tres métodos de delimitación molecular: 1) ASAP; 2) GMYC, y 3) bPTP. Además, se realizaron análisis filogenéticos de Inferencia bayesiana (IB) y Máxima verosimilitud (ML). El uso de distintas líneas de evidencia para reconocer linajes corrobora que la diversidad de *Loxosceles* en México aún está subestimada, y aunque la morfología del género es conservada, sobre todo en estructuras sexuales, estas siguen siendo robustas para la identificación a nivel de especie.

Key words: diversification, reclus group, molecular markers, Synspermiata.
Palabras claves: diversificación, grupo reclusa, marcadores moleculares, Synspermiata.

ORAL PRESENTATION ABSTRACTS

Online field guide to North American Camel Spiders (Arachnida, Solifugae)

Guía de campo en línea sobre las arañas camello de América del Norte (Arachnida, Solifugae)

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Natural History collections document biological, geological, and cultural diversity across the globe and across different spatial and temporal scales. These data are essential in making informed decisions or formulating hypotheses regarding the evolution of life on earth, what threats exist to biodiversity, current or past trends regarding threats to human health, and other critical issues surrounding global change. However, these collections are inaccessible to end-users if they are not digitized. Digitization is defined as the conversion of specimen data into accessible digital format. The first step in digitization is to utilize global metadata standards such as Darwin Core formatting (https://dwc.tdwg.org). Digitization includes not only making data associated with specimens available to a global audience but also all other information that is known about those specimens, including high quality images useful for diagnostic identification. In this presentation, we will demonstrate how data and images associated with the Denver Museum of Nature and Science arachnology collection – particularly the Solifugae specimens – are digitized and made accessible to a global audience through ecdysis (https://ecdysis.org/index.php), a portal for live-data arthropod collections.

Key words: Taxonomy, diversity, identification, database
Palabras claves: Taxonomía, identificación, diversidad, base de datos

Microarachnids Enlightening Macro-Patterns: New Advances on the Evolution and Biogeography of New World Schizomids

Macropatrones esclarecedores de microarácnidos: nuevos avances en la evolución y biogeografía de los esquizómidos del Nuevo Mundo

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Schizomida, or short-tailed whipscorpions, are cryptic predatory microarachnids with limited dispersal abilities which encompass over two hundred species with a largely pantropical distribution. Due to their limited dispersal abilities and restricted distributions, schizomids are excellent candidates for analyzing biogeographic patterns. However, current Schizomida biogeographic analyses lack fossil schizomid representation and erroneously place *Baalrog sbordonii* (Brignoli) as sister to all Hubbardiid schizomids. Current phylogenetic analyses have also consistently recovered the southwest American genus *Hubbardia* as sister to the remaining members of the family Hubbardiidae, diverging around 204 mya. As such, the inclusion of more species of *Hubbardia* in biogeographic analyses is a crucial step to fully understand patterns of divergence within the family Hubbardiidae. In this project, we combined fossil records and DNA sequences from specimens from the family Protoschizomidae, representatives of the genus *Hubbardia*, and a broader sampling of Caribbean and Mexican Hubbardiids to re-evaluate the divergence times and biogeography of Schizomida. Our results reveal an earlier divergence time for the family Hubbardiidae, as well as new diversification times calculated for Protoschizomidae, *Hubbardia*, *Surazomus* and Mexican schizomids. Leveraging our increased sampling, we aim to provide an alternate biogeographic hypothesis for the order Schizomida.

Key words: biogeography, divergence, diversification, evolution, Schizomida
Palabras claves: biogeografía, divergencia, diversificación, evolución, Schizomida

Systematics of the *Aliatypus erebus* group (Mygalomorphae, F. Antrodiaetidae): Exploring a possible ring of species around the California Central Valley

Sistemática del grupo *Aliatypus erebus* (Mygalomorphae, F. Antrodiaetidae): Explorando un posible anillo de especies alrededor del Valle Central de California

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The California Floristic province is a global center for biodiversity due to a unique combination of climatic and geological factors. Among these is the Central Valley which functions as a major barrier to conspecific taxa inhabiting the surrounding Sierra Nevada, Transverse, and Coastal Mountain ranges, promoting allopatric speciation in multiple groups. California's biodiversity includes a diverse assemblage of mygalomorph spiders, including the trapdoor genus *Aliatypus* (Mygalomorphae: Antrodiaetidae). This group of morphologically and behaviorally cryptic species preferentially inhabit shaded slopes and ravines, from low-elevation chaparral to mid and high-elevation coniferous forests, to shaded desert habitats throughout California. Like other mygalomorphs, *Aliatypus* species are long-lived, requiring over 4 years to reach reproductive maturity, during which time they lead sedentary lives. This combination of niche conservatism and low dispersal ability has produced high geographic fragmentation and population differentiation over California's complex geological landscape. As a result, *Aliatypus* species have disjunct allopatric distributions with few instances of syntopy between distantly related taxa, consistent with a non-adaptive radiation. This work aims to investigate patterns of biogeography in the *Aliatypus erebus* group using a combination of phylogenomic methods and biogeographic models. Preliminary results support the *Aliatypus erebus* group consisting of a species ring around the Central Valley, consistent with models of allopatric speciation. This project provides important context to the evolutionary history and environmental forces that contributed to the current distributions of an endemic group of spiders in California.

Key words: cryptic species, mygalomorphae, biogeography, phylogenomics
Palabras claves: especies crípticas, mygalomorphae, biogeografía, filogenómica

The biogeography and diversity of the North American solifuge family Eremobatidae

La biogeografía y diversidad de la familia de solífugos norteamericanos Eremobatidae

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The North American family Eremobatidae is the only camel spider (Solifugae) family for which a family level molecular-based phylogenetic hypothesis exists. This hypothesis, based on traditional Sanger-sequence data generated from approximately 45% of the documented eremobatid diversity, demonstrated extensive poly- and paraphyly of multiple genera and species groups. Here, ultra-conserved elements captured from field collected and historical museum material has allowed us to vastly improve the sampling effort of the family, achieving over 300 terminals representing all genera and ~70% of the known eremobatid species diversity. In addition, this analysis also indicates several putative new species, the majority of which are distributed in Mexico. Here we present the new preliminary phylogenomic hypothesis for Eremobatidae, and explore the taxonomic, morphological and biogeographical implications of the expanded family phylogenomic backbone. Many morphological characters that define multiple genera and species groups are rendered polyphyletic, demonstrating the need to dissolve overly diverse taxonomic groups and further refine characters used for taxonomic designations. Biogeographic ancestral state reconstructions indicate the bulk of the historical and contemporary biodiversity occurs in the Sonoran and Chihuahuan deserts, with more recent divergences in the northern latitudes of the United States and Canada.

Key words: solifuge, phylogenomics, biogeography, taxonomy
Palabras claves: solifugo, filogenomica, biogeografia, taxonomia

Mygalomorph spider systematics and evolution

Evolución y sistemática de arañas migalomorfas

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The infraorder Mygalomorphae is one of the three main lineages of spiders comprising over 3000 nominal species with a worldwide distribution that includes charismatic taxa such as tarantulas, trapdoor spiders, and highly venomous funnel-web spiders. Past Sanger-sequencing approaches have shown numerous mygalomorph families (e.g., Hexathelidae, Ctenizidae, Cyrtaucheniidae, Dipluridae, and Nemesiidae) as potentially non-monophyletic. However, these data were unable to sufficiently resolve the higher-level (intra- and interfamilial) relationships such that the necessary changes in classification could be made with confidence. A previous study published by Opatova et al., based on Anchored Hybrid Enrichment loci (AHEs), resulted in the relimitation of numerous families as well as the establishment of new family-rank taxa. We present here a follow-up analysis based on expanded sampling and an alternate subgenomic approach employing Ultra Conserved Elements (UCEs). This newly formulated data set confirms our previous results and provides further resolution and placement of genera.

Population genetics and reproductive variation over a latitudinal cline in sclerosomatid Opiliones

Genética poblacional y variación reproductiva a lo largo de un gradiente latitudinal de diversidad en Opiliones esclerosomátidos

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The family Sclerosomatidae (Opiliones) is noted for having multiple groups which have transitioned from the ancestral, solicitation-based mating system of scramble-competition polygynandry to a more coercive state with traits indicative of sexual conflict. Current knowledge of the genus *Leiobunum* indicates that reproductive seasonality (i.e., grouping of reproductive events during a specific time of the year due to environmental constraints), may play a role in the evolution of sexual conflict. Species from higher latitude regions, where the breeding season may be shorter, tend to display coercive traits such as male clasping structures, while species from southern locations, where the breeding season may be longer, display solicitous traits, such as nuptial gift sacs. A latitudinal cline in breeding season is expected to drive interspecific divergence in reproductive morphology. These variations in reproductive morphology may have important repercussions for population and species delimitation. Initially, we are combining population-level morphological analyses with increased sequencing efforts to better understand the evolutionary history and patterns in Sclerosomatidae. A phylogenetic reconstruction with sampling from 1-3 populations per species supports earlier phylogenies of *Leiobunum*, but associated population level parameters were surprisingly high for some species. Ongoing investigations into the reproductive morphology of understudied Latin American Sclerosomatidae are likely to provide additional support for a temperate transition in reproductive mode.

Key words: Sexual Conflict, Mating, Opiliones, Population Genetics, Phylogenetics
Palabras claves: Conflicto sexual, Apareamiento, Opiliones, Genética de Poblaciones, Filogenética

Phylogeographic and demographic perspective of the American Horseshoe Crab (*Limulus polyphemus*) in its distribution in the Yucatan Peninsula, Mexico

Perspectiva filogeográfica y demográfica del Cangrejo Herradura Americano (*Limulus polyphemus*) en su distribución en la península de Yucatán, México

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Xiphosurids (Merostomata, Xiphosura), also known as Horseshoe Crabs, are a group of aquatic chelicerates closely related to arachnids with an ancient and diverse evolutive history. There are only four extant species, one of which is *Limulus polyphemus*, distributed along North America's Atlantic coasts. In this study, we address the diversity and genetic structure of *L. polyphemus* from a phylogeographic perspective and evaluate the demographic history of its distribution in the Yucatán peninsula, Mexico. For this purpose, we sequenced an 1190 bp fragment of the COI region of mtDNA for 154 individuals from eight localities that represent the total distribution range of the species in Mexico. Our main results include the identification of 16 haplotypes arranged in a star-like haplotype network, moderate haplotypic diversity values (h = 0.447), and low nucleotide diversity (π = 0.00005). The values of Fu's *Fs* (Fs = -3.664, $p < 0.05$) and Tajima's *D* (D = -1.999, $p < 0.05$) demographic index, as well as the analysis of *mistmatch* distributions (r = 0.1067, $p > 0.05$) show evidence of population expansion. Bayesian Skylineplot analysis suggests a constant population expansion over the last 75,000 years. These phylogeographic and demographic patterns could be related to climatic events that generated changes in the distribution of the species, influencing its dynamics and leaving traces in its genome.

Key words: Horseshoe crabs, endangered species, haplotype network, Pleistocene, population expansion
Palabras clave: Cacerolita de mar, especie en peligro de extinción, expansión poblacional, Pleistoceno, red de haplotipos

There and back again – field study of *Tetragnatha* orientation and aquatic locomotion on rivers

Historia de una ida y una vuelta: estudio de campo de la orientación y locomoción acuática de *Tetragnatha* en ríos

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Four families of spiders have demonstrated the ability to walk or run on water: Pisauridae, Trechaleidae, Ctenidae, and Tetragnathidae. Two of these families have species that evolved a specialized gait for aquatic locomotion: Pisauridae and Tetragnathidae. Here we examined the orientation ability of the orbweaver *Tetragnatha elongata*, a riparian species that traverses the water's surface with a specialized gait. In 2022, between June and August we collected spiders along the lower branch of the Rouge River in Canton, MI and tested their ability to orient and return back to the bank when they were dropped into the river. To determine whether vision was required for orientation we tested the spiders before and after blinding them. A subset of spiders was used as controls and sham-blinded. We found that vision was not required for spiders to safely return to the nearest bank. Spiders used a variety of strategies beyond their unique aquatic gait including drifting, sailing, and rafting to get to the bank. The fastest speed observed in the field was 0.45 m/s which would be the fastest aquatic gait of any spider, but a more typical speed was 0.25 m/s. We supplemented this field study with more detailed observations of spider behavior in smaller artificial pools.

Key words: orientation, aquatic locomotion, Tetragnathidae, Araneae
Palabras claves: orientación, locomoción acuática, Tetragnathidae, Araneae

Racing against the clock: comparing locomotory activity and anti-predator behaviors between sexes in two species of *Hysterocrates* (Araneae, Theraphosidae, Eumenophorinae)

Corriendo contra el reloj: comparando la actividad locomotora y los comportamientos antidepredadores entre sexos en dos especies de *Hysterocrates* (Araneae, Theraphosidae, Eumenophorinae)

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Behaviors exhibited by animals vary across taxonomic levels but also change as an animal matures. In tarantulas, males enter an ultimate, nomadic, molt at sexual maturity. Essentially entering a race to find mates before their bodies give out, they are exposed to the elements as well as predators. Female tarantulas remain more sedentary, with a dedicated retreat, and continue to molt into adulthood- a period that can last years. Our goal was to specifically examine differences between the sexes and between two species of *Hysterocrates* (*H. crassipes* and *H. gigas*). We hypothesized that male *Hysterocrates* would exhibit higher locomotory activity because of these behavioral changes, and quicker escalation in defensive behaviors in response to perceived threats. A previous study of anti-predator behaviors found that Old World tarantulas, and *H. gigas* in particular, were quicker to engage in active defense behaviors. *H. gigas* also exhibits prolonged subsocial tolerance when young, but the extent of this tolerance is not well-documented in *H. crassipes*. Locomotory responses to a novel arena (measured in distance traveled and velocity) were determined using Ethovision. Anti-predator behaviors were documented using a prod trial. Strike latency and duration of defensive posturing was recorded. Male *H. crassipes* traveled significantly farther at a higher velocity in the arena trials. In the prod trials, while not statistically significant, female *H. gigas* were found to remain longer in defensive positions and *H. crassipes* were overall more likely to retreat. Both species and sexes showed a similar willingness to strike when provoked.

Key words: tarantula, activity level, defensive behavior
Palabras claves: tarántula, nivel de actividad, comportamiento defensivo

The Mexican Red Rump Tarantula: ecological, behavioral and ethnobiological aspects of a protected spider that could disappear

La tarántula mexicana de cadera roja: ecología, comportamiento y aspectos etnobiológicos de una araña protegida que podría desaparecer

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Tliltocatl vagans is a tarantula distributed mainly in southern Mexico and is on the IUCN Red List of Threatened Species. Over the last few years, we have studied various aspects of its ecology, genetics, behavior and relationship with humans. *T. vagans* belongs to the *Brachypelma*/*Tliltocatl* complex and has the widest distribution range, but opinions on its distribution are controversial and need to be studied. This tarantula is found associated with traditional activities in villages and is used by Maya peoples for traditional medicine. This association may partly explain its relative resistance to adversities linked to human activities, which are highly detrimental to Mexican tarantulas. Moreover, compared with other tarantulas' species, this tarantula seems to have more flexible behaviors than other closers species, which may explain its resistance to anthropogenic changes. Population genetics studies show a high degree of genetic diversity in *T. vagans* populations and good gene flow between populations, provided by males.Populations show good genetic diversity linked to phenotypic diversity. These characteristics also help to explain the success of these spiders when they are introduced into new territories. However, the profound changes taking place in southern Mexico, as in the rest of Central America, and the changes linked to climate, are likely to lead to the disappearance of these tarantulas in the medium term.

Key-Word: Theraphosidae, Interaction, Prey, Climate Change, Conservation.
Palabras claves: Theraphosidae, interacción, presa, Cambio Climático, conservación.

Colony demographics and limited retreat availability in prolonged subsocial huntsman spiders, *Delena cancerides*.

Demografía colonial y disponibilidad limitada de refugios en la araña esparásida subsocial, *Delena cancerides*.

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The limited number and size of diurnal retreats under loose tree bark drives much of the biology of the most social of the huntsman spiders, *Delena cancerides*, in their woodland Australian habitat. To evaluate social demographics and retreat ecology, between 2002 – 2014 we collected 232 *Delena cancerides* colonies and made field and laboratory observations on over 5,000 individuals. Our results demonstrate that colonies are formed by a single foundress who produces 1 to 4 cohorts of offspring who mingle and remain closely associated with each other in colonies of 20 to 180 individuals. Offspring remain in their natal retreat until they are close to or just past sexual maturity at about1-year. Mature daughters must disperse or fight to take over the colony.

We determined that certain ecological traits are associated with preferred retreats, but only a few aspects of colony demographics, such as retreat size, are correlated with retreat qualities. We used multiple approaches to quantify the number of alternative retreats available for females dispersing from their natal colony. Finally, we calculated female competition for retreats in 6 sites with dense colonies (n=63 colonies) and 17 isolated sites (n=27 colonies) at the current time, and estimated the future competition based on the predicted number of females maturing in each population. Together these results indicate that prolonged subsociality in this species is directly related to saturation of available retreat sites in these habitats.

Keywords: Competition, Demographics, Bark retreats, Ecology
Palabras claves: Competencia, Demografía, refugios de corteza, ecología

Brushing aside doubts: an evaluation of the beat-sheet brushing technique for detecting the Nearctic tree trunk sheetweaver (Araneae: Linyphiidae)

Una evaluación de la técnica del cepillado para detector la araña especialista en troncos *Drapetisca alteranda* (Araneae, Linyphiidae)

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It is important to have reliable information on the presence/absence, population structure, and density of animals across their natural range. Detecting small organisms, however, such as the Nearctic tree trunk sheetweaver spider *Drapetisca alteranda* Chamberlin 1909 (Araneae: Linyphiidae), presents challenges due to its diminutive size and cryptic nature. We used a capture/recapture study to determine the detection and recapture probabilities of this spider using a standard beat sheet technique adopted for surveying tree trunks. Spiders were released on 3 different tree species that provided a range of microhabitats, including variable bark surface area and furrow depth/width. Microhabitat features played a small role in the timing of spider recapture (i.e., slower rate of recapture as furrowing increased). However, our results demonstrated 100% detection across replicate experiments and individual recapture probabilities exceeding 90% in most situations, with no significant differences in recapture observed among tree species and with respect to tree circumference. Furthermore, we show that most spiders could be recaptured within 2 sampling revolutions around the tree trunk, and there was no difference in the probability of collecting male and female spiders (although they differ markedly in size). Finally, we found no difference among brushers, supporting the idea that this method is replicable across collectors and studies. Collectively, we establish confidence in the ecological knowledge obtained with this technique and encourage its application with similar species and systems.

Key words: deciduous forest management, forest ecology, ecological sampling, arthropod sampling method

Palabras claves: manejo de bosques caducifolios, ecología forestal, muestreo ecológico, métodos de muestreo de artrópodos

Biodiversity and Biogeography of the Opilioacaridae family in Mexico

Biodiversidad y Biogeografía de la familia Opilioacaridae en México

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La familia Opilioacaridae fue descrita en 1902 por With de África del Norte. Se describieron dos especies de esta región en el género *Opilioacarus* With 1902, que son *O. segmentatus* With, 1902, *O. italicus*, With 1904. En 1905 fue descrita la primera especie de la región Neotropical *O. platensis* (Silvestri 1905), de Uruguay y de Argentina. De Cuba se describieron dos especies *O. orghidani* y *O. vanderhammeni* por Juvara-Bals y Baltac en 1977, y en 1980 Lehtinen describió la especie *O. ojasti* de Venezuela. En 2002 Vázquez y Klompen describieron cuatro nuevas especies, tres de México y una de Nicaragua: *O. bajacalifornicus, O. siankaanensis, O. nohbecanus y O. nicaraguensis*. Actualmente Brasil con 12 spp y México con 10 spp, cuentan con el mayor número de especies descritas de la familia Opilioacaridae, distribuidas en tres géneros que son *Neocarus, Brasilacarus* y *Amazonacarus*. El género *Caribeacarus*, presente en la región del Caribe con 2 spp. Por lo que en la región Neotropical de América hay 29 especies descritas, siendo esta región de la que hasta ahora se conoce y se ha descrito el mayor número de especies de la familia Opilioacaridae. Los diferentes ecosistemas y microhábitats que ocupan estos organismos van desde dunas costeras al nivel del mar, hasta los 2,300 m s. n. m en zonas montañosas de México. La región Neotropical es por ahora la región del mundo con la mayor riqueza de especies y la mayor biodiversidad de la familia Opilioacaridae.

Key words: Neotropical, biodiversity, biogeography, Notostigmata.
Palabras claves: Neotropical, biodiversidad, biogeografía, Notostigmata.

Analysis of historical spider sites and territorial threats in the Yucatan Peninsula

Análisis de sitios históricos de arácnidos y amenazas territoriales en la Península de Yucatán

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The Yucatan Peninsula is a Mexican region undergoing important processes of territorial and landscape change. It is also one of the areas with little documentation of araneofauna diversity and high potential for discoveries due to some specific characteristics (large areas of tropical forests, fragile and unique ecosystems). In this work, we analyzed the historical collection localities of spiders (HCLS) found in specialized literature before the year 2000. Spatial information was obtained for four types of activities with territorial impact (ATI). We created a GIS with georeferenced localities and included polygons and buffers (2.5 km) of AITs, as well as polygons of Natural Protected Areas (NPAs). We found 69 localities, 395 organism records, and 213 named taxa, of which 144 species are valid taxa. At least 36 historical localities are found in ATI areas, of which 22 are in communication roads, 10 in the area of agriculture, 11 in the area of industrial activity and 11 in the area of tourist activity. Only 1 SIR is found within a Federal NPA (Sian Ka'an) and 6 in a State NPA. The localities of several endemic species are found in areas where several ATIs converge (e.g. *Odo tulum* [Xenoctenidae], *Ctenus siankaan* [Ctenidae], various Pholcidae). The results suggest the need for protection, sampling, and articulation of strategies for the conservation of natural areas and vulnerable species, and outline conservation needs for ecosystems and spiders of the Yucatan Peninsula.

Key words: Araneae, conservation, global change, territorial impact
Palabras claves: Araneae, conservación, Cambio Global, impacto territorial

Orb webs avoid overdesign: evidence from architecture and silk material properties

Las redes orbitelares evitan el diseño excesivo: evidencia de la arquitectura y las propiedades materiales de la seda

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Spiders spin webs in environments that differ in humidity, temperature, a prey abundance, and species richness. Individual spiders also differ in their recent prey capture success and vary in genetics and age and health. We investigated correlations between orb web architecture and mechanical properties of major ampullate (MA) silk (i.e. radii silk) across several orb-weaving spider species while controlling for species differences. We examined MA silk not subject to super-contraction (i.e. native silk) and subjected to unconstrained super-contraction in water saturated air. The number of spiral turns in orb webs was positively correlated with native MA silk extensibility. The super-contracted silk strength and super-contracted silk toughness was positively correlated with the number of radial threads in a web. We propose that the super-contracted silk intrinsic material properties are conveyed by its primary protein structure, while native silk is more influenced by spigot parameters. Native and super-contracted silk revealed that spiders adjusted some silk chemistry and architecture in concert. When this happened, it was always in directions consistent with adjusting web stopping power in the same direction (as estimated by maximum kinetic energy absorbed per web surface area). To use an industrial analogy, spiders did not overdesign any one component of their webs.

Key words: spinning, behavior, biomaterials, engineering
Palabras claves: hilado, comportamiento, biomateriales, ingeniería

Unexpectedly low population sizes in of *Aphonopelma hentzi* in fragmented glade habitats.

Tamaños de población inesperadamente bajos de *Aphonopelma hentz*i en hábitats fragmentados de claros de bosque.

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Aphonopelma hentzi has not been a species of concern for arachnologists in North America. Researchers report high densities at their field sites in the states of Colorado (CO) and Texas (TX) with no major conservation concerns. Central Missouri (MO) represents the most northern and easterly range edge for *A. hentzi* where they are primarily found in native glade grasslands. I have conducted a population assessment on two such glades over the past two years and discovered very low population densities compared to other researcher sites around the USA. Glades in central MO may represent habitat islands within the edge of *A. hentzi*'s range. Additionally, MO glades have been degraded over time by changing fire regimes and disturbance by hobby herpetologists. My research aims to assess these populations over time in terms of density, preferred habitat, genetic health, and effects of disturbance. These tarantulas may be at risk due to a confluence of factors such as range edge effects, illegal collecting, habitat fragmentation, or other unknowns like pesticide exposure or disease. These factors may be causing low population densities, creating an Allee effect where these subpopulations may not easily recover. Small predators are important for maintaining native vegetation in glades. Tarantula conservation in these habitats is important for maintaining small predator diversity and bottom-up maintenance of native vegetation via control of grazing invertebrates like orthopterans. This paper presentation will cover my work on this project and future directions.

Key words: tarantula, conservation, habitat fragmentation, glades
Palabras claves: tarántulas, conservación, fragmentación del hábitat, claros de bosque

Descubrimiento de bioadhesivos en Opiliones Dyspnoi

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Methodological improvements in repetitive gene sequencing have allowed new insights into the structure of bioadhesive proteins. These mucilaginous materials feature prominently in the capture spiral of orb weaving spiders in the form of aggregate spidroin (AgSp), but also appear to play a role in the pedipalpal prey capture of species of the Opiliones suborder Dyspnoi. In this presentation, we overview the evolutionary biology of the veritable species grab-bag that is Dyspnoi and detail our efforts to identify the pedipalpal secretions they produce. Direct removal and intercalating dye fluorometric quantification of secretion droplets indicates that the material is proteinaceous in nature. Subsequent limb and soma tissue-specific comparative gene expression analyses from the species *Sabacon occidentalis* have moreover yielded RNA transcripts with sequence features that resemble spidroins, with BLAST analyses indicating ~76% sequence identity with a uloborid major ampullate spidroin gene, and no hits to recently published non-Dyspnoi Opiliones genomes. However, these putative bioadhesive transcripts are not significantly upregulated in the pedipalps when compared to expression levels in the legs. Ongoing work will employ bottom-up proteomic mass spectrometry to cross-reference putative bioadhesives from pedipalpal transcriptomes.

Key words: bioadhesives, Dyspnoi, glandular setae, *Sabacon occidentalis*, RNAseq
Palabras claves: bioadhesivos, Dyspnoi, setas glandulares, *Sabacon occidentalis*, RNAseq

Silk and glue genes of the Saint Andrews Cross spider, *Argiope keyserlingi*

Genes de seda y de pegamento de la araña de la Cruz de Saint Andrews, *Argiope keyserlingi*

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Spiders make up to seven different silk types, each used for a different purpose. The proteins that make up spider silks, called spidroins, are encoded by extremely long and repetitious genes, making them difficult to sequence and study. We recently sequenced the silk genes for *Argiope keyserlingi*, the Saint Andrews Cross Spider, an orb weaver found along the east coast of Australia. Despite being commonly found in its native range, nothing is known about its spidroins, or their similarity to those of other species in the genus. With the primary goal of sequencing efforts aimed to understand the aggregate spidroin genes, we also explore other silk genes in the context of spidroin catalogs from other species.

Key words: silk, spidroins, genes, *Argiope.*
Palabras claves: seda, spidroins, genes, *Argiope.*

An analysis of the flexural strength of *Parasteatoda tepidariorum* gumfoot line silk

Un análisis de la resistencia a la flexión de la línea de seda pegajosa de *Parasteatoda tepidariorum*

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Spider webs are made from several types of silk, one of the strongest biomaterials known. These silks withstand forces in many directions in order to capture prey. *Parasteatoda tepidariorum*, a cobweb weaver, uses gumfoot lines as a spring-loaded trap to capture crawling prey. The tensile strength, or the parallel forces generated when a silk strand is pulled from both ends, has been tested and well-characterized for these silks. However, the flexural strength, or the force that results when a silk is pushed or deformed perpendicularly, has not. We tested the flexural strength of gumfoot silk lines at two different speeds and found at higher speeds, the gumfoot line is able to withstand more force and extends a further distance. As silks in nature are warped and distorted in many different ways depending on use, it is important to understand the contrasting functional characteristics when alternately stressed.

Key words: biomaterial, flexural strength, gumfoot silk.
Palabras claves: biomaterial, fuerza flexible, seda pegajosa.

Revision of the North American genus *Branchia* Muma, 1951 (Solifugae, Ammotrechidae)

Revisión del género norteamericano *Branchia* Muma, 1951 (Solifugae, Ammotrechidae)

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Ammotrechidae is one of the four camel-spider families that occur in the Americas. Currently, the family comprises 100 species grouped into 26 genera, with an extended distribution throughout the continent. While recent taxonomic work has mainly focused on South American groups, North American ammotrechids remain understudied. The genus *Branchia* Muma, 1951, comprises a small group of ammotrechids that inhabit major North American deserts. Muma (1951) described three species, *B. angustus* and *B. potens*, are from a locality in California which is part of the Sonoran Desert. The third species, *B. brevis*, was described from a locality in Texas, in the Chihuahuan desert. Since Muma's description of the genus, no other work has attempted to acknowledge the diversity and distribution of the group. Here we present a revision of *Branchia* based on the analysis of morphological characters. We revised specimens from different museum collections and conducted fieldwork throughout Baja California Peninsula to collect specimens. We provide informative morphological characters to identify the specimens to genus and species level. In addition, we identified two new species of *Branchia* from Baja California Sur, Mexico. The distribution of *Branchia* species shows a pattern related with each one of the North American deserts, Chihuahua, Mojave, and Sonora as well as the Baja California Peninsula.
El resumen tendrá un máximum de 250 palabras en Arial 12.

Key words: Camel-spiders, Ammotrechidae, Baja California Sur, North America.
Palabras claves: Solífugos. Ammotrechidae, Baja California Sur, Norte América.

Hidden in the dark: A new genus of subterranean spiders (Araneae: Linyphiidae) from the United States

Ocultas en la oscuridad: Un nuevo género de arañas subterráneas (Araneae: Linyphiidae) de Estados Unidos

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Subterranean habitats are home to many species of arthropods that are often overlooked due to their hidden nature. Spiders are among these secretive arthropods, oftentimes living in leaf litter and deep subterranean spaces such as under rotting tree stumps, in caves, and within the subterranean cracks in fractured rocks and soils. While identifying spiders captured in habitat such as these between 2016 and 2023, we discovered a new genus of spiders unique to eastern United States. This new genus, *Cornicudiabola*, will be erected to hold three new species: *C. hardeni* n. sp., *C. draneyi* n. sp., and *C. goha* n. sp. These spiders range from 1.1 – 1.7mm in size and differ from all other spider genera by possessing the following combination of characters: males with cephalic pits larger than eyes, a raised anterior part of the carapace with posterior median eyes, embolic division with extended, rounded, straight tailpiece, an embolus with the exposed portion long and sinuous that spirals retrolaterally, and a dorsal tibial apophysis with dual projections, one rounded and the other sharp. This discovery highlights the need to search for and document the biodiversity within subterranean habitats, habitats that are highly threatened by anthropogenic activities such as habitat destruction and climate change.

Key words: karst, taxonomy, SSH, sheet-web weavers
Palabras claves: karst, taxonomía, SSH, tejedoras de lámina

Species delimitation of the *Eremobates palpisetulosus* species group from the Chihuahuan Desert and Great Plains.

Delimitación de especies del grupo *Eremobates palpisetulosus* del desierto de Chihuahua y las Grandes Llanuras.

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The *Eremobates palpisetulosus* species group was constructed for multiple camel spider species, based on the morphological similarity of males and is distributed across western North America. This species group was initially constructed using a synapomorphy found on the upper cheliceral finger of the males, a retrodorsal process (RDP). A family level phylogeny in 2015 did not support the monophyly of this group and instead found there to be several monophyletic clades across the family phylogeny showing biogeographic signatures from the Chihuahuan, Great Plains and the Sonoran Desert. The biodiversity for these regions includes 16 species,but is potentially overestimated owing to the similarity of diagnostic characters used to identify taxa and overlapping ranges. The *E. palpisetulosus* species group is being re-evaluated using CO1 to test species limits and generate new species hypotheses. An analysis of cheliceral morphology in males, and examination of the female genital opercula show overlap in many characters used for diagnosing species. Utilizing multiple approaches for revising the taxonomy of this group will propose more stable species hypotheses that include morphological synapomorphies. In the presentation, I will present my current phylogenetic and morphological analysis using CO1 and linear metric data and to revise the paraphyletic *E. palpisetulosus* species group.

Key words: Taxonomy, Phylogenetics, Morphology, Solifugae, CO1.
Palabras claves: Taxonomía, Filogenética, Morfología, Solifugae, CO1.

Disparity among venom components and morphometric analyses in *Centruroides baergi* Hoffmann, 1932, a medically relevant scorpion species from Mexico

Disparidad de componentes de veneno y análisis morfométrico en *Centruroides baergi* Hoffmann, 1932, un escorpión de importancia médica de México

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Centruroides baergi is distributed in the Balsas Basin, a biogeographical province surrounded by mountains. Health authorities reported deceased on the Western side of the distribution but none on the Eastern population. This disparity in toxicity and distribution suggested that there may be two species. We collected fresh venom and used specimens deposited in the CNAN for morphometric analyses. We conducted an HPLC experiment to identify these toxins, corroborated with an acrylamide gel electrophoresis and obtained the LD_{50} for the Eastern population. We found significant differences among β-toxins, the most toxic components, among the populations. The β-toxin Cb3 is associated only with the Western, but not the Eastern population. The LD_{50} of the Eastern resulted in twice as weak as the Western population. For the morphometric analyses, we used measurements routinely used to delimit species. Linear and quotients were analyzed with parametric and not parametric statistics. PCA, MANOVA, and supervised machine learning SVM model indicated that all putative populations of *C. baergi* are similar, suggesting they may comprise a single species. The analyses included *C. nigrovariatus*, the closest geographic and morphological species to *C. baergi*. Surprisingly, a population distributed in the center that we identified as *C. baergi*, produced significant morphological and venom composition differences compared to the extreme populations and *C. nigrovariatus*, and it is distributed in a different biogeographical province. For these reasons, we suspect that it may represent another species. This study demonstrates that venomics may be part of the toolbox for species delimitation.

Key words: β-toxins, supervised machine learning, new species, Balsas Basin, venomics.
Palabras claves: β-toxinas, aprendizaje computacional supervisado, Cuenca del Balsas, venómica.

POSTER PRESENTATION ABSTRACTS

Supplemental Feeding Increases Body Condition of Tarantulas in their Natural Habitat (*Aphonopelma hentzi*)

La alimentación suplementaria aumenta la condición corporal de las tarántulas en su hábitat natural (*Aphonopelma hentzi*)

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Foraging success affects the overall fitness level of organisms, by impacting factors such as growth rate, reproduction and survivorship. Additionally, foraging success is influenced by prey availability and the organism's foraging strategy. Tarantulas are opportunistic predators that use a sit-and-wait foraging strategy. Although this strategy is less energetically taxing, the amount of prey available for capture within close proximity to their burrows, is unpredictable. The goal of our study is to gain insight on how much prey tarantulas consume in their natural habitat. We used supplemental feeding and a body condition index (BCI) to examine weight gain as a proxy for foraging success in tarantulas at the Comanche National Grasslands, CO. We predicted that the supplementally-fed group would gain more weight and thus have a higher body condition index compared to the non-supplemented group over the 3-week study period. Supplemental feedings occurred twice per week using crickets captured around the field site. Both supplemented and non-supplemented groups had similar weights and BCI at the start. All but one individual in each of the groups gained weight, but weights and BCI were significantly higher for the supplementally-fed group. While these increases across both groups indicate successful prey capture during the study period, lower weight gains/BCI can lead to lower rates of reproduction and potentially decreased survival over the winter months. Future directions include examining BCI in lab-raised tarantulas on different feeding regimes to quantify rates of prey consumption in tarantulas in their natural habitat.

Key words: Body Condition, Supplemental Feeding, Foraging
Palabras claves: Condición corporal, Alimentación suplementaria, Forrajeo

An analysis of the glue droplet strength of *Argiope keyserlingi*

Un análisis de la resistencia de las gotas de pegamento de *Argiope keyserlingi*

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Many orb weaving spiders use sticky glue extruded from aggregate glands within the opisthosoma to trap prey in their webs. Testing the force that these droplets withstand whilst stretching is important for understanding the material properties of the glue, and the prey capture ability of a species. Force analysis of aggregate glue from other spiders in the genus *Argiope* has been documented and researching the strength values of a sister species from another environment can aid in understanding the evolutionary relationship between habitat and glue strength. We tested droplet pull-off forces to obtain the baseline strength values for glues produced by the Australian species *Argiope keyserlingi.* We controlled for environmental conditions and tested droplets at native humidity and temperature, as it is well documented that humidity and temperature can affect capture glue material properties. Understanding the material properties of glues will inform potential synthetic replication of spider glues and inspire future synthesis projects.

Key words: Biomaterials, Glue, Force Analysis
Palabras claves: Biomateriales, Cola, Análisis de fuerza

Assessing the welfare of tarantulas during shift training in a laboratory setting.

Evaluación del bienestar de tarántulas durante amaestramiento de reubicación en laboratorio

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Captive tarantulas are generally not handled unless they are being rehoused, sick, researched, or used in education programs. Handling causes changes in their behavior, may be stressful, and increases the likelihood of injury to the spider and the handler. Therefore, many keepers recommend against handling or interacting with captive tarantulas to maintain their wellbeing. However, this attitude means tarantulas are not assessed until they appear sick or injured. Additionally, medical examinations and rehousing may be more stressful because the tarantula has not been habituated to the procedure. In this preliminary study, I have attempted to quantify metrics that may be associated with stress (defensive behaviors and heart rate) in a small number of captive spiders undergoing shift training. Shift training is a common technique used in zoological settings to safely move animals so they may be transported so their living quarters can be safely maintained. Shift training, while initially stressful, may reduce handling time and long-term stress. In this study, I trained a small number of tarantulas to shift into a small enclosure to avoid contact with a small brush. Once in the enclosure, I measured their heart rates using a doppler device. The tarantulas showed differing responses to training, but generally improved their time to get in the bucket and some showed evidence of habituation. This study demonstrates that tarantulas are remarkably individual in their responses and that systematic operant conditioning may be beneficial. More research is required to develop training protocols that are effective and less invasive.

Key words: tarantula, training, welfare
Palabras claves: tarántulas, amaestramiento, bienestar

Characterizing bioadhesives in Arachnida: *O*-glycosylation and dietary impacts

Caracterización de bioadhesivos en Arachnida: *O*-glycosilación e impactos dietéticos

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Methodological improvements in repetitive gene sequencing have allowed new insights into the structure of bioadhesive proteins. These mucilaginous materials feature prominently in the capture spiral of orb weaving spiders in the form of aggregate spidroin (AgSp). We discuss our preliminary efforts to characterize the variability of *O*-glycosylation, a post-translational modification critical to the hygroscopic function of AgSp, by diet. Using common garden spiders from the genus *Argiope*, we find that aqueous protein yield, indicative of successful AgSp extraction, differs between web orientations. Although high-carbohydrate diets tend to yield higher aqueous protein concentrations, the effect is not statistically significant, potentially owing to individual spider identity. We outline a future dietary study designed to assess the responsivity of aggregate spidroin *O*-glycosylation to high and low carbohydrate diets. Ongoing research will link these structural findings to their functional outcomes in standardized tests of force to pull-off.

Key words: bioadhesives, *Argiope* spp., Aggregate spidroin (AgSp), *O*-glycosylation, diet
Palabras claves: bioadhesivos, *Argiope* spp., Spidroin aggregado (AgSp), *O*-glycosylación, dieta

Life cycle of the Nearctic Treetrunk Sheetweaver (Linyphiidae: *Drapetsica alteranda*)

Ciclo de vida de la Tejedor de Sábanas de Troncos del Neártico (Linyphiidae: *Drapetisca alteranda*)

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The Nearctic Treetrunk Sheetweaver (*Drapetisca alteranda*) is a tree trunk microhabitat specialist belonging to the family Linyphiidae. Although this species has been gaining traction within the literature, much of the knowledge pertaining to its life cycle and phenology has remained unknown. This study aimed at describing the life cycle of *D. alteranda* by utilizing both lab and field data to record the timing and development of captured individuals. Phenological monitoring at the Cofrin Arboretum at UW – Green Bay revealed this species to have a summer stenochronous phenological pattern, with a reproductive period occurring in the early fall season. There was a highly pronounced period of adult spider activity occurring in late August, with an average capture date for males being August 23rd and females being August 24th. The average capture date for females that appeared to be gravid was September 19th. Egg sacs kept under laboratory conditions revealed that *D. alteranda* is semelparous and overwinters in the egg sac stage, with embryonic development lasting about five months from the beginning of October to mid-March and eclosion occurring in mid-April. Egg sacs were observed to be wrapped in flocculent silk rather than tubiliform silk, with an average clutch size of 24 eggs. The timing of the overwintering stage may suggest that *D. alteranda* egg sacs require colder temperatures to initiate embryonic development. This observation combined with the use of flocculent silk and low clutch sizes may also suggest that egg sacs do not encounter egg predators during the winter season.

Key words: Life cycle, life history traits, phenology
Palabras claves: Ciclo de vida, rasgos de historia de vida, fenología.

Lycosidae Abundance and Diversity Across Lawn and Leaf Litter Substrate

Abundancia y diversidad de Lycosidae en sustratos de césped y hojarasca

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This study investigates a common family of ground-hunting spiders, *Lycosidae*, to determine differences in their abundance and diversity in deciduous leaf litter and managed turfgrass (lawn). The study was conducted within a forested ecosystem at Virginia Commonwealth University's Rice Rivers Center in Charles City County, Virginia. I placed 10 belt transects (2m x 10m) on lawn substrate and 10 identical transects in deciduous forest leaf litter substrate. I performed repeated visual census via eyeshine and manual capture of up to three individuals per transect per survey in July and August of 2023. There was significant difference in abundance between lawn and leaf litter transects, with higher average abundance in leaf litter transects ($p = 0.01$). There was significant difference in total Lycosid abundance between survey periods (chi-squared = 23.6, df = 3, $p = 2.9e-05$). There were no significant differences in diversity (Shannon Diversity Index; $W = 68$ and $p = 0.18$); however, several species had significant associations with lawn or leaf litter substrate.These findings can aid in the understanding of human land management on a group of understudied, but abundant and ecologically vital arthropod predators, and suggests further research into the habitat preferences of Lycosid spiders is needed.

Key words: *Lycosidae*, Substrate, Abundance, Diversity
Palabras claves: *Lycosidae*, Sustrato, Abundancia, Diversidad

A synopsis of the collection "Arácnidos de Chetumal", with emphasis on the Order Araneae.

Sinopsis de la colección “Arácnidos de Chetumal”, con hincapié en la sección del Orden Araneae

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The "Arácnidos de Chetumal" Biological Collection (Chetumal Arachnid Collection, CHAC) is attached to the Zoology Museum of ECOSUR Unidad Chetumal. It was part of the "Terrestrial Arthropods" collection from 1990 until 2021, when it was formed and registered as a separate collection. Most part of the samples comes from theses, sub-capture material or casual collections. All the material comes from Mexican states, with Quintana Roo as the most represented state, although there is material from the states of Yucatan, Campeche, Chiapas, Hidalgo, and Aguascalientes. The Chetumal Arachnid Collection is oriented to Araneae and Scorpiones, with some specimens of Amblypigi, Opiliones, Solifugae, and Schizomida. By 2024, the Araneae section has 3,574 vials recorded, with 5,399 specimens, 46 families, and 132 species (1,160 specimens determined to species), corresponding to 75 % of the 175 species reported for Q. Roo, and 6% of the 2,300 species reported for the country. The best represented families are Araneidae (1,307 specimens), Salticidae (400), Tetragnathidae (349) and Theridiidae (251), and there are 440 unrevised vials. The information is recorded in a spreadsheet with collection and ecological data, localities are geo-referenced, and a GIS is constructed with historical localities, priority areas for sampling, and proposed monitoring sites. It is necessary to process material from collections made in the 2010s in the municipality of Bacalar, and from 2021 to 2023 from the municipality of Othón P. Blanco (Chetumal). It is expected that the number of taxa represented in the collection will increase considerably as the curation of the material progresses.

Key words: Araneae, diversity, Latin America, Southern Mexico, Taxonomy
Palabras claves: arañas, diversidad, Latinoamérica, sureste de México, taxonomía

A comparative study of microhabitat use by arachnids in the Tamaulipan Biotic Region of south Texas

Un estudio comparativo de uso microhábitat en la Región Biótica Tamaulipeca del sur de Texas

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Microhabitat use of arachnids was compared in south Texas from July 2020 to August 2022. The most active arachnids were the striped bark scorpion, *Centruroides vittatus* and wolf spiders (Lycosidae) and various species of orb-web spiders (Araneidae). Scorpions were active both on the ground and vegetation (including blackbrush and prickly pear cactus) while wolf spiders were mainly on the ground. Orb-web spiders were using various species of vegetation for attachment sites of the orb-web. Further analysis will establish preferences by arachnids for microhabitats (and attachment sites) and determine the effect of interactions among arachnids such as intraguild predation on temporal and spatial distributions.

Key Words: microhabitat, Arachnida, guild
Palabras claves: microhabitat, Arachnida, gremio

New Insights into the Life History of Eastern North American Opiliones (Arachnida)

Nuevos datos sobre la historia de vida de los Opiliones (Arachnida) del este de América del Norte

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Opiliones (“harvesters”) is an understudied order of Arachnida, and details of their behavior, phenology, and developmental biology have received little academic attention. These baseline ecological studies can provide a critical bedrock for future research, enhancing our understanding of Opiliones behavior, evolution, and natural history. This work could hold a myriad of applications and potentially provide further insight into other arachnid and arthropod species. We designed a series of related projects, including rearing the first lab-born generation of leiobunine harvesters, to describe the poorly understood opilionid life cycle, including egg development, juvenile morphology, adult ecology, mating, and oviposition. We conducted mating and oviposition trials to better understand substrate preferences, egg development, and hatching success. We then reared wild-caught and lab-raised juveniles to determine the number of molts to maturity and juvenile morphology. Finally, abundance surveys allowed for a deeper understanding of opilionid phenology and ecology, such as plant preference and species richness. We found clear patterns in the seasonal distributions, oviposition preferences, and developmental patterns of the species of harvesters common to eastern North America, all of which will contribute to a clearer understanding of Opiliones biodiversity.

Key words: Opiliones, Arachnida, life cycle, ecology, phenology.
Palabras claves: Opiliones, Arachnida, ciclo de la vida, ecología, fenología.

Review of the Theridiidae family in urban and vegetation environments within the academic division of biological sciences at UJAT.

Revisión de la familia Theridiidae en ambientes urbanos y vegetación en la división académica de ciencias biológicas de la UJAT.

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En este trabajo se hizo una revisión de las especies de la familia Theridiidae encontradas en dos ambientes contrastantes, siendo los entornos de infraestructura y de vegetación dentro de la División Académica de Ciencias Biológicas de la Universidad Juárez Autónoma de Tabasco, colectadas desde septiembre de 2019 a febrero de 2020. Para ello se realizó un contraste con el listado de Hoffmann (1976), los ejemplares fueron colectados mediante colectas diurnas y nocturnas cada 15 días en los sitios mencionados dentro de la DACBiol por medio de la captura directa con pinzas, frascos y pinceles. Los ejemplares capturados se identificaron con la ayuda de claves taxonómicas (Roth, 1993 y Kaston, 1953), se etiquetaron y se preservaron en tubos de ensayo con alcohol etílico al 70%. Se colectaron un total de 66 individuos donde 42 corresponden al área de vegetación y 24 al de infraestructura. La especie más abundante fue *Theridion differens* (Emerton, 1882), que se colecto exclusivamente en el sitio de infraestructura, seguido por *Theridion murarium* (Emerton, 1882), colectada exclusivamente en el área de vegetación. Las especies observadas corresponde con las observadas en el trabajo de Hoffmann, no se observan especies nuevas, la abundancia de *T. murarium* puede deberse a que se encuentran en sitios como los marcos de las ventanas donde pueden construir sus redes con facilidad y tener acceso a una gran diversidad de presas.

Key words: Theridiidae, Synanthropy, Species review, Contrasting environments.
Palabras claves: Theridiidae, Sinantropía, Revisión de especies, Ambientes contrastantes.

Comparing ethanol rehydration techniques: Effects on spider morphology and DNA Integrity.

Comparación de técnicas de rehidratación con etanol: efectos sobre la morfología de las arañas y la integridad del ADN.

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Ethanol curation plays a crucial role in preserving museum specimens, especially soft-bodied arthropods. Dehydration happens as a result of less-than-ideal storage and preservation conditions. If rehydration is desired for a specimen, then effective rehydration methods must be investigated and compared. The impact different rehydration techniques have on specimen tissues has been studied in vertebrates but has not been explored as much with arthropods. Additionally, how these techniques impact the DNA in dehydrated arthropod specimens has not been assessed. In this study, we investigated the impact of two rehydration approaches on dehydrated spiders from the same donation. We used a gradual ethanol rehydration "step-up" method, and a heat-accelerated rehydration method. To determine which approach was most effective for restoring dehydrated spiders in ethanol, we assessed spider morphology for damage, DNA yield, and DNA integrity. We found that all desiccated and rehydrated spiders, regardless of treatment choice, displayed varying levels of tissue desiccation and separation in the abdomen and legs. The Step-Up method was more consistent than heat in rehydrating tissues and reducing the separation of tissues from the abdomen. Overall, we found a significant difference in tissue separation between our controls and treatments but no significant difference for damage to pedipalps. Additionally, DNA capture from all specimens was low and significantly degraded compared to a positive control group. Our recommendations for collections managers are to consider the fragility of dehydrated materials in making a rehydration decision and to preferentially extract DNA from other material if possible.

Key words: Museum Curation, Ethanol Preservation, Rehydration, DNA integrity, Morphology
Palabras claves: Curación de museos, preservación en etanol, rehidratación, integridad del ADN, morfología

Thinking of *Thrasychirus*: An Evolutionary and Phylogenetic Analysis of South American Long-Legged Harvesters (Opiliones, Neopilionidae)

Pensando en *Thrasychirus*: Un Análisis Evolutivo y Filogenético de los Opiliones Patilargos de Sudamérica (Opiliones, Neopilionidae)

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The vast majority of life on this planet remains undiscovered or undescribed; for instance, around 80% of insect and arachnid species are still undescribed. Harvesters, colloquially known as “daddy long-legs”, are especially in need of taxonomic revision as their diversity is highly underestimated due to their limited geographic dispersal. The Gondwanan long-legged harvester family Neopilionidae consists of over sixty species spread over South America, Africa, Australia, and New Zealand, with many described over fifty years ago without molecular techniques. Currently, we lack a published in-depth phylogenetic analysis of South American long-legged harvesters within the genera *Thrasychirus*, described in 1884, and *Thrasychiroides*, described in 1947. In addition to this, the three known species of *Thrasychirus* have only been recorded from the southern tip of Chile, whereas specimens of *Thrasychirus* have been collected and recorded from all across Chile and the residing Andes mountain range (with *Thrasychiroides* in Brazil). In this project, we use Sanger sequencing of COI and 18S for phylogenetic analyses, adding to previously sequenced data. Using integrative taxonomy combining genetics and qualitative morphometrics, we then determine whether genetic lineages within these broader clades can be considered as separate species. Our findings indicate that there are at least seven broadly distinct clades, most with high levels of genetic variance indicative of species. Through furthering our knowledge of the systematics and phylogeny of *Thrasychirus* and other Gondwanan members of Neopilionidae, we contribute to our understanding of harvester diversity and reaffirm that there remains a great deal of diversity left to describe.

Key words: diversity, phylogenetics, speciation, systematics, taxonomy
Palabras claves: diversidad, especiación, filogenética, sistemática, taxonomía