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Future A.A.S. Annual Meeting Sites

2003—Denver Museum of Nature and Science, 24—28 July
2004— Norman, Oklahoma
2005— Hiram, Ohio

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Reports from the 26th Annual AAS Meeting Univ. of California - Riverside 25-29 June, 2002

The 2002 AAS meeting was most ably hosted by **Rick Vetter** and his trusty assistants at UCR in Riverside California. It was a well-planned meeting that ran smoothly and kept the attendants occupied but not exhausted. Rick and his crew deserve a very large "**Thanks & Well Done!**".

Jon Reiskind gives his recollections and impressions of the Meeting:

2002 AAS Meetings in Riverside

From the opening of the 26th American Arachnid Olympiad to its auction finale an exciting time was had by the myriad of arachnozealots who found their way to Riverside in June from throughout the US as well as from Mexico, Canada, Taiwan, Singapore, and Australia. Getting there was my first problem. Having been delayed four hours in Orlando by some blinking cockpit light my perfect plan to meet Allen Brady fell through. Luckily upon arriving in Ontario (US not Canada) I bumped into the peripatetic Rovners who took me under their wing and I arrived at UC Riverside in style. Soon we were searching for the "gold", i.e. those exclusive parking places on campus.

After a post registration social gathering the meetings were kicked off Wednesday morning with the entrance of a reasonably fit, partly dressed runner, Rick Vetter, who came to light the mighty Olympic flame and welcome us. No sooner did he greet us then we were plunged into a gruesome presentation of all the reasons many of us decided not to go to medical school. The symposium on "Arachnids of Medical Importance" gave us vivid descriptions of the toxic effects of the few spiders and scorpions that are truly dangerous in our neck of the woods. Treatments were discussed as well. The group photo, giving each of us a bona fide alibi, followed.

This year's talks and posters once more demonstrated that arachnology is alive and well (see the abstracts in this newsletter). The mixture of old and new, in both people and scholarship, was evident. With 120 participants the subjects varied from neurophysiology to biophysics to ecosystem inventories and even some phylogenies. As usual spiders outnumbered other orders but scorpions, solfugids, opiliones and uropygids were represented as well. To keep us metabolizing and our tongues well lubricated we were treated to BBQ at the Barn (Wednesday night) and offered an array of franchises and local establishments along University Avenue. [I fell in love with Rubio's lobster burrito.] Others stayed and ate at the new dorms on campus.

Thursday night's postprandial presentations included some clips of non-salticid jumping spiders (*Dolomedes* of Suter's) and a replay of Rick's fiancé, Kathleen Campbell, re-enacting the urban legend a 1960's woman in whose beehive hairdo a cocoon of *Latrodectus* hatched.

Shepherded expertly by our mother hen, Rick, we wended our way through the final talks, ending up with a tempting preview of next year's meeting in Den-

ver by our favorite temptress, Paula Cushing. A general business meeting of the AAS ended Friday afternoon (minutes will accompany Spring Ballot). Concern about dropping membership was foremost concern.

Finally the final banquet. The food was excellent, and there were heartfelt words of praise and thanks for the two Executive Committee members stepping down: Treasurer Gail Stratton (13 years) and Membership Secretary Norm Platnick (26 years). Bruce Cutler eclipsed us all. It was generally an orderly, well behaved crowd with lots of money. Good thing, since the noisy auction (as opposed to the silent auction that was also held) was a lively competition between those who could afford the items and those who could not, but willing to go into debt. Rick Vetter, assisted by myself, kept the items moving. The generosity of the late Bill Peck's widow, Maria, and Jerry Rovner, who contributed some very special items, was matched by that of the bidders. Albin's "Natural History of Spiders" [1736] was sold for $300 to Pat Craig. The bids received for Dahl's linyphiid monographs brought new meaning to the term "money spiders". A total of $ $1,474.50 was raised for the Society.

For those who could not bring themselves to leave after the meetings there were two collecting trips. I was told collecting was meager due to the severe drought. Others of us decided to observe the humanity at Laguna Beach (with Lenny Vincent, AAS's archivist, acting as guide). Bea Vogel (AAS's founder and first president) and I swam in the cool Pacific waters, no pychnogonids found. We all ate, browsed and ogled the southern California scene. Then we all ballooned away to our home retreats.

Desert - Mountain field trip by **Rick Vetter**

Although Lenny Vincent's ego was bruised because more people chose to go out on the hot, desert trip rather than to visit his artsy, cool, chic Laguna Beach hometown, we had a joyous, good time. About 32 of us headed east into the brutal sun, led by me and associates Tom Prentice, Kathleen Campbell and Gail Van Gordon. The weather all week in Riverside had been a pleasant low 90's meaning that the desert would probably be around 100. It was a short 45-minute drive out to Oasis de los Osos, a very unique desert habitat. It has a perennial stream from mountain runoff and other sources so the entire collecting trail was about 1 mile long with a waterfall at the end. The stream was lined with 8-foot high *Salix* sp. so it offered shade, running water and lots of green plants to beat for spiders. Two weeks prior to our visit, Tom Prentice and I went out there and buried 8 pitfall traps in hopes of getting something after this least-rainfall-on-record winter season. When we arrived, the pitfalls were divvyed up amongst those who were interested. Spiders were sparse (*Scytodes* and *Xysticus* imm.) but there were some very cute lizards including a banded-tail gecko in Mark Harvey's pitfall and a baby banded snake and several lizards in Paula Cushing's, all of which were liberated into the brush. GB Edwards, beating sheet in hand, quickly set upon the vegetation like a vindictive Catholic school nun and was rewarded with the ant-mimicking salticid *Peckhamia*. By the waterfall, Jeremy Miller collected *Tidarren sisyphioides* including 3 males which is a special find because the males are tiny and have the curious habit of being singularly palped, chewing off the other after molting to maturity. Serendipitously, on the day of the field trip, it was calm which is rare for this place which is so routinely windy that there are wind mill farms generating electricity nearby. It made for better collecting (not having all your stuff blow around) but was a bit toasty in the sun. No one perished in the desert heat so I didn't have to fill out all kinds of administrative paperwork. Much appreciated.

We then scurried away at 11AM to the mountain retreat of the James Reserve, 5600 foot elevation, pine-oak forest with a lovely cooling breeze and had a filling lunch, washed down with cold beverages and snacked on some of the cheeses left over from the Tuesday night reception.. Despite the dry winter, we had very good collecting. The team of Tom Prentice, Mike Draney and Jeremy Miller set about sifting moist oak-pine duff near a slow-flowing stream and were rewarded with many specimens of *Ceratinops inflatus*, significantly reducing the total spider fauna of the reserve. Another old (leaf-) duffer, Darrell Ubick collected *Filistatinella* (Filistatidae), *Orchestina* (Oonopidae) and the very cute *Cybaeota nana* (Cybaeotidae). Once again, GB Edwards, with his keen salticid search image, was pulling in lovely specimens. Mark Harvey did not neglect the neglected arachnid orders and found several pseudoscorpions and opiliones including one specimen of *Pseudogarypus bicornis* (Pseudogarypidae), a rarely encountered pseudoscorpion species belonging to a highly relictual family. The group collectively found several *Megahexura fulva* (Mecicobothriidae) but because they were years from maturity, some were released back into the reserve so they could continue their life cycle. We left at 4pm with booty in hand, back to Riverside before 5 so folks could shower and get their last Riverside meal before ballooning homeward.

Abstracts of Poster, Podium, and Symposium Presentations

26th AAS Meeting, Riverside CA

25-29 June, 2002

A Phylogenetic View of Sociality in Cobweb Spiders (Theridiidae)

Ingi Agnarsson
George Washington University and Smithsonian Institute

Spiders are a lineage of predominantly aggressive and distinctly territorial hermits. Tolerance is usually limited to conspecifics, briefly during mating, or as tiny juveniles emerging from the egg sac. Yet, a few species do share webs, and about 20 do so permanently (quasi-sociality). While about half of these are phylogenetically widespread and isolated, the remainder are cobweb spiders. As the family represents less than 6% of spider diversity, the concentration of social species there seems to require an explanation. In order to examine the phylogenetic patterns of sociality within the family, I present a cladistic reconstruction of theridiid relationships, based on morphological data. The results indicate that; first, the relatively high number of social theridiids is a result of multiple (four) origins of sociality, rather than a diversification within a single social lineage. Thus, as in other spiders, social clades never are specious; spider sociality seems to represent a diversification dead end, rather than a key innovation. Second, I found that within Theridiidae, social origins are non-randomly clustered within a distal lineage. Presumably that lineage exhibits traits that facilitate social evolution. The "maternal care route" hypothesis, suggests that web-sharing sociality is merely an extension of maternal care, whose prolongation may be more likely where certain other traits, e.g. three- dimensional webs are present. Congruent with such ideas, I found that sociality in cobweb spiders is indeed concentrated in a lineage where maternal care occurs in the presence of three-dimensional webs.

Spiders in elementary schools

Bill Bennett
Crosbyton County Memorial Museum, TX

Scream and squash is the usual reaction of kids, a behavior learned from parents, when encountering a spider. That is until they have been properly enlightened by a biologically hip teacher (rare and endangered) or a by a courageous AAS volunteer. These knee-biters learn to distinguish between all the good species from the few really dangerous ones. They also learn what distinguishes the arachnids from other arthropods, their varied predatory techniques and their important place in the environment. Halloween offers a great opportunity for

spider education as well as Native American studies, e. g., legends of the Spider Grandmother in Kiowa lore, Spider Woman of the Cherokees, etc. You will find that 1st through 4th graders are easier to teach than graduate students!

The evolutionary origin of sphingomyelinase D in *Loxosceles* venoms: how, when and why?

Greta Binford
University of Arizona

Sphingomyelinase D (SMD) in *Loxosceles* venoms is a sufficient causative agent for lesion formation and is only known elsewhere in a few species of pathogenic bacteria. This makes the evolution of SMD an interesting puzzle. I will discuss insights into the evolution of *Loxosceles* SMD based on characteristics of the gene and comparative biochemical assays. The gene spans at least 6,500 bp, contains 5 introns, and is a member of a multigene family. A signal sequence indicates SMD is expressed as a zymogen with a trypsin cleavage activation site. Weak amino acid sequence similarity suggests SMD is a divergent member of the broadly conserved glycerophosphoryl diester phosphodiesterase family (GDPD). These data strongly suggest that spider SMD has been evolving within a eukaryotic genome for a long time ruling out evolutionary origin by recent horizontal transfer from bacteria. Comparative enzyme assays indicate that SMD originated in the ancestors of *Loxosceles* and *Sicarius* making it likely that the enzyme is present in all members of this clade. Venoms of spiders in the *Loxosceles/Sicarius* clade (with SMD) are more potent when injected into *Manduca sexta* than are venoms of *Drymusa*, a close relative without SMD in their venom. This is suggestive that the enzymatic activity of SMD (present in large quantities in the venom) may contribute to prey paralysis.

Behavioral diversification in the adaptive radiation of Hawaiian orb-weaving *Tetragnatha*

Todd Blackledge
University of California-Berkeley

The extreme isolation and habitat heterogeneity of the Hawaiian Islands has contributed to many spectacular evolutionary radiations of organisms, exemplified within spiders by the orb-weaving *Tetragnatha* (Araneae: Tetragnathidae). While the "spiny leg" lineage of *Tetragnatha* has abandoned the use of webs in prey capture, most endemic *Tetragnatha* (approximately 50 species) still construct orb webs. This web-building clade may have speciated across the archipelago more rapidly than the spiny leg clade, suggesting that construction of webs has facilitated species coexistence or even diversification itself by allowing finer subdivision of microhabitat or prey resources within habitats. Here, I show that sympatric species of Hawaiian *Tetragnatha* display distinct differences in the microhabitats and architectures of their webs, as well as the prey that they capture. I examine the possibility that web architecture and location reflect adaptation to local selective pressures and that similarities in selective pressures between habitats on different islands have led to convergent evolution of community structure.

Neotropical jumping spiders of the genera *Sidusa* and *Cobanus*, with discussion of phylogenetic relationships within the Euophryinae (Araneae: Salticidae)

Gitanjali Bodner
University of Arizona

Members of the jumping spider genera *Cobanus* F. O. Pickard-Cambridge 1901 and *Sidusa* Peckham and Peckham 1896 are amongst the most abundant and conspicuous spiders in many Neotropical rainforests, yet distinguishing features have not been proposed for either genus, and neither has previously been revised. Similarly, the euophryine subfamily is one of the dominant salticid groups throughout the world, yet very little work has been done on its boundaries and internal phylogenetic structure. This work suggests synapomorphies for *Cobanus* and *Sidusa*, and addition of newly discovered species approximately doubles the size of both genera. Twenty-four species are newly described here, twelve re-described, three synonymized, two transferred to other genera, and several recognized as being misplaced. Phylogenetic analysis of morphological characters in these species and representatives of thirty other euophryine genera supports the sister relationship and mutual monophyly of *Cobanus* and *Sidusa*, provides insight into character variation within the subfamily Euophryinae, and suggests the existence of several previously unrecognized euophryine clades.

Molecular comparisons of scorpion species groups from the Genus *Vaejovis* (Family Vaejovidae) using a 500 base-pair sequence of mitochondrial 16S rDNA

Karen Bost, Richard Henson, Mary Connell, Zack Murrell
Appalachian State University

The genus *Vaejovis* has the largest distribution and degree of variation of any scorpion genus found in the United States. Due to a lack of distinct morphological characteristics, the phylogeny of this genus is poorly understood. Species of this genus have been separated into five loosely defined groups based on morphological and ecological characteristics. The five species groups include *eusthenura*, *intrepidus*, *mexicanus*, *nitidulus*, and *punctipalpi*. Representative species and populations from each group except *intrepidus* were examined using a 500 base-pair sequence of mitochondrial 16S rDNA in order to assess phylogenetic relationships. The *intrepidus* group was not analyzed due to the inability to obtain specimens. Scorpions were obtained at night using ultraviolet light in Big Bend National Park and Guadalupe Mountains National Park Texas, throughout Utah, Arizona, New Mexico, North Carolina, Tennessee and Mexico. Habitats ranged from consolidated sand to rocky substrate. Sequences were compared to *Hadrurus arizonensis* , a member of a related Family (Iuridae). Preliminary data consisting of twenty-eight sequences from the four representative groups and outgroup were analyzed using PAUP where a heuristic search was performed to create a consensus tree computed by fifty percent majority rule. Early evidence suggests a combined monophyletic origin of the *mexicanus* and the *nitidulus* groups. The *eusthenura* and *punctipalpi* groups have not been resolved at this time.

Gum-Foot Threads: Prey Capture by Spring-Action in Black Widow Webs

Crystal Botham, Yurixsa López and Anne Moore
University of the Pacific

Vertical gumfoot threads in a black widow's (*Latrodectus hesperus*) cobweb catch ground-moving prey by sticking to the prey, detaching from the ground and raising the prey into the air. We propose that gumfoot threads, unlike other spider silks, act as a spring, using stored energy from pre-stretching of the threads to pick up the prey. We tested the ability of the gumfoot threads to store energy by cyclic loading tests, enabling measurement of energy input and output. Our tests show that gumfoot silk is very efficient (81%) at low strain (<2%) but not efficient (24%) at higher strains (5-10%). Low-strain efficiency in spider silks has not been previously measured, so silk was thought to act as a shock absorber (energy dissipation) rather than a spring (energy storage). Our initial observations of intact gumfoot threads in the web are consistent with this spring hypothesis. Our stress-strain analysis shows that gumfoot silk has nearly identical material properties as dragline silk. They both show an initially stiff region followed by a distinct decrease in stiffness as the silk is stretched beyond 2% of its original length. This yield point suggests a significant change in the way that the silk molecules resist being stretched. Therefore, the two silks can have identical properties yet exactly the opposite function (energy storage as opposed to energy dissipation) because the spider uses the silks at different strains.

Envenomation by *Centruroides* scorpions

Leslie Boyer
University of Arizona

In North America, approximately 8 species and subspecies of *Centruroides* scorpion are significantly neurotoxic to humans. Venom includes sodium channel neurotoxins that provoke a clinical syndrome affecting nicotinic, muscarinic and neuromotor systems. Children in particular are susceptible to neurotoxicity, of sometimes life-threatening severity. Treatment varies widely with local medical capabilities, traditions, and laws. Currently there is no scorpion antivenom approved for use in the United States, but efficacy has been demonstrated both with an Arizona State University goat immunoglobulin product and, in Mexico, with an equine F(ab)2 product. Efforts are under way to demonstrate cross-protection using the Mexican antivenom against envenomation by the US species.

Papillae on the Pedipalps of Solifugae: structure and proposed function

Jack Brookhart and Paula Cushing
Denver Museum of Nature & Science

Some male solifugids have a series of conical structures called papillae on the ventral surface of the metatarsal segment of their pedipalps. We present the first known images of the microstructure of these papillae and present our hypothesis as to their function.

Clinical Aspects of Envenomation by Black Widow Spiders

Sean Bush
Loma Linda University Medical Center

Clinical signs and symptoms following black widow spider envenomation may include severe muscular pain, high blood pressure, and profuse sweating. Initially, a bite may cause sharp pain or go unnoticed. The lesion following the bite typically has a "target" appearance, i.e., central reddened puncture site surrounded by blanching and an outer halo of redness. Unlike brown recluse bites, the skin around the bite site does not rot. Pain may progress from the bite site gradually to involve muscles in the limbs, abdomen, back, and/or chest. Abdominal pain may mimic surgical conditions. Patients may complain of a headache and develop facial swelling, called *Latrodectus* facies. Nausea and vomiting may ensue. Sweating may be isolated to the area surrounding the bite or may be generalized. The envenomation syndrome usually manifests within an hour, reaches maximum intensity within 12 hours, and can last for days to weeks. There is antivenom for black widow spider bites. However, there has been a death attributed to an allergic reaction to this antivenom, so most U.S. doctors opt to treat patients' symptoms with pain medications, such as morphine, and sedatives, such as valium. Interestingly, Australian red-back spider antivenom works for U.S. black widow spider envenomation. Calcium has been reported to be no more effective than placebo and is no longer recommended. Although around 2,500 black widow spider bites were reported last year to the American Association of Poison Control Centers, no deaths have ever been reported to Poison Control since its first report in 1983.

Diurnal Use of Artificial Shelters by Harvestmen in Experimental Gardens

Sarah Bradbury and Alan Cady
Miami University, Oxford, Ohio

Harvestmen (Opiliones) are a Generalist Predatory Arthropod and are usually numerous and common in gardens. Little is known of how they may contribute to suppression of herbivore activities in such habitats if their populations were augmented. Previous results from experimental enclosures show that brussel sprouts plants in the presence of harvestmen had greater growth and less damage from herbivores. These experiments were continued with cucumbers and to test the effects of small lean-to shelters designed to provide harvestmen with favorable microhabitats during the day to prevent their leaving to seek shelter from daytime heat and desiccation. Twelve 2X2 meter metal flashing enclosures holding cucumbers and brussel sprouts were erected. Six of the 12 enclosures contained 15 harvestmen each, uniquely marked to denote treatment. Three enclosures with and three enclosures without harvestmen were supplied with 8 25X25 cm lean-to shelters. Each of 4 treatments (harvestmen with shelters; harvestmen without shelters; no harvestmen with shelters; and no harvestmen, no shelters) were replicated three times. Harvestman positions were noted during nocturnal and diurnal censuses and observations. Herbivore plant damage, fruit yields, and biomass were measured. Harvestmen chose the shelters during the hotter, drier daytime, and were found out on vegetation at night. Thus, shelters may reduce harvestman emigration out of gardens during the day, inducing them to remain in positions to prey upon pests or their eggs at night. Plants in the presence of harvestmen showed trends for less damage and higher fruit yields, especially during mid-season.

Spiders in Texas pecans; are they affected by fire ants?

Alejandro Calixto, Allen Dean, Allen Knutson, Marvin K. Harris and Bill Ree
Texas A&M University

Imported Fire Ants (IFA) are known to interfere with natural enemies in pecans. This ecological disruption may contribute to pest outbreaks by preying on natural enemies. We investigated this effect on spiders associated with the pecan agroecosystem. The study was conducted in a pecan orchard (Robertson Co., TX). Plots treated for IFA were compared with untreated, three treatments were established and replicated four times; 1. untreated controls; 2. chlorpyrifos (Lorsban 4E TM) as a trunk treatment (was used as a chemical barrier to impair ants to climbing up the tree) and; 3. broadcast methoprene (ExtinguishTM) bait treatment that reduced IFA densities by 70%. Ground and foliage spiders were studied by using 4 pitfall traps and 200 artificial refuges per treatment weekly, monitoring from May 2000 thru May 2002. Refuges consisted of strips of corrugated cardboard (6x3 in) attached to the terminal twigs of the tree and inspected every week from April 2001 thru May 2002. A total of 15,588 spiders were collected in all, 3,372 in pitfall traps and 12,216 in corrugated strips. 127 species distributed into 26 families were recorded during the study, 77 species occurred in refuge strips, 94 species in pitfall traps and 44 species in both methods. Results suggested that spider densities were not affected by IFA directly but effect over other natural enemies may cause an increase in numbers in control plots due to lack of high intraspecific competition. Untreated plots tended to have more spiders compared with treated. Spiders seem to be present year round on the tree/ground playing an important role as a buffer predator over pest outbreaks. while multivoline insect predators (lacewings and lady beetles) vary considerably in conjunction with prey availability and often occur at very low densities. Spiders consistently occur at reasonably stable densities.

Geographic variation in prey capture in a colonial orb-weaving spider

Florencia Fernández Campón and Susan E. Riechert
University of Tennessee

Prey availability affects tolerance and cooperation in spiders. Individuals from populations from habitats with high prey availability showing higher levels of cooperation. In addition, temporal variation in prey availability could be affecting plasticity levels with which individuals respond. Populations changing their behavior to adapt to local conditions favored against populations lacking that plasticity. *Parawixia bistriata* is a colonial spider in which cooperative capture is facultative. By doing reciprocal transplants in habitats with different prey availability and seasonality we evaluated the hypotheses of a) higher cooperation under high prey levels, b) more plasticity when temporal variation in prey level existed. In manipulative studies we observed the response towards prey of increased size based on number of individuals participating in capture, in communal feeding and latency of the feeding group to divide. We expected more individuals participating in prey capture and feeding under higher prey conditions as well as longer durations of the feeding groups, indicating higher tolerance as well. Populations differed in their response but not as expected. Despite the low sample size, data from transplants suggest that dry populations present more plasticity, behaving like native populations when transplanted to wet habitats, whereas wet populations maintained their behavior under different levels of prey.

Abundance patterns, stream use and overwintering in a community of stream-bank cursorial spiders

Karen Cangialosi, Sharon Martinson and David Cook
Keene State College

While spiders are predominately terrestrial, a few species are known to enter aquatic environments for most or some of their lives. Spiders living along a stream bank may make use of the water flow for foraging for aquatic organisms or for dispersal. The objectives of this study were to document annual abundance patterns for the community of stream-bank cursorial spiders and to quantify their degree of entry into the stream drift. A drift net was placed in each of three stream sites in forested areas in Cheshire County, New Hampshire and net contents were collected and recorded twice a week for approximately one year. Simultaneously, pitfall traps were placed along three, 30m transects adjacent to each stream and contents were collected and recorded once a week. Air temperature, water temperature, and water level were also recorded at each sampling period. We found that most species had non-overlapping periods of peak abundance, and that most species that were along the stream margins did not enter the drift. However, two species of Dictynids, (*Cicurina*) entered the drift in large numbers in early December when the average daily temperature reached below freezing. It it possible that these species may be using the streams to locate suitable overwintering sites.

Are mechanoreceptors involved in the neural circuitry of scorpion peg sensilla?

Steven Carter and Douglas Gaffin
University of Oklahoma

Scorpion pectines are paired, ventral appendages that extend

from their eleventh body segment. Each pecten resembles a comb with a jointed spine connecting numerous teeth. The ventral surface of each tooth contains a dense patch of truncated hairs, called peg sensilla. Morphological and electrophysiological studies have concluded that numerous chemoreceptive neurons are present in each peg while only one mechanoreceptor is present. Synaptic interactions between chemosensitive cells have been identified via cross-correlation analysis; however, the mechanoreceptor has received very little attention, and it is unknown if it is part of the peg circuitry. Our research focused on the general characteristics and roles of the mechanoreceptors in peg sensilla of the desert grassland scorpion (*Paruroctonus utahensis*). Extracellular electrophysiological recordings were obtained from the bases of individual pegs during mechanical stimulation. These recordings were then segregated into individual cellular firings using wave-form analysis, which showed the existence of at least four different waveforms (three putative chemoreceptors and one mechanoreceptor). Cross-correlation analysis did not reveal signs of synaptic interaction between the mechanoreceptor and two of the chemoreceptors while a third was inconclusive. Taken together with previous morphological studies it appears that the chemoreceptors and mechanoreceptors form synaptically isolated neural populations in scorpion peg sensilla.

Ultrastructure of the Major Ampullate Gland of the Black Widow spider, *Latrodectus hesperus*

Merri Lynn Casem [1], LPP Tran [2] and Anne M.F. Moore [3]
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Silk production in the spider occurs within specialized glands that are capable of the synthesis of large fibrous proteins and the post-translational processing of those proteins to form an insoluble fiber. The major ampullate gland of *Latrodectus hesperus* (black widow) is similar in morphology to those found in the araneid spiders. The tail domain of this gland is highly protein synthetic, giving rise to a core protein product. The silk product is transported to the ampullar region where it is stored. The cells of the ampulla wall produce an electron dense material that appears to form a "skin"; surrounding the silk "core"; generated in the tail. The duct of the gland consists of at least two distinct cell types. One type contains 'honeycomb' vesicles of unknown function while the other possesses elaborate microvilli that may be involved in the reabsorption of water and subsequent dehydration of the silk. The duct is reinforced with a chitinous cuticle. As the silk product transits through these various stages of assembly it can be seen to undergo a condensation or concentration, possibly reflecting the influence of both the dehydration and shear forces that occur within the duct.

Spider Diversity of Orchid Island, Taiwan: A Comparison Between Habitats generated from various aboriginal activities

Kuan-Chou Chen and I-Min Tso
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Tropical forests exhibit very high spider diversity, but due to the difficulties of conducting comprehensive sampling in tropical areas relevant studies are quite rare. Orchid Island is a tropical island 91 km off the southeast coast of Taiwan. The forests on this island are the northern most tropical forests in East Asia. In this study, the spider diversity of Orchid Island was studied and those from three types of habitats generated by various kinds of aboriginal activities were examined. Habitat type studied in this study included the forest interior, the meadow outside the forest and the forest edge. All habitat types had four replicates located in Yonsing farm, Yeying village and Chungshing farm respectively. In each replicate four 5m X 5m sampling plots were established. In addition, we also set up additional 8 plots in the relatively undisturbed forest in Tienchi for comparison. Three field trips were conducted in August, 2000 and February and April, 2001. Spiders were collected by six methods (pitfall traps, litter substraction, shrub sweeping-net, day and night hand collection and canopy sweeping-net) to have a comprehensive representation of diversity from all microhabitats in the plot. From the adult specimens obtained, a total of 110 species from 18 families were identified. Shannon-Weaver function, Simpson index and Evenness were not significantly different among habitat types, suggesting a similar dominance pattern island-wide. However, species composition differed considerably among different types of habitats. Result of a UPGMA analysis using pair-wise Euclidean distance demonstrated that specimens from 56 plots can be divided into seven major groups, with Tienchi plots united as a unique cluster. In addition to species composition, foraging guild composition also differed significantly among habitat types. These results suggest that the diversity of ground spiders in Orchid Island tropical forest is quite heterogeneous. Spider diversiy in disturbed area did not constitute a subset of those in the relatively undisturbed area.

Detritus decoration built by *Cyclosa confusa* may not function to improve foraging or concealing

I-Chia Chou and I-Min Tso
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In some orb-weaving spiders, in addition to regular components of web they also construct extra structure known as decorations on web. Besides silk, decorations built by many species of the genus *Cyclosa* are composed of debris, leaf and egg sacs. So far, there is no direct test of the functions of these debris decorations built by *Cyclosa* spiders. Although direct support is lacking, debris decorations are traditionally believed to function as a camouflaging device. In this study, we test this hypothesis by comparing the mortality of *C. confusa* with or without detritus decorations on their webs. Besides, prey remains deposited on the webs of the social spiders *Mallos gregalis* had been shown to be capable of attracting prey insects to spider webs. Therefore in this study we also examined if *C. confusa* webs decorated with prey remains intercept more prey than undecorated ones. Two field studies were conducted in a tropical forest in Orchid Island, Taiwan in February and April, 2002. Results from both field trips showed that no significant difference was found in prey interception rates between experimental group (decoration removed) and control group (decoration remained). Similarly no significant difference was found in mortality rates between experimental and control groups in our February study. However, results of our April study indicated that *C. confusa* with decorations suffered significantly higher mortality than those where decorations were experimentally removed. These results suggest that detritus decorations of *C. confusa* do not seem to function to increase insect catching or to decrease mortality rate. Instead, detritus decoration may even be a cost to *C. confusa* by increasing the mortality rate. Why *C. confusa* consistently build decorations on their webs given the cost of increasing mortality rate awaits future study.

An Inventory of the Spiders of the Great Smoky Mountains National Park

Frederick Coyle
Western Carolina University

The key objectives of this project are to determine what spider species live in the Great Smoky Mountains National Park (GSMNP) and how they are distributed among the park's habitats. The primary sampling protocol involves a team of collectors using four standardized methods that sample spiders in most microhabitats and vegetation strata. This protocol yields large and statistically tractable replicate data sets that reflect the relative abundance of species in the sites and habitats studied and will facilitate comparisons of species richness, taxonomic composition, and guild structure among diverse communities and regions. We have collected 2010 1-hr ground, aerial, beat, and sweep samples, and 450 1 m sq. litter samples, containing an estimated 52,000 adult spiders from 17 intensively sampled focal sites representing 16 of the park's major habitats and from accessory sites representing additional habitats. Eighty percent of these adult spiders have been sorted to morphospecies, 40% have been identified, and 20% have been entered into a Biota database. The identified spiders comprise 482 species, 36 of which appear to be undescribed. Products of this inventory will include a Biota database available on the internet, a monographic guide to GSMNP spiders (in CD or DVD format), and a pocket guide for park visitors. Published papers based on inventory data describe the spider assemblage structure at selected sites, evaluate the effectiveness of species richness estimators, and describe the habitat distribution patterns, life cycles, and behaviors of species of *Araneus*, *Tetragnatha*, *Neriene*, *Theridion*, and *Pirata*.

The Effects of Altered Precipitation on Leaf Litter Spider Communities

Kenneth Cramer
Monmouth College

At Oak Ridge National Labs in Tennessee, a long-term manipulative experiment was initiated in 1993 to study the potential impacts of precipitation change due to global warming in a temperate deciduous forest. The Throughfall Displacement Experiment (TDE) diverts 33% of ambient rainfall from one

80x80m plot to another. I evaluated the impacts of the TDE on spider abundance and species richness and composition. Samples of leaf litter from 0.2m^2 circular plots taken in August and November from the wet, ambient (control), and dry plots were hand sorted for spiders. Leaf mass (as an estimate of leaf volume and habitat area) had a significant positive correlation with spider abundance, more so of selected taxa, especially *Dictyna*. Total spider abundance was unchanged across treatments, although leaf mass was significantly greater in the dry plots. Changes in species richness were minimal, yet rare species may have been adversely affected by moisture changes. Species composition, however, was affected by the treatments (as well as by slope and season), and certain species showed distinct habitat associations correlating with treatment or slope of the experimental plots.

Cryptic Vicariance in *Homalonychus* (Araneae, Homalonychidae)

Sarah Crews and Marshal Hedin
San Diego State University

When a vicariant event has occurred in the past, but is not readily detectable by analysis of morphology alone (i.e., two or more morphological groups are not apparent), this vicariance is said to be cryptic. Detection of cryptic vicariance is important for studies of conservation and biodiversity, as well as for elucidating biogeographic histories. Cryptic vicariance has been shown to occur in numerous vertebrate taxa distributed on the Baja Peninsula, where molecular analyses reveal deep phylogenetic splits in morphologically homogeneous taxa. Here we report the first evidence of cryptic vicariance in Baja for an invertebrate group, the spider family Homalonychidae. Using mtDNA data we have detected a deep molecular split between northern and southern populations of *Homalonychus theologus* on the Baja Peninsula. Roth (1984) made no mention of genitalic variation within *H. theologus*, although he highlighted considerable variation in the congeneric *H. selenopoides*. This north – south split may correspond to a mid-peninsular seaway that existed around 1.6 mya.

Spider Genera of North America Revision Project

Paula Cushing
Denver Museum of Nature & Science

In September 2001, a team of taxonomists and interested arachnologists proposed to the American Arachnological Society Executive Committee that the Spider Genera of North America guide by Vince Roth be revised. The Spider Genera of North America Revision Team, or SGNART, consists of Paula Cushing, Darrell Ubick, Suzanne Ubick, Don Buckle, Mike Draney, Nadine Dupérré, Jack Kaspar, Pierre Paquin, Dave Richman, and Barbara Roth. The SGNART proposes to have the revision completed by the end of 2004. This poster serves both as an overview of the revision project as well as a solicitation for assistance from interested taxonomists who wish to assist in this revision. Taxonomists who contribute a major revision of a particular taxonomic group will receive chapter authorship.

Semi-heavy Metal: Calcium, Manganese and Zinc in the Oral Cuticle of the Tarantula, *Stichoplastus sanguiniceps* (Araneae: Theraphosidae)

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It has been known since 1989 that some spider sclerotized cuticle contains high concentrations of manganese (Mn) in the tarsal claws, and zinc (Zn) in the fangs. I examined the molted exoskeleton of *Stiphoplastus sanguiniceps*, a small Trinidadian tarantula for the presence of divalent metals. The specimens were collected after molting and frozen at -4 ^{o}C until use. Cuticle areas of interest were removed and mounted on aluminum stubs with silver paint. After drying specimens were sputter coated with 10 nm of gold or gold-palladium alloy. A Leo 1550 field emission scanning electron microscope (SEM) equipped with an EDAX energy dispersive x-ray spectroscopy system was used to provide topographical and compositional information about the specimens. Both individual x-ray spectra and compositional maps were taken from the different areas of the chelicerae and fangs. As expected the fangs' surface contained significant levels of Zn. The surface of the cheliceral teeth contained elevated levels of Mn. Non-cheliceral tooth regions of the chelicerae did not contain elevated levels of any metals. An unexpected finding was the presence of high levels of calcium (Ca) in the non-surficial fang cuticle. High levels of Ca are unusual in terrestrial arthropod cuticle, except for isopods and millipedes. Mn and Zn also occur in hymenopterous cuticle where they have been intensively investigated. Supposedly they confer toughness on cuticle containing them, but the mechanism for this is still unknown. Future work will examine the distribution of these elements in oral cuticle within different spider taxa, and look at non-molted as well as molted exoskeleton.

Evolution of spermathecal structures within the spider family Tetragnathidae

Anne Danielson-Francois
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The study of arachnid genitalic structures is useful from the perspectives of systematics and sexual selection. Spider genitalia have been used as a taxonomic tool for distinguishing between taxa and by evolutionary biologists to test mechanisms of sexual selection by which the variation could evolve, ranging from Fisherian run-away selection, chase-away selection, and sperm competition. While many species have been dissected at a gross level, few detailed studies exist that examine female spermathecal ducts, spermathecal accessory glands and their gland pores. Hypotheses have been proposed to explain both male behavior and the outcome of sperm competition based on the number and location of spermathecal ducts alone. Far less attention has been paid to the spider spermathecal gland pores, which penetrate the cuticular wall of the spermathecae, allowing glandular secretions to pass into the lumen of the spermathecae. The spider family Tetragnathidae has particularly variable spermathecal morphologies, ranging from entelegyne to haplogyne genitalic characters. Sixteen representative members of this family and five outgroup taxa were examined with scanning and transmission electron microscopy in order to describe the fine structure of spermathecae, including the distribution and density of spermathecal gland pores. The function(s) of the glandular secretion are unknown. The distribution and density of spermathecal gland pores is discussed with regard to possible functions of the glandular secretion. The potential influence of spermathecal gland secretions on mating behavior and sperm competition is discussed.

Inventory of linyphiids from burned and unburned oak woodland/savanna habitats in Chicago, Cook Co., Illinois

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Swallow Cliff is a mature remnant oak woodland/savanna complex; Open woodlands such as these are highly endangered globally by development and invasive vegetation. Ground spiders were sampled biweekly during growing seasons of four years (1996-1999) at four sites using pitfall traps as well as Berlese-extracted leaf-litter samples, flight-intercept traps, and carrion-baited pitfall traps. This yielded 14,166 adult spiders in 159 species and 21 families. Linyphiidae was the 2nd most abundant family (19.0% of total adults) after Thomisidae (42.7%), but was by far the most diverse family with 52 species (32.7%) in 22 genera; Salticidae was 2nd with 14 species (8.9%). This includes 20 linyphiids new to Illinois, and one species (*Walckenaeria palustris*) found for the first time within the United States. The assemblage is composed of species characteristic of both field as well as forest communities. All the species are broadly distributed across the northern and/or eastern portions of North America and can be considered part of the generalized Great Lakes fauna rather than prairie biome habitat specialists. The herbaceous component of two of the sites was experimentally burned prior to the 1999 sampling. Six of nine abundant species (n > 30) increased or decreased their proportional representation by over 50% during the post-burn year at the burned sites, compared with four of eight species during the same period at the unburned sites. Thus, although the linyphiid fauna of the burned sites changed more dynamically, some of the observed change is apparently due to normal year-to-year variation.

The Present Status and a Review of the Brown Recluse and Related Spiders, *Loxosceles* spp. (Araneae: Sicariidae), in Florida

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Florida State Collection of Arthropods, Gainesville

Spiders of the genus *Loxosceles* have only been collected in 8 of the 67 counties in Florida. The native brown recluse spider, *L. reclusa* Gertsch and Mulaik, has been found in Alachua, Bay, Duval, Jefferson, and Leon counties, all in the northern part of the state. The introduced Mediterranean recluse, *L. rufescens* (Dufour), has been found in Orange, Osceola, and Dade counties, in the central and southern areas of the state. All records have

been interceptions of single specimens or of established populations in one or two buildings. There is no evidence of a widespread population of recluse spiders in Florida, nor is there any evidence that there are frequent interactions between recluse spiders and humans in the state. Despite hundreds of diagnoses by medical personnel of brown recluse spider bite in Florida every year, there has been only one instance where an alleged bite was accompanied by an actual specimen of a brown recluse spider. Doctors should be aware of multiple other causes of apparent pre-necrotic and necrotic wounds, and only suspect spider bite as a last resort in regions where recluse spiders are not endemic.

Litter and ground surface dwelling spiders of mixed mesophytic forests in southeast Louisiana

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Louisiana State University

Mixed mesophytic hardwood forests are composed predominantly of magnolia, holly, and beech with a mixture of other tree species, such as oak and hickory, and a distinct understory. Remnants of mixed mesophytic hardwood forests in the southern United States are important refugia for disjunct and habitat-restricted species. In Louisiana, mixed mesophytic forest habitat is found mostly in West Feliciana Parish. I chose two sites to conduct a study of spider diversity in litter habitats of disturbed and mature mixed mesophytic forests. Berlese sampling was used to collect 10-kg samples of forest litter twice monthly from both sites. Collections were made from October 1998 to October 1999. I collected 1725 adult specimens representing 89 species in 14 families. At the mature forest site (Tunica Hills WMA) I collected 909 adult specimens, 58 species in 12 families. At the disturbed forest site (Feliciana Preserve) I collected 816 adult specimens, 73 species in 12 families. Species accumulation and richness estimators indicated the likelihood that additional species were present but not collected during the sampling period. The disturbed site had significantly greater species diversity and more uncommon species, perhaps because of a wider variety of microhabitats and presence of tourist and colonizer species. The mature forest site was less diverse, perhaps as a result of more stable and homogeneous habitat. Multiple disjunct species with northern affinities were found. Additionally, twelve species that had not been previously reported in Louisiana were discovered.

New data on "*Euscorpius carpathicus*" species complex (Scorpiones: Euscorpiidae) from Italy, Malta, and Greece: evidence from mitochondrial DNA and morphology

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The first mitochondrial DNA phylogeny (based on 16 unique haplotypes) is presented for a number of scorpion populations from Italy, Malta, and Greece, previously classified under a "catch-all" name of *Euscorpius carpathicus* (L., 1767) (Fet & Sissom, 2000). The comparative analysis of mitochondrial gene for 16S (large subunit) ribosomal RNA suggests that at least two clearly separated lineages are present. However, neither of these belongs to *E. carpathicus* (L.) in strict sense (which is limited to Romania; Fet & Soleglad, 2002). The first, "western" lineage, found in northern and central Italy (also present in southern France, Slovenia, Croatia, and Austria) is identified as *E. tergestinus* (C.L. Koch, 1837) according to Fet & Soleglad (2002). Here, we identify another monophyletic, "southern" lineage as *E. sicanus* (C.L. Koch, 1837), originally described from Sicily; it includes as new synonyms the following seven subspecies: *E. carpathicus canestrinii* (Fanzago, 1872) and six subspecies described by Caporiacco (1950): *E. c. calabriae, E. c. ilvanus, E. c. garganicus, E. c. argentarii, E. c. palmarolae,* and *E.c. linosae.* Morphology also confirms the existence of two lineages; of those *E. sicanus* is characterized by unique trichobothrial pattern and number where series *eb* (and in some populations, also series *eba*) have 5 trichobothria (instead of always 4 in *E. tergestinus*). The *E. sicanus* lineage is found in southern Italy (with Sicily and Sardinia), Malta, northern Africa (Tunisia, Libya), Madeira, and southern Greece. The enigmatic "*E. mesotrichus*" (Kinzelbach, 1975) from Greece (Thessaly) belongs to this species.

Sexual selection favors large body size during opportunistic mating in male *Argiope aurantia*

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During their quest to maximize fertilization success, male *Argiope aurantia* may face a cannibalistic attack by the female. However, males are protandrous and are often observed cohabiting with penultimate females, with usually more than one male present per web. While the female undergoes her molt to maturity, males try to copulate with the then defenseless female, which is known as opportunistic mating. Here, we investigate the fitness consequences for males resulting from the ensuing competitive interactions among them. In order to estimate male mating success we caged those males that were found with penultimate females close to molt with their respective females. We measured male prosoma width and patella-tibia length of the first leg pair. Pedipalps of males were checked for signs of insertion before and after caging, and we performed three scan samples per day. A trial was over once the female had molted. Both prosoma width and leg length were positively and significantly associated with mating success, but not independent of each other. This suggests a general pattern of selection for large size, and this was independent of number of males present per female. Further, position of a male at the last scan before the female's molt was an important predictor of mating success, but this was unrelated to male size. We put these findings into context by evaluating the relative occurrence of opportunistic mating and conclude that selection for large male size is important in this species, despite the fact that males are much smaller than females.

Polynesian voyagers: phylogenetic relationships among Hawaiian crab spiders (Araneae: Thomisidae)

Jessica Garb and Rosemarie Gillespie
University California-Berkeley

Spiders of the family Thomisidae are characterized as ambush predators that employ color mimicry of plants to capture prey. The twenty described species of Hawaiian thomisids exhibit a diversity of plant host affiliations and host-specific cryptic coloration. This diversity led previous systematists to place the Hawaiian species into several different genera, suggesting that they descended from several independent colonization events to the archipelago. Recently, all Hawaiian species were hypothesized to comprise a monophyletic group having undergone dramatic morphological diversification subsequent to colonization. This hypothesis is tested with a phylogenetic analysis of molecular sequence data. Specifically, a 525 bp region of the nuclear gene elongation factor 1-a , containing two exons separated by a 168 bp intron, was sequenced from Hawaiian representatives as well as closely related taxa from North and South America, Africa, and several islands of French Polynesia. We compare the resulting phylogenetic hypothesis with another generated from previously collected mitochondrial sequence data, and determine the combinability of the two data sets for a total evidence analysis. The resulting hypothesis is used to assess levels of speciation following initial colonization and whether specific colorations exhibited among the species have repeatedly evolved.

Spiders on the Storm: Adaptive Radiation on Pacific Archipelagos

Rosemary Gillespie
University of California, Berkeley

Adaptive radiation involves the diversification of species to exploit different ecological roles, with related adaptations. It is associated with the occupation of new environments that are sufficiently isolated as to allow colonists to diversify by filling multiple ecological roles. How is the diversification achieved? I have been studying spiders in the genus *Tetragnatha* in order to elucidate commonalities underlying patterns of adaptive radiation. In this talk I will first compare three archipelagoes of differing isolation across the Pacific and show that the genus has diversified within each, although the lineages are unrelated to each other. Second, I compare different lineages within the Hawaiian Islands, where the diversification is the most prolific, to determine how species differentiation is occurring within the archipelago. I show that one clade, the spiny-leg clade, has progressed down the island chain, with species on any one island most closely related to others on the same island. Moreover, the same set of ecological forms has evolved repeatedly, filling the ecological space in a similar manner and allowing multiple species to co-occur. However, another clade of spiders, a web-building clade, is ecologically conservative, and has differentiated between geographic areas only, with a single representative of the clade at any one site. The general conclusion is that adaptive radiation has occurred in multiple

lineages of *Tetragnatha* in the Pacific, and has done so independently, with multiple mechanisms underlying diversification.

The systematics of spiders of the *Hadrotarsus*-group (Araneae, Theridiidae)

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Western Australian Museum

The Hadrotarsidae were once considered amongst the rarest and least known of all spider families and, accordingly, have been thought to represent relatives of the Theridiidae, Oonopidae and Tetrablemmidae, amongst others. The discovery that hadrotarsids were simply a highly autapomorphic sub-group of the Theridiidae (Wunderlich, 1978, Forster, Platnick and Coddington 1990) and were placed with genera such as *Euryopis*, *Dipoena*, *Anatea* and *Yoroa* in an expanded Hadrotarsinae. A revision of those hadrotarsine spiders with reniform posterior median eyes – the *Hadrotarsus*-group – has revealed five genera and 27 species (22 of which are new) from Australia and southern New Guinea. The bulk of the diversity lies within just two genera, *Hadrotarsus* and *Gmogala*, which contain 12 and 11 species respectively. Three new genera are recognised, two of which appear to retain at least one plesiomorphic feature, the accessory spermathecae found in other members of the Hadrotarsinae such as *Euryopis* and *Dipoena*. A comprehensive examination of the phylogenetic relationships within the *Hadrotarsus*-group supports the monophyly of each of the five genera, and provides some structuring within *Hadrotarsus* but not within *Gmogala*. Many hadrotarsine species are found to possess wide distributions that are consistent with dispersal mechanisms such as ballooning. Most species are found in the drier woodland regions of Australia, with very few found in rainforests, suggesting a radiation during the late Tertiary following the onset of arid climatic patterns across Australia during the Miocene.

Evolution of Adhesive Mechanisms in Cribellar Spider Prey Capture Thread: Evidence for Van der Waals and Hygroscopic Forces

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Sticky prey capture threads are produced by many members of the spider infraorder Araneomorphae. Cribellar threads are plesiomorphic for this clade, and viscous threads are apomorphic. The outer surface of cribellar thread is formed of thousands of fine, looped fibrils. Basal araneomorphs produce non-noded cribellar fibrils, whereas more derived members produce noded fibrils. Cribellar fibrils snag and hold rough surfaces, but other forces are required to explain their adherence to smooth surfaces. Threads of *Hypochilus pococki* (Hypochilidae) formed of non-noded fibrils held to a smooth plastic surface with the same force under low and high humidities. In contrast, threads of *Hyptiotes cavatus* and *Uloborus glomosus* (Uloboridae) formed of noded fibrils held with greater force to the same surface at intermediate and high humidities. This supports the hypothesis that van der Waals forces allow non-noded cribellar fibrils to adhere to smooth surfaces, whereas noded fibrils, owing to the hydrophilic properties of their nodes, add hygroscopic forces at intermediate and high humidities. Mathematical models of these forces are consistent with the observed stickiness of cribellar thread. Thus, there appear to have been two major events in the evolution of adhesive mechanisms in spider prey capture thread: the addition of hydrophilic nodes to the fibrils of cribellar threads and the replacement of cribellar fibrils by viscous material and glycoprotein glue.

Genealogical Exclusivity in Geographically Proximate Populations of *Hypochilus thorelli* Marx (Araneae, Hypochilidae) on the Cumberland Plateau of North America

Marshal Hedin and Dustin Wood
San Diego State University

The issue of sampling sufficiency is too infrequently explored in phylogeographical analysis, despite both theoretical work and analytical methods that stress the importance of sampling effort. Regarding the evolutionary pattern of reciprocal monophyly, both the probability of recovering this pattern, and the possible inferences derived from this pattern, are highly contingent upon the density and geographic scale of sampling. Here we present an empirical example that relates directly to this issue. We analyze genetic structure in the southern Appalachian spider species *Hypochilus thorelli*, using an average sample of five mtDNA sequences per location for 19 locations. All sampled sites are reciprocally monophyletic for mtDNA variation, even when separated by geographic distances as little as five kilometers. For populations separated by greater geographic distances of 20-50 kilometers, mtDNA sequences are not only exclusive, but are also highly divergent (uncorrected *p*-distances exceeding five percent). Although these extreme genealogical patterns are most seemingly consistent with a complete isolation model, both a coalescent method (Slatkin 1989) and nested cladistic analysis (Templeton et al. 1995) suggest that other restricted, but non-zero, gene flow models may also apply. *Hypochilus thorelli* appears to have maintained morphological cohesion despite this limited female-based gene flow, suggesting a pattern of stasis similar to that observed at higher taxonomic levels in *Hypochilus*.

Use of a micro-engineered chemical delivery device to evaluate scorpion peg sensillum response to organic stimulants

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University of Oklahoma

Scorpions are nocturnal animals with a rich array of finely tuned sensory structures. In particular, mid-ventral appendages called pectines are complex chemosensory organs that are used in the detection of food and mates. Previous electrophysiological studies have shown that the sensory elements on pectines (thousands of minute peg-shaped sensilla) are sensitive to a variety of volatile organic compounds. However, the stimulus delivery mechanism used in these studies was imprecise, making it difficult to compare response patterns among peg sensilla. We have engineered a new device to allow chemical stimulants to be more precisely delivered to a small group of pegs. We tested the efficacy of the engineered device and its dynamics by designing a series of stimulations using 1-hexanol and mineral oil as the control chemical. Peg sensilla on the pectines of *Paruroctonus utahensis* and *Paruroctonus mesaensis* were recorded extracellularly while being stimulated to record the elicited response pattern. We have completed preliminary testing of the delivery device, including optimal duration of stimulus pulse and the best size for the nozzle bore. This device will be used to investigate a basic question of pectine functionality: do all peg sensilla respond with the same pattern of neural activity or are there distinct inter-peg differences? The latter would suggest a segmentation of chemical information at the level of the peg, similar to the olfactory epithelium of mammals.

Sosippus, revisited

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Hiram College

The vast majority of lycosids are vagrant hunters, either lying in wait for prey or wandering in search of prey. A few species are sedentary, building more-or-less permanent burrows from which they ambush passing prey. Only species in the subfamily Hippasinae build webs. These spiders are thought to possess the most primitive morphological features of the Lycosidae, indicating that they may represent an ancestral lineage. The genus *Sosippus* builds prey capture webs that exhibit a remarkable resemblance to the funnel-webs of agelenids. The geographic distribution of the 10 described *Sosippus* species ranges from the southern United States, through Mexico and Central America to Costa Rica. One species, *Sosippus placidus*, has a very restricted distribution, having been collected primarily at Archbold Biological Station (ABS) and from a few scrub remnants near Lake Placid, Florida. *Sosippus floridanus* is sympatric with *S. placidus*, but is distributed across the entire Florida peninsula. We compared the habitat use of these sympatric species at ABS and found that the widespread *S. floridanus* uses disturbed habitats such as pastures and roadsides, while *S. placidus* is associated with vegetation specific to scrub. We also describe extended maternal care in which offspring remain in the mother's web past their first molt and feed communally off of prey captured by the mother. This subsocial behavior was observed in *S. floridanus*, *S. placidus*, and *S. janus*.

Field observations of the relationships between ecological variables and orb web decorations

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Many species of orb weaver add conspicuous tufts or bands of silk to their webs. Despite a fair amount of theory and some

recent testing, the ecological functions of these decorations remain largely debatable. It is likely that the functions vary considerably across individuals, species, and ecological circumstances. With this in mind, a multivariate correlational approach was taken in an attempt to discern which ecological and behavioral variables may be worthy of further study. Field measurements were taken on adult female *Argiope aurantia, Argiope florida, Argiope argentata, Gasteracantha cancriformis*, and *Nephila clavipes*. The size of the spider was measured, along with its responsiveness to a 100-Hz tuning fork applied to the web. Web size, height, compass orientation, and angle off vertical were measured, along with the number of *Argyrodes*, conspecific males, and wrapped prey items present. In *Argiope*, web decorations were measured by quantifying the geometry of the stabilimentum; specifically, stabilimenta were measured by counting the number of arms, the length of each arm, the angle between arms, and the number of interradial silk crossings. In *Gasteracantha*, the number of silk tufts was counted and whether they were on radii or frame threads was noted. Many of these variables have never been quantified in the field, so the results provide some baseline natural history data for these species. The relationships between web characteristics and ecological factors provide some limited support for a visual signaling role of these decorations.

The systematics of nephiline spiders (Araneae, Tetragnathidae)

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Simon's argiopid subfamily Nephilinae consisted of the genera *Singotypa*, *Phonognatha*, *Deliochus*, *Nephila* (*Nephilengys* included), *Clitaetra*, and *Herennia*. Later, *Singafrotypa* and *Perilla* were included in nephilines, and *Singotypa* was synonymized with *Phonognatha*. Most earlier authors placed Nephilinae within Araneidae, and recent authors moved it to Tetragnathidae. Hormiga et al. (1995) analyzed a sample of 14 tetragnathid genera, including five nephiline genera. The results supported the mono-phyly of Tetragnathidae and a clade Nephilinae (*Phonognatha* (*Clitaetra* (*Nephila* (*Herennia* + *Nephilengys*))) being sister to all other tetragnathids. No phylogenetic placement has been hypothesized for *Singafrotypa*, *Perilla* and *Deliochus*. This project focuses on a taxonomic revision and systematics of all nephiline spiders. A preliminary phylogenetic analysis of the latest morphological and behavioral data matrix corroborates the monophyly of the following nephiline genera: ((*Deliochus* + *Phonognatha*) + (*Clitaetra* (*Nephila* (*Nephilengys* + *Herennia*)))). However, the support for this nephiline clade is weak. This analysis supports the recent transfer of *Singafrotypa* and *Perilla* to the araneid subfamily Araneinae. It does not, however, corroborate the placement of nephilines with tetragnathids. Instead, nephilines are here sister to Araneidae. The implication of the single most parsimonious cladogram is that nephilines are either an araneid subfamily, or alternatively deserve a family status, which conflicts with all recent phylogenetic treatments of araneoids. However, the data matrix is not complete, and most basal araneoid clades are weakly supported in this phylogeny. Eliminating the missing entries, and increasing the number of taxa, will provide a stronger test of the composition and phylogenetic affinities of Nephilinae.

Evidence for Interspecific Gene Flow in the *Habronattus amicus* Species Complex (Araneae, Salticidae)

Michael Lowder and Marshal Hedin
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Gene flow across species boundaries has rarely been documented in spiders, perhaps because the phenomenon is rare, but also because such processes are difficult to detect in nature. Here we present evidence for interspecific gene flow occurring between *H. amicus* (Peckham & Peckham) and *H. cf. signatus*, both members of the *Habronattus amicus* species group. These species are distributed in the western US, where they almost always occur in allopatry. However, we have recently discovered multiple lake basins in the upper Great Basin (southeastern OR, northeastern CA, and western NV) where these species are found together on pluvial sand dunes. Multiple lines of molecular evidence suggest that interspecific gene flow is occurring at some of these sites, perhaps in a unidirectional manner (i.e., *H. amicus* genes are found in *H. cf. signatus*, but the reverse is not true). This gene flow is taking place despite obvious morphological and size differences between the taxa, and despite preliminary evidence for fine-scale microhabitat differences. These findings provide novel insights into processes of speciation and character evolution in these jumping spiders.

Population divergence under sexual selection in *Habronattus pugillis* (Salticidae)

Wayne Maddison [1], Eileen Hebets [1] and Susan Masta [2]
[1] University of Arizona, [2] San Francisco State University

Montane populations of *Habronattus pugillis* Griswold in southern Arizona, isolated by intervening desert, show many fixed differences in male courtship characters (ornamentation and behavior). A gene genealogy for mitochondrial DNA was reconstructed, and showed partial but not complete differentiation among the mountain ranges. The shared retention of some polymorphisms in mitochondrial genes contrasts against the fixation of differences in the courtship characters, which are presumably under control of nuclear genes. This contrast is statistically significant and points to the courtship divergence being due to selection, given that under a neutral model nuclear genes would be expected to show considerably more polymorphism than mitochondrial genes. To explore the nature of selection on courtship traits, we studied the reaction of females of two mountain ranges (Santa Rita and Atascosa) to their own males and "foreign" males. These two ranges are strikingly different in male traits: Santa Rita males have a brown and white face, and engage in a slow display with palp circling and leg waving, while Atascoca males have a silver face, and have a vigorous sidling display. Atascosa females showed no strong preference, but Santa Rita females accepted the "foreign" Atascosa males significantly more frequently than their own males. This is consistent with the predictions of a model of sexual selection by antagonistic coevolution (e.g. males exploiting female sensory biases and females evolving resistance) but not with those of a model of Fisherian runaway sexual selection.

Evidence for an ontogenetic shift in retreat structure and placement in the Neotropical tarantula *Ephebopus murninus* (Araneae: Theraphosidae)

Sam Marshall and Rick West
Hiram College

The theraphosid genus *Ephebopus* Simon, 1892, currently contains four Neotropical tarantula species which share several unusual traits: they possesses a field of urticating hairs on the prolateral surface of their pedipalpal femora, they are fossorial members of an arboreal subfamily (the Avicullariinae), and they possess spatulate tarsi and metatarsi, traits usually associated with an arboreal lifestyle. We studied the retreat structure and placement of *Ephebopus murinus* (Walckenaer, 1837) in a forest in French Guiana. We found that early-instar spiderlings construct arboreal retreats in low vegetation, and only shifted to a burrowing lifestyle when well grown. We also studied the placement of the retreats and found that there were no obvious macrohabitat variables that might determine retreat location. We suggest that the fossorial lifestyle of subadult/adult *E. murinus* has evolved secondarily, and that this might explain the burrow architecture, which is unique among New World theraphosids.

Microhabitat preferences of the scorpion, *Centruroides vittatus*

C. Neal McReynolds
Texas A&M International University

Microhabitat use by *Centruroides vittatus* (Scorpiones: Buthidae) includes climbing vegetation. This study is to establish if *C. vittatus* have preferences in the microhabitat selected. The scorpions use of microhabitat did vary significantly at different research sites on the campus of Texas A&M International University in the Tamaulipan Biotic Province. The perennial plants selected by scorpions were compared to the relative abundance of these plant species at the different research sites. The relative abundance of perennial plants varied significantly at different sites with the following species common: blackbrush, *Acacia rigidula*; desert Christmas cactus, *Opuntia leptocauli*; prickly pear cactus, *Opuntia engelmannii*; guajillo, *Acacia berlandieri*; soapbush, *Guaiacum angustifolium*; and leatherstem, *Jatropha dioica*. The plants selected by the scorpions at the different sites were significantly different from the expected frequencies that were based on the relative abundance of plant species. Scorpions did show a preference for some plant species (e.g., blackbrush and strawberry cactus), but their relative abundance did influence the plants selected. Two possible reasons for a microhabitat preference can be higher abundance of prey on some plant species (blackbrush) or as a refuge from predators and high

temperatures during the day (strawberry cactus). Future research will establish the effect of prey abundance and microclimate on the microhabitat preferences of *C. vittatus*.

Representing Behavior: A case study using *Habronattus* courtship

Peter Midford and Wayne Maddison
University of Arizona

Traditionally, the behavioral repertoire of a species was collected and categorized in a descriptive document called an ethogram. An ethogram is a catalog of terms for behavior patterns with descriptions of those patterns. In the past two decades, the field of computer science called knowledge representation has developed several methods for representing everyday knowledge, such as behavior. The best developed of these methods is the construction of machine "ontologies". An ontology contains a hierarchical set of terms or concepts and a set of relations among them. Terms are "defined" by their relationships with other terms. Ontology-based representations of complex behavior may offer several advantages over conventional ethograms. To illustrate the strengths and weaknesses of each method, we constructed both an ethogram and an ontological representation of courtship behavior in the salticid *Habronattus clypeatus*. We then extended the data set to *H. californicus*. We will present both the ethogram and ontology-based representation of courtship behavior for each species.

Systematics of Neotropical Erigonine Spiders (Araneae: Linyphiidae, Erigoninae): Are We Making Progress?

Jeremy Miller and Gustavo Hormiga
The Smithsonian Institution and George Washington University

We present a new hypothesis of relationships among erigonine spiders based mainly on morphological characters. We have added taxa and characters to a previous analysis of erigonine relationships by Hormiga (2000). Hormiga encoded 43 taxa including 31 erigonines for 73 characters. We have added 37 erigonine taxa to this matrix. All 80 taxa are coded for 162 informative characters. Most of the characters in Hormiga's analysis are included, sometimes in modified form. Nearly all of the taxa added for the current analysis represent Neotropical genera. We evaluate progress in our effort to understand erigonine phylogeny by studying the impact of new taxa and characters on the relationships hypothesized in the original study. To approach this, we prune all new taxa from the new analysis and identify groups with identical composition in both Hormiga's (2000) original cladogram and the pruned tree based on new characters and taxa. We also reanalyze the original set of taxa using the expanded set of characters. Finally, we use a new method, Continuous Jackknife Function analysis (Miller, in prep.) to assess our progress toward a stable phylogenetic hypothesis. Continuous Jackknife Function analysis uses character removal and a reference hypothesis to evaluate the stability of the hypothesis under test. The results are presented as a graph of the number of clades recovered after character removal and reanalysis against the percent probability of character removal. Stable phylogenies are expected to take the form of a decreasing asymptotic curve with a high rate of clade recovery.

Identification of Chitin in the Extracellular Matrix of the Duct Region of the Ampullate Glands of *Latrodectus hesperus*

Teresa Bonomini, Jason Newmark, Laurie ONeil & Merri Lynn Casem
California State University, Fullerton

The purpose of this study was to examine the structure and composition of the major and minor ampullate glands in the Black Widow Spider (*Latrodectus hesperus*); specifically, the duct region. We hypothesized that the duct did not contain chitin. The presence of chitin was determined using calcofluor, a chitin-specific dye. Findings were not consistent with our hypothesis; fluorescent microscopy revealed the presence of chitin in the duct region of 80% of the specimens analyzed.

A Comparative Study of Landscape Influences on Spider Migration into Homes

Carol O'Meara
Denver Museum of Nature & Science/CSU

During 1999 and 2000, sixty percent of the clients complaining to Colorado State University Cooperative Extension in Boulder County about spiders in their homes claimed that their homes were infested with more spiders than their neighbors living next door. The aim of this study is to determine whether the complexity of landscaping around a home decreases or increases the number of spiders entering the house. To study this, a two-year survey of homes with simple and complex landscapes is being conducted. Urban homeowners make decisions about the extent and type of landscaping they plant around a house and this variation in landscape structure may influence spider migration into homes on a house to house basis. This study includes 20 houses with 5 glue traps each collected on a monthly basis. Overall, 100 traps per month are collected with a total of 2400 traps over the course of this survey. The sampled homes include 10 homes with simple landscapes and 10 homes with complex landscapes. For the purposes of this survey, simple landscapes are those in which up to 30% of the square footage of the plantable property (not covered by buildings) is in herbaceous or woody plantings. The remainder may be covered by turf, mulch, rock, cement, or exposed soil. Complex landscapes have greater than 60% of the plantable area in herbaceous or woody plantings. Fourteen months of data will be discussed, and there appears to be a correlation between complex landscapes and higher numbers of spiders in homes.

Spiders of Québec (an identification guide)

Pierre Paquin and Nadine Dupérré
San Diego State University

The spider fauna of the province of Québec actually lists 623 species and the occurence of another 147 is suspected (Paquin *et al.* 2001). We are here presenting a monograph that will be a major tool for the identification of spiders species of Eastern North America. It includes illustrated keys to families and genera (except Linyphiidae) and genitalias of all species are fully illustrated. We have used comparable angles within each genera to allow an easier recognition of diagnostic characters. The book contains 180 plates (4 species each) presented in a 8.5 x 11 format with a spiral binding to facilitate handling in the lab. Samples of key and plates are given.

Spatial and Temporal Distribution of Sympatric Species of *Agelenopsis* and *Barronopsis*

Marius Pfeiffer
University of Texas at Arlington

Much work has been done to determine the importance of interspecific competition in moderation of population and distribution of numerous species. Within arachnida recent results have suggested that interspecific competition is not a major ecological force. Additional investigation of natural systems, both passive and manipulative is required for clarification of ambiguities. A two year survey study was undertaken to determine spatial and temporal distribution of sympatric populations of the genera *Agelenopsis* and *Barronopsis* along a road boundary in a riparian habitat. The objective of the study was to determine, indirectly, if the potential for interspecific competition exists between ecologically similar members of closely related genera. Significant overlap of spatial, temporal or substrate use characteristics is considered as suggestive of competitive potential. Significant partitioning of any of these characteristics is considered as indirect evidence for avoidance of competition (Ghost of Competition Past). Ten 5x20m quadrats were surveyed three times per year for the first year and for the spring of 2002. Species, size, 3 axis positional data, substrate and activity were noted for all identifiable animals. Results so far suggest temporal segregation of life histories and spatial segregation among species and based on animal size within species.

Systematics of Island and Mainland Populations of *B. californicum* (Araneae, Ctenizidae)

Martin Ramirez and Brian Cashin
Loyola Marymount University

Bothriocyrtum californicum is a large California trapdoor spider. *B. californicum* samples were collected from six mainland sites in Los Angeles, Orange and San Diego Counties, as well as from Santa Catalina and Santa Cruz Islands, and were assayed for variability at 11 allozyme loci. Estimates of genetic variability for *B. californicum* are comparable to those of other non-social spiders. A phylogeny for these populations shows that the Otay Mesa population is basal in the phylogeny and the remaining populations are placed in two monophyletic groups: populations of central/northern Los Angeles Co.; and populations from inland Los Angeles Co. to coastal Orange Co. The fact that most populations fall into these two groups may be

associated with geologic changes that occurred in this region beginning in the Pliocene. During this time the Los Angeles basin was flooded, which coupled with the northward extension of the Sea of Cortez, severely restricted the movement of organisms to and from Baja California at its northern end until the Pleistocene. This San Gorgonio Barrier has been implicated as a historic biogeographic obstacle for the movements of vertebrate taxa and may be the cause of the evolution of northern and southern mainland groups of *B. californicum*.

Basin and Bajada Grassland Spider Communities and the Invasive Grass *Eragrostis lehmanniana* Nees (Poaceae)

David Hu and David Richman
New Mexico State University

Spider grassland communities are diverse and play an important arthropod predator role. Recent invasion by the African grass Lehmann lovegrass (*Eragrostis lehmanniana* Nees) in the Jornada Basin has influenced the grasslands, by displacing and out-competing the native grasses, such as threeawn (spidergrass)(*Aristida* spp.), mesa dropseed (*Sporobolus brevifolius*) and in particular black grama (*Bouteloua eriopoda*). In this study, we compared two different grassland spider communities (basin and bajada) in which *Eragrostis lehmanniana* has established and is increasing in dominance. Three *Eragrostis lehmanniana* treatment levels were selected in each grassland, one of complete dominance, an intermediate level and one of minimal influence. Spiders were collected in hand capture visual surveys and pitfall traps with vegetation associations noted. There were no significant differences found in spider numbers or diversities between *Eragrostis lehmanniana* treatment levels. The bajada grassland yielded a higher diversity and number of spiders than the basin grassland. There were no significant differences in spider numbers between sample seasons, but a higher diversity of genera was found in the spring samples. Comparisons between levels of *Eragrostis lehmanniana* influence as well as between grasslands may provide new insight into spider community dynamics and may reveal some of the underlying associations between desert spiders and desert grass species.

The Recluse Community Project: The project designed with the people in mind

Jamél Sandidge
University of Kansas

The brown recluse spider *Loxosceles reclusa* is implicated in medical emergencies in North America each year, leaving many people with open wounds and unsightly scars (necrotic arachnidism), and an intense fear of spiders (arachnophobia). Presently, there are no reliable diagnostic tests to positively identify brown recluse bites. There is no widely distributed antivenom or medically proven treatment, which presents a serious medical dilemma. Controlling infestations has proven to be difficult, and is thought to be impossible. Despite the large number of medical research articles on the components, activity, and destructiveness of *Loxosceles reclusa* venom, none are devoted directly to exploring the crucial and most essential element of the system -- the spider populations themselves. The Recluse Community Project is a three-year project consisting of four primary areas: public education and awareness, population biology, molecular population genetics, and biological invasion and population monitoring. The immediate and most critical components of this project are to increase our limited knowledge of the behavior, population dynamics and genetics of this clinically significant spider for the benefit of all. These factors may help to reduce the probability of accidental envenomations and associated medical emergencies by providing a clear description of species movements, periods of activity, and patterns of biological invasion. This research is original in that is takes public paranoia, issues of public health and safety, as well as an intense fear of the unknown to solicit public involvement while creating a public fascination for science.

Spiders collected from mangrove forest in Mexico

Francisco Medina and Areli Santos
Universidad Nacional Autónoma de México.

1582 spiders were collected at 4 localities of a mangrove forest during an expedition to Reserva La Encrucijada in the coast of Chiapas state, Mexico, last April. Spiders were directly collected from mangrove roots, foliage and ground where available, within a 3 hour collecting effort replicated at day and night. Theridiidae was the most abundant family among the web-spinning spiders with 495 specimens collected, while among the wandering spiders, Ctenidae was the most abundant family with 147 specimens. In contrast with the latter, comprised only of two genera with one species each, Theridiidae showed greater diversity with 5 genera and about 6 species identified as of yet. Up to now, 18 other families have been identified out of the whole mangrove sample, including Senoculidae, Dictynidae, Lycosidae, Oxyopidae, Scytodidae, Pisauridae, Corinnidae, Tetragnathidae and Deinopidae. This is considerably more numerous compared with 5 families recorded on the scarce information about this type of ecosystem from other mangrove forests around the world (Australia, Singapore and United States). All the families reported on such references are represented here, with the only exception of one Barychelid from Australia, considered restricted to that zone and in danger of extinction. These data are part of a major study on mangrove spiders of the coast of Chiapas, Mexico.

Who preys on the ultimate predator: Life history strategies of the vinegaroon, Mastigoproctus giganteus

Justin Schmidt
Southwestern Biological Institute

Vinegaroons, large generalist ambush predators, are often considered curiosities rather than major factors shaping communities. In some areas they likely are the most important predator in the system, and, importantly, prey on large numbers of other top predators including scorpions, solpugids, and lycosids. Vinegaroons are famous for their defensive capabilities, especially their acid-rich spray. A natural question: if vinegaroons are dominant predators, who preys on them, and what factors are limiting in their life history? To understand the forces shaping the biology of vinegaroons, prey records from hundreds of hours in the field were analyzed and manipulative laboratory tests were conducted. No vinegaroon of any size or instar was ever observed to be preyed upon in the field and no remnants (pedipalp/leg fragments) were discovered. Laboratory investigations suggest adults die in their overwintering cells rather than being predated. Immatures are rarely seen in the field and might be the vulnerable link in the life cycle. Staged encounters revealed that the defenses of even the first instar free-living immatures are only rarely overcome by predators. Predators most able to endure the acid spray of immatures were large adult lycosids, and carabid beetles and tarantulas. However, even with these predators, success was achieved mainly when the attack was such that the defensive spray was avoided. The results suggest that vinegaroon life history is limited by low reproductive potential, abiotic factors, shortage of food, and some predation on first and second instar individuals by a few species of large spiders or insects.

A Glimpse into the Diversity and Endemism of Malagasy Spiders

Diana Silva
California Academy of Sciences

Madagascar is an island in the Indian Ocean separated from Africa since the late Cretaceous, approx. 130 mya. This island, often referred as a "museum of living fossils" for harboring very old phylogenetic lineages, has been the focus of major conservation efforts due to 1) its high levels of endemism for various groups of plants and animals, and 2) the highly threatened status of numerous taxa as a result of deforestation of native habitats and introduced exotic species, among other factors. Through multidisciplinary efforts of various research centers, such as the California Academy of Sciences, a sampling protocol including a wide range of techniques has been designed to document the biodiversity of Madagascar. This report shows the family composition of all spiders recorded from this island after two years of intensive field work, the species richness of the spider communities, and comparisons of the species diversity and distribution patterns of such families as the ctenids (57 spp), gnaphosids (33 spp), lycosids (15 spp), mimetids (12 spp), and sparassids (64 spp). Although available data do not allow comprehensive phylogenetic analyses for most spider families, a cladistic analysis for the Ctenidae suggests that the Malagasy ctenids comprise two lineages; one of them, the viridasines, appear to be the most basal lineage of the family.

A Survey of the terrestrial non-insect macroarthropods of Toft Point Natural Area, Wisconsin

Bruce Snyder and Michael Draney
University of Wisconsin – Green Bay

Toft Point Natural Area is a National Natural Landmark owned and managed by the University of Wisconsin – Green Bay and is located on the Lake Michigan shore of Wisconsin's Door

Peninsula. With twelve different biotic communities on 700 acres, Toft Point is biologically diverse. We attempted a preliminary survey of the terrestrial non-insect macro-arthropods, which include most of the non-aquatic arthropods except insects and mites; specifically, arachnids (spiders and harvestmen), myriapods (centipedes and millipedes), and terrestrial isopods (crustaceans). We sampled on May 2, July 17, and September 22, 2001. One concentrated, spatially integrated litter sample was collected at each of five habitats during each date; these were then Berlese extracted. A timed hand collection was also used, consisting of 0.5 person-hour/site/date, using a combination of techniques, including sweeping herbaceous vegetation, brushing/beating woody vegetation, and hand searching with aspirators within vegetation and at ground level, including turning over rocks and logs.The 35 samples collected covered nine different habitats. Three of the twelve isopod species known in Wisconsin were found at Toft Point. Five families of myriapods were found, including Polyzoniids rarely found in Wisconsin. 91 species of spiders in 17 families were found, including 60 new to Toft Point, 46 new to Door County, and 10 new Wisconsin state records. These include two southern and two western range extensions. The Polyzoniids and eight of the state records were collected by leaf litter extraction, mostly from wetland habitats.

Molecular Phylogenetic Analysis of North American Grass-spiders (Araneae: Agelenidae)

Joseph Spagna and Rosemary Gillespie
U.C. Berkeley

The family Agelenidae (Koch 1837) is large (42 genera, 490 described species) and a number of spiders from this family have been used as models for toxicological and behavioral research. Despite this use, to date little phylogenetic work has been done on these taxa, thus there is little information on the evolutionary context of this research. In the Agelenidae, there are eight genera (*Hololena, Rualena, Calilena, Novalena, Agelenopsis, Barronopsis, Tortolena* and *Melpomene*) endemic to North and Central America. Cladistic analysis of molecular sequence data from mitochondrial (cytochrome oxidase 1 and 16S ribosomal DNA) and nuclear (28S rDNA) genes suggests a monophyletic group confined to the Western U.S. (*Calilena* (*Hololena* (*Novalena* + *Rualena*))), which relates distantly to the more widespread Agelenid genera *Agelenopsis* and *Tegenaria*. Preliminary analysis of distributions of subsets of morphological and behavioral characters suggests that while differences between species within each genus is primarily based on genitalic structure, one of the primary differences between the genera appears to be choice of web-substrate. I am using these patterns of character changes to examine ecological and morphological correlates of diversification on temporal and spatial scales.

Response of male *Centruroides vittatus* to aerial and substrate-borne chemical signals.

Steffany Steinmetz and Douglas Gaffin
University of Oklahoma

From insects to primates, chemical signaling aids in the success of mate location. In this study we investigated the possibility that striped scorpions, *Centruroides vittatus*, use air or ground based chemical cues as a channel of intraspecific communication. A Y-shaped arena was constructed to test scorpions' use of olfactory signals to detect potential mates. A second behavioral choice chamber (similar to that used by previous investigators) was used to test male scorpions' responses to female deposits by direct substrate contact. Male scorpions showed no tendency to move toward females in tests of air-borne chemical transmission. A preliminary test of male response to female deposits suggested some tendency to move to the regions previously occupied by a female. However, subsequent trials showed no bias in male movements relative to potential female deposits. Under the conditions of these laboratory experiments, males did not appear to detect females via air or ground based chemicals. We will repeat this set of experiments during late summer / early fall to test for possible seasonal effects on mate signaling in *C. vittatus*.

Diagnosis and Therapy of *Loxosceles reclusa* (brown recluse spider) bites

W. Van Stoecker[1], Hernan Gomez[2] and Jennifer L. Parks[3]
[1] The Dermatology Center, Rolla, MO, [2]Univ. Michigan, [3] Univ. Missouri-Rolla

Envenomations by North American *Loxosceles* spiders, most commonly represented by the brown recluse spider *L. reclusa*, are frequently misdiagnosed. This presentation reviews clinical aspects of envenomations including the typical symptoms, physical findings, and diagnostic tests. Key therapeutic interventions include the RICE regimen and dapsone if the area of necrosis exceeds 1 cm^2 Emerging diagnostic tests include ELISA tests using either polyclonal or monoclonal antibodies. Which clinical features are most important in making the diagnosis of "necrotic arachnidism?" What variants are possible and which findings are more suggestive of clinically similar diagnoses? Very large ulcers, multiple skin lesions, and early ulceration all lead us to alternate diagnoses. This presentation will include brief clinical descriptions of the foremost confounding diagnoses including envenomations by other arthropods, pyoderma gangrenosum and factitial causes of skin necrosis. We will summarize the approximately 90 documented *Loxosceles* envenomations in North America, a very small number considering the thousands of diagnosis of "spider bites" that are made each year.

Trichobothrial mediation of an escape response: Vertical jumps by *Dolomedes triton* foil frog attacks

Robert B. Suter and Nura Farah
Vassar College

Jumps of fishing spiders (*Dolomedes* sp.) from the water surface have been presumed to be evasive behaviors directed against predators. In an earlier study, we analyzed the jumps of fishing spiders and demonstrated that jump heights and durations were inadequate to provide protection against strikes from below by fish. We report here (1) that attacks from the side by large frogs (Ranidae) are effectively evaded by the vertical jumps of the spiders, (2) that leg-borne trichobothria appear to be the primary sensory mediators of the evasive behavior, and (3) that the kinematics of the air just above the water surface can effectively mask the attack of a frog. In a quasi-natural laboratory setting, spiders frequently (in 25 of 30 trials) made no attempt to evade attacks by bullfrogs and green frogs; but when the spiders did attempt evasion by jumping, they escaped uninjured in 4 of 5 trials. When we measured the responses of intact spiders and spiders with disabled trichobothria to sham attacks by a mechanically propelled, freeze-dried bullfrog, we found that the absence of trichobothrial input nearly obliterated the evasion response. Preliminary results indicate that during attacks in which the spiders make no attempt at evasion, the air movements that signal an attack are probably effectively masked by "noisy" ambient air.

New spiders from California (Araneae: Amaurobiidae)

Darrell Ubick
California Academy of Sciences

Three new species of spiders are described from California. The first is from the southern Sierra foothills in Tulare County and the other two are from the Mojave region: Granite Mountain (sp 2) and a series of localities from Riverside to Imperial counties (sp 3). All three are small cribellate spiders with similar somatic morphologies and appear related because of synapomorphies of the male genitalia, the most striking of which are an unusual retrolateral furrow on the cymbium and a tripartite RTA. It is argued that the species represent two new genera (1 + (2 + 3)) which are most closely related to *Zanomys*. This zanomyine complex is defined on the basis of a shared sexual dimorphism (males with a laterally expanded carapace) and is the likely sister group of the subfamily Coelotinae, whose members have a similar retrolateral furrow on the cymbium. The family placement of this clade is not certain as it shows affinities to both the Amaurobiidae and Agelenidae.

A comparison of the diversity of ground dwelling spiders in old-growth beech-maple with a second-growth forest

Melissa Varrecchia and Maggie Hodge
Hiram College

Beech-maple forests were once widespread throughout Ohio and Indiana, but are now restricted to a few small remnant sites. We report on preliminary findings of a study designed to measure and compare species turn-over rates in a pristine 200-acre beech-maple forest and an adjacent, second growth forest at the J.H. Barrow Field Station in northeast Ohio. Eight pairs of pitfall traps were sampled in each habitat at weekly intervals from May-August 2001. Abundance, familial and generic diversity as well as various phenological patterns will be presented.

The myth of the brown recluse spider: myth-takes, myth-identifications and myth-diagnoses

Richard S. Vetter
University of California - Riverside

The brown recluse spider, *Loxosceles reclusa*, is rarely found outside of its endemic range (southeastern Nebraska to southernmost Ohio, south to Texas and Georgia). Despite the fact that brown recluses are extremely rare in non-endemic areas, the general public and the medical community believe that the spider is common throughout the United States and is the cause of mysterious wounds of unknown etiology. The annual number of medical diagnoses of brown recluse bites in many non-endemic states or regions is tens to hundreds times greater than the historic total of verified brown recluses from the area. In endemic areas, individual homes can be infested annually with more brown recluses than can historically be documented in several American states and often, no one from these Midwestern homes shows evidence of a bite. The myth of the brown recluse is kept alive by medical misdiagnoses, misidentifications of harmless common spiders, hyperbolic news media and erroneous public perception. The danger lies in that because the diagnosis of "brown recluse spider bite" is so readily accepted by both the medical community and their patients in non-endemic areas, these misdiagnoses mask a plethora of medical maladies manifesting in dermatologic eruptions. Although many of these maladies are innocuous with no long-term effects, several conditions (such as Lyme disease, anthrax, necrotizing bacteria, lymphoma, leukemia) can be debilitating or fatal if the ailment is misdiagnosed and remedy is delayed or incorrect.

The distribution of the hobo spider, *Tegenaria agrestis*, in North America

Richard S. Vetter,[1] Alan H. Roe,[2] Robert G. Bennett,[3] Craig R. Baird,[4] Lynn A. Royce,[5] William T. Lanier,[6] Arthur L. Antonelli[7] and Paula E. Cushing[8]
[1] University of California - Riverside, [2] Utah State University, [3] British Columbia Ministry of Forests, [4] University of Idaho, [5] Oregon State University, [6] Montana State University, [7] Washington State University, [8] Denver Museum of Nature and Science

Since the late 1980s, the hobo spider has been implicated in necrotic wounds in the northwestern United States and British Columbia, Canada. Before this, necrotic wounds were blamed on the brown recluse spider even though there were no recluse populations there. The hobo spider is the subject of much hyperbole. Sources of information are publications that are usually regional in scope or are written by non-arachnologists, hence they are subject to misintrepretation and exaggeration. Along with 7 collaborators, I coordinated a study to determine where the hobo spider is found. The current known range is from southern British Columbia to southern Oregon and eastward to central Montana, western Wyoming and northern Utah. All of Washington and Idaho are considered within the range of the hobo spider. Reliable isolated populations are associated with two houses in Colorado. This study also mapped out the distribution of the giant house spider, *Tegenaria duellica* (synonymizations include *T. saeva* and *T. gigantea*) which is found on the Pacific side of the mountains in British Columbia, Washington and Oregon, is more common than the hobo spider in most human population centers where the two species are found, is considered harmless but is often misidentified as a hobo spider by non-arachnologists.

Observations on courtship, mating, maternal care and subsocial behavior of the East African tarantula *Heterothele villosela* (Araneae: Theraphosidae)

Amanda Weigand, Barbara Vasquez and Sam Marshall
Hiram College

Spider sociality is a rare phenomenon, being observed in less than 0.1% of described species. We studied the reproductive behavior, maternal care, and spiderling social behavior of *Heterothele villosela* Strand, 1907, a small theraphosid in the subfamily Ischnocolinae from East Africa. This genus is phylogenetically enigmatic, having been recently moved between different genera and even families. The current hypothesized placement of this genus places it in a poorly-defined group of small and widely distributed tarantula species. Ours will be the second description of the sociality in *Heterothele*, and one of the few studies of the social behavior any tarantula. We acquired 32 *H. villosela* collected in Tanzania from a commercial importer. The spiders were held in 1.0 liter plastic containers with a bark mulch substratum, a piece of bark for a refuge, and a small water dish. The spiders are fed twice weekly on domestic crickets. The cages were held in a humidified, heated room (27°C and 20% rh) with ambient sunlight for photoperiod. We paired spiders and videotaped the courtship and/or matings. We generated ethograms of the behaviors observed and compared successful to unsuccessful courtships. We also observed the interactions of the females and offspring.

ITS2 rDNA variation of two black widow species, *Latrodectus mactans* and *Latrodectus hesperus*

Daiyuan Zhang, Bill Cook, and Norman Homer
Midwestern State University

The taxonomic status of two closely related species of *Latrodectus*, *L. mactans* and *L. hesperus*, has been debated for many years. Based on morphological characteristics and genitallia, some workers consider them valid species and others as subspecies. The purpose of this project was to determine whether the internal transcribed spacers 2 (ITS2) of rDNA from the two taxa exhibit sequence differences which could shed light on their taxonomic relationship. Individuals of *Latrodectus mactans* and *Latrodectus hesperus* from six populations were collected and identified based on reported morphological characteristics. The ITS2 rDNA of 9 individuals were sequenced and analyzed. Results suggest that: 1) ITS2 sequences in the two taxa exhibit minimal differences. 2) The assignment of the two taxa to seperate species is not supported by ITS2 sequences comparison.

Student Paper Awardees

The Student Paper Competition at the Riverside AAS Meeting produced many fine presentations. The awardees were:

Podium Presentation— First place was **Jeremy Miller** ($100) and the runner up **Michael Lowder** ($50).

Poster Presentation—First place for the poster is was **Joseph Spagna** ($100) and runner up was **Steffany Steinmetz** ($50).

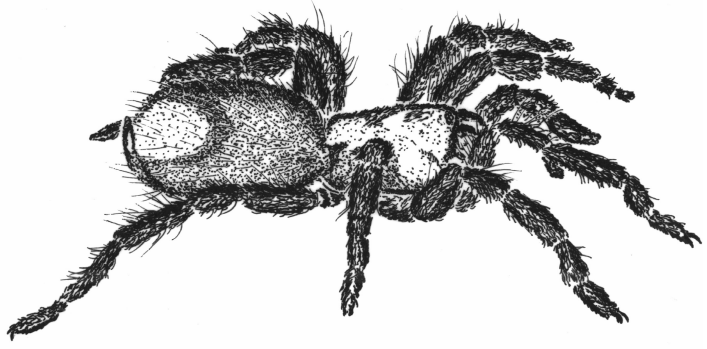
Congratulations to the award recipients, and we look forward to the student presentations in Denver!

2002 A.A.S. Election Results

The AAS members cast their ballots this year for a Director and Secretary. **Rosemary Gillespie** has become the newest AAS Director, and **Alan Cady** continues as Secretary.

Congratulations the candidates and Thanks to the Nominating Committee (Bruce Cutler, Marshal Hedin, and Rich Bradley.

In 2003 we will elect a President-Elect, Treasurer, and Director.



Student Research Awardees 2002

Here are the AAS Student Research awardees for 2002.

Chad Hoefler, Dept. Entomology, Organismic and Evolutionary Biology, University of Mass., Amherst, MA 01003

Jeremy Houser, Neuroscience and Behavior Program, Tobin Hall Box 37710, U. Mass., Amherst, MA 01003-7710

Christina Skow, Neuroscience and Behavior Program, Tobin Hall Box 37710, U. Mass., Amherst, MA 01003-7710

Award winner from the Vince Roth fund:

Sarah Crews, Dept. Biology, Evolutionary Biology Program Area, San Diego State Univ., San Diego CA 92182-4614

2003 A.A.S. Annual Meeting

Denver Museum of Nature & Science

Denver, Colorado

Thursday 24 July – Monday 28 July

Hosted by Dr. Paula E. Cushing

Curator of Entomology & Arachnology

Travel Info: It's best to fly into Denver International Airport; NOT Colorado Springs.Take a hotel shuttle to the Red Lion or we will arrange to pick up those staying in the dorms (if the dorm option comes thru). Drivers will have information sent to them on how to get to their housing site.

Housing: Red Lion Inn ($66/double occupancy including room tax!) Up to 4 per room if they are good friends (only two double beds per room). $15/night extra for cots.

Use of dormitories is being investigated, but definitely have a Red Lion Inn option lined up.

Red Lion Inn offers free evening shuttle service to downtown Denver; daily shuttle service to and from museum will be provided.

Food: Breakfasts at either the dorm (if that option is realized), or at the Red Lion. Lunch: at the museum.ranges from $3 for a sandwich to $7 for a hot meal; Dinner:off site or at the dorm or hotel

Paper & Poster Sessions at the museum

Banquet at the museum -. It will be at the Museum (like in Chicago; please see the following schedule).

Behind-the-scenes tour of arthropod collection

Informal slide presentations

Collecting trips to one or more of: shortgrass prairie site, foothills site, alpine site, fossil arthropod site (Green River).

On Monday the 28th, we will offer a field trip to a great plains site (probably one of the state parks east of the mountains) or a field trip to an alpine site (Guanella Pass).People can sign up for one or the other.

We will also try to schedule one night-time collecting trip to a small park with a diversity of habitats a few miles from the museum.This site has both short grass prairie habitat and riparian habitat.

Spouse/family trips to one or more of: Central City (gambling and mining town tour), operational gold mine, narrow gauge train trip through the mountains, tour of U.S. Mint, tour of Coor's brewery.

We are also trying to plan a two day post-meeting field trip to the Green River fossil sight for anyone who is interested.This trip would leave on Monday the 28th and return either very late on the 29th or early on the 30th.

Tee Shirts: The meeting logo is the same design as the cover of the Colorado Spider Survey Handbook, except that above the spider will be 2003 AAS Meeting and below the spider will be Denver, Colorado.

A mystery tee shirt will be up for sale at the meeting. Don't miss this!

Host contact Information:

Paula E. Cushing, Ph.D., Curator of Entomology & Arachnology, Zoology Depart., Denver Museum of Nature and Science, 2001 Colorado Blvd., Denver, CO 80205-5798, USA; **Phone**:(303)-370-6442; **FAX:**(303)-331-6492; HTTP://WWW.DMNS.ORG/SPIDERS1.HTM

Please note that the e-mail system here is unreliable.If you send me an e-mail to which you expect a reply and do not hear from me within a reasonable period of time, please send a follow-up e-mail to PECushing@juno.com

Tentative Itinerary for 27th American Arachnological Society Annual Meeting

Thursday, 24 July: arrival and registration at an area hotel and/or at a local University

5 p.m. – 7 p.m. Executive Committee meeting

5 p.m. – 9 p.m. social in the Museum

Friday, 25 July:

8:30 a.m. – 10:15 a.m. Paper sessions in Ricketson Auditorium

10:15 a.m. – 10:30 a.m. Catered coffee/pastry break in Ricketson Lobby

10:30 a.m. – 12:30 p.m. Paper sessions in Ricketson Auditorium

12:30 a.m. – 1:30 p.m. Lunch in T-Rex or Deli or off-site

1:30 p.m. – 2:45 p.m. Poster session in Ricketson Lobby

2:45 p.m. – 3:00 p.m. Catered coffee/pastry break also in Ricketson Lobby

3:00 p.m. – 4:30 p.m. Paper sessions in Ricketson Auditorium

Friday evening, off-site activities – probably brew pub visitations down town Denver

Saturday, 26 July:

8:30 a.m. – 10:15 a.m. Paper sessions in Ricketson Auditorium

10:15 a.m. – 10:30 a.m. Catered coffee/pastry break in Ricketson Lobby

10:30 a.m. – 12:30 p.m. Paper sessions in Ricketson Auditorium

12:30 a.m. – 1:30 p.m. Lunch in T-Rex or Deli or off-site

1:30 p.m. – 3:15 p.m. Paper sessions in Ricketson Auditorium

3:15 p.m. – 3:30 p.m. Catered coffee/pastry break in Ricketson Lobby

3:30 p.m. – 4:45 p.m. Paper sessions in Ricketson Auditorium

5:30 p.m. – 7:30 p.m. Catered banquet in Atrium

7:30 p.m. – 9:00 p.m. Evening entertainment (usually a traditional AAS auction to raise money for the society & announcement of student paper/ poster awards)

Sunday, 27 July:

8:30 a.m. – 10:15 a.m. Paper sessions in Ricketson Auditorium

10:15 a.m. – 10:30 a.m. Catered coffee/pastry break in Ricketson Lobby

10:30 a.m. – 12:30 p.m. Remaining Paper session in Ricketson Auditorium

12:30 p.m. – 1:30 p.m. Lunch in T-Rex or Deli or off-site

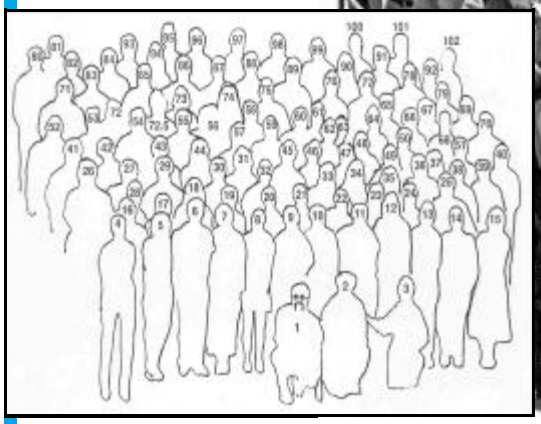
1:30 p.m. – 2:30 p.m. Business Meeting Ricketson Auditorium

2:30 p.m. – 3:30 p.m. Tour of Collections

4:00 p.m. Optional evening picnic/collecting trip to local area (Jefferson Co. open space??)

Or Optional evening slide show in Ricketson Auditorium

Monday, 28 July: 8:00 a.m. All-day field trip into the mountains (alpine) or to great plains site



Key to Official Group Photograph of 2002 AAS Annual Meeting, UC-Riverside, July 1. Vetter, Rick; 2. Medina, Francisco; 3. Rovner, Phyllis; 4. Ubick, Suzanne; 5. Garb, Jessica; 6. Reiskind, Jon; 7. Binford, Greta; 8. Hodge, Maggie; 9. Miller, Pat; 10. Cushing, Paula; 11. Hawthorn, Anya; 12. Danielson-Francois, Anne; 13. Steinmetz, Steffany; 14. Dexter-Mendez, Deborah; 15. Chou, I-Chia; 16. Ubick, Darrell; 17. Silva, Diana; 18. Weigand, Amanda; 19. Sandlin, Nina; 20. Stratton, Gail; 21. Vogel, Beatrice; 22. Bodner, Gita; 23. Kinchloe, April; 24. Berry, Betsy; 25. Marshall, Sam; 26. Craig, Patrick; 27. Coyle, Frederick; 28. Calixjo, Alejandro; 29. Frommer, Saul; 30. Schmidt, Justin; 31. Lawrence, Barbara; 32. Draney, Michael; 33. Kirshner, Shannon; 34. Bost, Karen; 35. O'Meara, Carol; 36. Berry, Jim; 37. Parks, Jennifer; 38. Cangialosi, Karen; 39. Ramirez, Martin; 40. Fernandez Campon, Florencia; 41. Griswold, Charles; 42. Richman, David; 43. Miller, Gary; 44. Casem, Merri; 45. Vincent, Lenny; 46. Hebert, Blaine; 47. Hines, Mujahid; 48. Botham, Crystal; 49. Moore, Anne M. F.; 50. Carter, Steven; 51. Stoecker, William; 52. Justice, Michael; 53. Moore, Gene; 54. Savary, Warren; 55. Johnson, Steve; 56. Zhang, Daiyuan; 57. Maddison, Wayne; 58. Cook, William; 59. Hedin, Marshal; 60. Starrett, James; 61. Boyer, Leslie; 62. Midford, Peter; 63. Crews, Sarah; 64. Lowder, Michael; 65. Cameron, Howard; 66. Bradley, Richard; 67. Bradley, David; 68. Sandidge, Jamel; 69. Spagna, Joseph; 70. Lew, Stephen; 71. Berrian, James; 72. Varrecchia, Melissa; 72.5. Miller,Jeremy; 73. Kempf, Janet; 74. Hamilton, Donna; 75. Mott, Dan; 76. Cady, Alan; 77. Gaffin, Douglas; 78. Cramer, Kenneth; 79. Blackledge, Todd; 80. Cutler, Bruce; 81. Rovner, Jerome; 82. Gillespie, Rosie; 83. Agnarsson, Ingi; 84. Bennett, Bill; 85. Nwadike, Chris; 86. Wu, Ting; 87. Snyder, Bruce; 88. Relys, Vygandas; 89. McReynolds, C. Neal; 90. Prentice, Thomas; 91. Ennik, Franklin; 92. Chen, Kuan-Chou; 93. Foellmer, Matthias; 94. VanGordon, Gail; 95. Harvey, Mark; 96. Brady, Allen; 97. Coddington, Jonathan; 98. Icenogle, Wendell; 99. Opell, Brent; 100. Bush, Sean; 101. Edwards, GB; 102. Kuntner, Matjaz

From **Paula Cushing**:

To U.S. collectors: please consider using the Denver Museum of Nature & Science (approved abbreviation DMNH) as the repository for your specimens, particularly those collected west of the Mississippi in the Rocky Mountain/Great Plains ecoregions. This relatively new repository for arachnids is curated by Paula Cushing. Identified specimens will be databased immediately and the information made electronically available within a year at the following website: HTTP://WWW.DMNS.ORG/SPIDERS/INDEX.HTML

Click on the database tab at this website to view the information made available to users and to view the searchable data fields.

Lou Sorkin writes:

This is an announcement pertaining to the online spider catalog (originally published by The New York Entomological Society in book form). Version 3.0 is up and running so take a test drive for all you spider enthusiasts with taxonomic questions. HTTP://RESEARCH.AMNH.ORG/ENTOMOLOGY/SPIDERS/CATALOG81-87/INDEX.HTML

Sergei Kuzmin announces:

A new book on the spiders Georgia has been printed: Mkheidze T.S. 1992. Spiders of Georgia: Systematics, ecology, geographical overview. Tbilisi, 390 p., 54 b/w pts. (717 pictures), hardbound, includes descriptions of some new species, in Georgian, with a small number of copies printed.

The book was printed in in this Caucasian Republic during the time of political muddling. It is absent in open trade, and it is difficult to buy copies from Georgia. However, we will try to do it. If the books will be available, net price for you will be about $ 65 per copy. Please, indicate your mailing address, where the books may be sent, as well as the number of desired copies.

Jean-Michel Maes (jmmaes@ibw.com.ni) writes:

Dear friends, We are very pleased to present you our web page on insects of Nicaragua. It's completely in Spanish but it could be useful for people who like Neotropical insects. It's inside the Insectarium Virtual website from Spain: WWW.INSECTARIUMVIRTUAL.COM/TERMITERO/NICARAGUA/MEL HOME PAGE.HTM. If it doesn't work directly, you can enter the insectarium virtual web site at : WWW.INSECTARIUMVIRTUAL.COM, then click on the main image to get the main menu, click on the termite nest (termitero) then on Nicaragua.

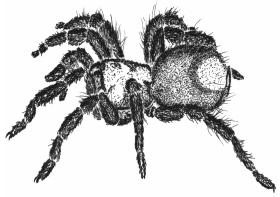
You get a small map of Nicaragua which is the welcome image, click on and get the main menu of our web page. This page is equivalent to 1,500 printed pages. "Fauna de Nicaragua" section includes a full checklist of the 10,000 reported insect and terrestrial arthropod species from Nicaragua. "Documentos de interes" section presents many small documents, useful for education. Also a study on butterflies of Nicaragua and the complete text of "Diversidad Zoologica de Nicaragua".

Peter Jäger writes:

Dear colleagues, herewith the Internet-site of the Springer Verlag, where the book of Prof. Friedrich G. Barth may be ordered. Please note, that the book is written in German and an English edition will be available in October this year! HTTP//WWW.SPRINGER.DE/CGI-BIN/SEARCH_BOOK.PL?ISBN=3-540-67716-X&COOKIE=DONE

Gregoire Ghislain & **P. Leblance** announce:

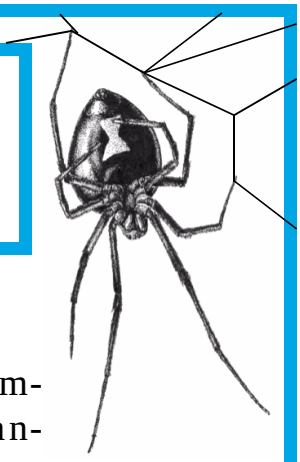
The Museum D'Histoire Naturelle in Troyes (France) spider collection and a list of material is now available. There is type material from Australia, described by Koch (mainly cited Arachniden Australiens' as 'on loan from the Museum Troyes by Dr. Jules Ray). Most (all?) of this material was collected in Brisbane. Email: Pleblanc@m6net.fr



American Arachnology

The Newsletter of the American Arachnological Society

Number 66 February 2003



AMERICAN ARACHNOLGICAL SOCIETY WEBSITE

HTTP://AMERICANARACHNOLOGY.ORG

Ken Prestwich has developed our website where one may find membership information, **Annual Meeting Info & registration**, announcements & Bulletin Board, officers, meeting minutes, instructions to JOA authors, an electronic JOA index, graduate study opportunities, a photo gallery, links to other arachnological sites, and **JOA OnLine** (electronic versions of the Journal of Arachnology; available to A.A.S. Members). Many, many thanks and kudos to Ken for applying his time and skill to the Website!! Thanks too to Holy Cross for sponsoring the site.

ARACHNOLOGY IN CYBERSPACE

Here are some website addresses for arachnological information:

International Society of Arachnology—HTTP://160.111.87.78/ISA/DEFAULT.HTML

Wolf Spiders of Australia (Lycosidae) - HTTP://WWW.ALPHALINK.COM.AU/~FRAMENAU/LYCOSIDAE/INDEX.HTML

JOURNAL OF ARACHNOLOGY ELECTRONIC INDEX

The electronic index for the Journal of Arachnology is available at: **http://vassun.vassar.edu/~celt/suter/spiderform.html**

Note that the main search keywords are:**SCORPION, SPIDER, HARVESTMAN, MITE.** Any word or taxon that is in a title may be found with a search of the Index. Thanks to Bob Suter: **SUTER@VASSAR.EDU** HTTP://FACULTY.VASSAR.EDU/~SUTER/SUTER.HTML

AMERICAN ARACHNOLOGY

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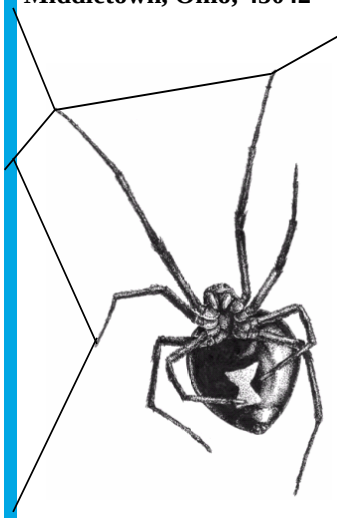

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