

Oral and Poster Presentations

1999 AAS Annual Meeting

Univ. of the West Indies St. Augustine, Trinidad



THERIDIID SYSTEMATICS: A PRELIMINARY MOLECULAR AND MORPHOLOGICAL PHYLOGENETIC ANALYSIS

Ingi Agnarsson, Miquel A. Arnedo, Rosie Gillespie, Jonathan Coddington, & Gustavo Hormiga

The family Theridiidae (cob-web spiders) is one of the largest spider families, comprising over 2000 described species in 73 genera and exhibiting extreme diversity in morphology, ecology and behavior. Theridiids are unique in including many cooperative or quasisocial species, a behavior otherwise very rare in arachnids. Theridiids include some very familiar species, such as the common house spider (*Achaearanea tepidariorum*) and the widow spiders (*Latrodectus* spp.). Despite their relatively high profile, systematic work on the family has so far been limited to the inclusion of a few of its members in family level phylogenetic analyses. We present the first cladistic analysis of a wide selection of theridiid genera based on molecular and morphological data. Apart from presenting a higher level phylogenetic hypothesis of theridiid interrelations, we address questions such as their sister relationship with nesticids, the monophyly and placement of the putative theridiid subfamily Hadrotarsinae, and the evolution of several morphological traits.

CANNIBALISM AS A FACTOR REGULATING POPULATION DENSITY IN THE WOLF SPIDER PARDOSA MILVINA (ARANEAE, LYCOSIDAE)

Robert Balfour, Sean E. Walker & Ann L. Rypstra

Cannibalism has been suggested as a factor that can regulate population density in wolf spiders. We used a series of laboratory and field experiments to determine if cannibalism occurs in *Pardosa milvina* and if it is density dependent. Field collected *Pardosa* were paired in laboratory arenas in order to measure the level of aggression. Cannibalism occurred in only 10% of the trials and we have evidence of injury due to an aggressive interaction in an additional 8%. Levels of aggression were related to size, injuries or cannibalism were more likely with larger weight differences between spiders. In the field, we used replicated enclosures in conventionally tilled soy bean fields to determine if survival is density dependent. 2.25 m² enclosures were stocked with 0.5x, 1x, or 2x the field density of *Pardosa* (~16/m²). After five days, we counted the number of *Pardosa* in each enclosure. Survival was negatively correlated with density. Also, as density increased, the size of the survivors increased indicating that the smaller individuals were missing. These data along with the lab study suggest that cannibalism could play a role in regulating the density of *Pardosa milvina*.

A COMPARISON OF SPIDER FAUNAS OF HENDERSON AND PITCAIRN ISLANDS

J.A. Beatty

The Pitcairn group, including Pitcairn, Henderson, Oeno and Ducie Islands, lies just south of the tropics and east of all the other central and west Pacific island groups. Only two small islands, Easter and Sala-y-Gomez, lie between the Pitcairns and South America. A major recent study of this group (Ed. Benton & Spencer

1995) concentrated primarily on Henderson. Spiders from Henderson Island were first recorded in 1942 by Berland. Additional species reported by Proctor (1991) and Benton & Lehtinen (1995a) bring the current total to 26 species. Pitcairn Island has been largely ignored, only eight species having been reported, three by Berland (1942), three by Marples (1955), and two by Benton and Lehtinen (1995b). A recent collection from Pitcairn made by John Starmer of the University of Guam has been sent to me for examination. This material brings the Pitcairn fauna up to 25 species. The combined list for Henderson and Pitcairn includes 35 species. Almost all of these are widespread Pacific or cosmopolitan species, as expected. The degree of overlap between the two faunas is unexpectedly low, only 16 species, about 46% of the total. Insufficient collecting probably explains this result. The families Oonopidae, Theridiidae and Salticidae were most diverse in the combined fauna, with six species each. Next were the Pholcidae, four species; Scytodidae and Araneidae, three species each; Lycosidae, Clubionidae and Gnaphosidae, two each; and Corinnidae, Thomisidae and Heteropodidae, one each. References: Benton, T. and P. Lehtinen. 1995a. The arachnids of Henderson Island, South Pacific. *Brit. Arach. Soc. Newsletter* 72:10-12. Benton, T. and P. Lehtinen 1995b. Biodiversity and origin of the non-flying terrestrial arthropods of Henderson Island. *Biol. Jour. Linnean Soc.* 56:261-272. Benton, T.G. and T. Spencer, eds. 1995. *The Pitcairn Islands: biogeography, ecology and prehistory.* *Biol Jour. Linnean Soc.* 56:1-422. Berland, L. 1942. Polynesian spiders. *Occ. Papers B.P. Bishop Mus.* 17:1-24. Marples, B.J. 1955. Spiders from some Pacific Islands. *Pacific Science.* 9:69-76. Proctor, D. 1991. Spiders of Henderson Island, a World Heritage site. *Brit. Arach. Soc. Newsl.* 62:6.

A BEHAVIORAL TEST OF THE EFFECT OF SILK COLOR ON VISIBILITY TO INSECTS

Todd A. Blackledge

Primitive spider silk has an ultraviolet (UV) reflective peak, while evolutionarily derived spider silk in Araneid orb webs reflects very low amounts of UV light. This has been interpreted as an adaptation to reduce web visibility to insect prey. However, many orb webs also include stabilimenta which reflect large amounts of UV, like primitive silk, and are suggested to attract prey to otherwise cryptic webs. Insect color vision suggests an alternative hypothesis. Insect eyes are adapted to see highly saturated colors that stimulate only one or two, but not all three, of their UV, blue, and green photoreceptors. Because stabilimentum silk reflects relatively similar amounts of UV, blue, and green light, this hypothesis suggests it is cryptic to insects, regardless of UV intensity and that primitive silk is conspicuous because it reflects relatively more UV than blue or green light. I tested these two hypotheses by comparing the visibility of stabilimentum and primitive tarantula silks, which differ in the reflectance of blue and green but not UV light. Bees were trained to associate either type of silk with sugar rewards and their ability to learn to find silk targets versus unrewarded blank targets was used as a measure of silk visibility. Bees learned to find tarantula silk targets but could not learn to find stabilimentum silk targets, supporting that stabilimentum silk is cryptic and not a prey attractant. Furthermore, it suggests that capture threads of orb webs are not cryptic and are released from selection on color by their thin size.

SHORT TERM FORAGING EFFECTS ON WEB INVESTMENT IN DICTYNA VOLUCRIPES (ARANEAE: DICTYNIDAE)

Todd A. Blackledge

Studying the interrelationship between web architecture and prey capture is critical to understanding the role of spiders as intermediate level predators. I examined how web building and prey capture were linked to the foraging history of *Dictyna volucripes*. Adult, female spiders were divided into two foraging groups and allowed to build webs on artificial trees in the laboratory. Their investment in new silk was monitored through photography over a nine day period. Both increase in web size and prey capture, under standardized

prey density, were proportional to the original web architecture in High Prey spiders but not in Low Prey spiders. Starved spiders may have altered their investment in webs based upon their initial foraging effort because Low Prey spiders with large initial webs had a proportionately smaller increase in web than those with small initial webs.

TESTING ESTIMATES OF SPIDER SPECIES DIVERSITY

Richard A. Bradley

The species diversity at a particular locality or from a particular habitat is an important baseline variable in ecological analysis. The estimation of species diversity has been the subject of many studies and a variety of techniques have been used. The aim of this study was to employ three different previously-applied methods (Chao's, Jackknife, Accumulation-curve) of estimating species richness to data collected during the first three years of the Ohio Spider Survey. Diversity estimates were calculated for two localities (Glen Helen Nature Preserve, Greene County; Seymour Woods Nature Preserve, Delaware County) species-diversity estimate was most satisfactory as an estimate for the current data, but probably underestimates total diversity. The Chao method may approach the total diversity value. The most likely explanation for these results are that even after three years of study, we still have a relatively incomplete picture of spider diversity at either of these sites.

SPIDERS IN THE DRIFT

David Cook, Karen Cangialosi, & and Sharon Jensen

While the phenomenon of stream drift for aquatic insects has been well studied, little is known about the frequency of spiders in the drift or the factors that may prompt it. For spiders that live near streams, entering stream drift may be a favorable alternative to ballooning or walking for long distance dispersal. Also, the stream environment may provide relatively warm microsites which spiders may take advantage of for overwintering. The objective of this initial study (still in progress) was to quantify and identify the spiders found in the stream drift, as well as those on the adjacent stream bank. Future studies will seek to determine whether entry into the drift by spiders is purposeful or merely accidental; and to determine if these spiders use the stream for overwintering. A drift net was placed in each of three sites in streams in southwestern New Hampshire and net contents were collected and recorded twice a week beginning in May 1999. Water depth, water temperature, air temperature and day length were also recorded. In addition, pitfall traps were placed along three, 30m transects adjacent to each stream and contents were collected and recorded once a week. Finally, a visual survey was performed once a week along a 30m transect on the opposite bank of the stream from where pitfall traps were placed. Most of the spiders collected both in the pitfall traps and the drift nets were Agelenids (primarily *Coelotes* spp.). During an initial drift net analysis from October 1998 to March 1999, 0.472 spiders/day were collected from drift nets which was 6 times as many as in the May and June samples (0.08 spiders/day). These preliminary results suggest that since certain spiders enter the drift frequently and late in the year, they may be using the drift for dispersal or overwintering.

CLUBIONIDS AND CORINNIDS AND LIOCRANIDS, OH MY! CORRUGATED CARDBOARD COLLECTING IN THE LAND OF OZ

Bruce Cutler

Waste paper products, such as cardboard and newspaper, are often used by spiders as a resource for retreat

building, egg laying and molting. Similar waste material such as plastics and metals are almost never utilized. As a method for sampling ground and litter active fauna I cut strips of corrugated cardboard about 5 cm by about 20 cm long. The corrugations were semicircles about 0.4 - 0.5 cm in diameter. They were set out in a backyard in Lawrence in northeastern Kansas along fence lines. Sampling was done for a calendar year, but not quantitatively. A total of 754 spiders were collected, 35% were clubionids, of which 92% of these *Clubiona abboti*. Frequently collected families were other dionychous wandering spiders, Corinnidae, Liocranidae and Gnaphosidae. Together with the clubionids these comprised 85% of all spiders collected. Diversity was low, no more than three or four species per family. The exception was the Salticidae, although only 4% of the specimens collected, was represented by at least nine species. This method appears to offer an effective means of collecting certain taxa of the spider fauna. The trap material is inexpensive (free), easy to acquire, and easy to set in the habitat. Within certain limits, different size openings can be had. One could quantitate trapping easily. Spiders either do not enter wet cardboard or abscond when it is soaked, thus during rainy periods the catch is greatly reduced. Collecting is time consuming as each corrugation must be probed individually to release inmates. However, the live spiders collected are available for rearing and behavioral studies. Forgotten traps do not pose an environmental hazard as they continue to provide shelter until they disintegrate. The size specificity (diameter of corrugations) can be an advantage or disadvantage depending on the study.

THE GENERA ANASAITIS AND CORYTHALIA (ARANEAE: SALTICIDAE: EUOPHRYINAE) IN THE CARIBBEAN REGION

G.B. Edwards

The Euophryinae is one of the larger subfamilies of salticids, yet has been poorly studied compared to other groups in the Neotropics. One of the largest genera in this subfamily is *Corythalia* with well over 50 species, an excessively diverse genus of neotropical jumping spiders which has served as a dumping ground for groups of miscellaneous euophryine salticids. One definable group is primarily Caribbean in distribution. Four species of this group from Jamaica were placed in the genus *Anasaitis* by Bryant (1950) [*A. morgani* (Peckham-type species), *A. decoris* Bryant, *A. scintilla* Bryant, *A. venatoria* (Peckham)]. She also noted that *Corythalia locuples* (Simon) from Hispaniola, and *C. signata* (Banks) and *C. gloriae* Petrunkevitch from Puerto Rico, might belong here; I concur. In addition, *C. tristriata* Bryant from Puerto Rico, *C. arcuata* Franganillo, *C. emertoni* Bryant, *C. parvula* (Banks), and *C. squamata* Bryant from Cuba, and *C. canosa* (Walckenaer) from Cuba and southeastern U.S., appear to be *Anasaitis*. Some major differences between the two genera are as follows: *Corythalia* has the embolus a flattened, adpressed spiral, the epigynum has strong atrial rims, and males have at least some legs strongly fringed; *Anasaitis* has the embolus a short, free rod with a trace of an extended spiral, the epigynum lacks strong rims, and the males (with one exception) lack leg fringes. There are some differences in the color pattern as well, although both tend to be well-endowed with colorful, iridescent markings. *Corythalia peckhami* Petrunkevitch from Dominica has an embolus like *Anasaitis* but retains leg fringes, suggesting that it is the most basal member of *Anasaitis*. *Corythalia elegantissima* (Simon) from Hispaniola, which has male leg fringes but unique genitalia, may represent the sister group to *Anasaitis*. A map of the region is presented showing the location of the Caribbean species of each genus. It can be seen that of the island fauna, *Anasaitis* and its nearest relatives are restricted to the southeastern U.S., the Greater Antilles, and the upper Lesser Antilles, whereas true *Corythalia* (which has many continental species ranging from the southwestern U.S. to Brazil) are found only in the lower Lesser Antilles and Trinidad.

ON A NEWLY DISCOVERED RADIATION OF HAWAIIAN LINYPHIID SPIDERS

Gustavo Hormiga

The Hawaiian spiders currently placed in the linyphiid genus *Labulla* represent an undescribed radiation and a genuine case of insular gigantism. Hawaiian "Labulla" have remained unstudied since the superficial description of two species at the turn of the century, thus the majority of these species remain undescribed. All the members of this radiation (10 species are known so far) are single island endemics. Cladistic analysis of morphological and molecular data support the monophyly of Hawaiian "Labulla" and suggests that the members of this radiation are the result of a single colonization event of the Hawaiian archipelago. This clade is not closely related to the type species of *Labulla*; a new genus is required to place these Hawaiian endemics.

ASSESSMENT OF THE PHYLOGENETIC SIGNAL IN EF-1A FOR SPIDER SYSTEMATICS

Kelly C. Kissane, Jeffrey W. Shultz & Jerry Regier

The phylogenetic utility of the nuclear protein-encoding gene EF-1a was analyzed for use in spider systematics. Saturation curves were constructed by plotting pairwise sequence differences vs relative time. Concordance analysis was conducted using the most parsimonious trees derived from our data with the reference tree from Coddington & Levi (1991). Empirical support for each node was estimated using bootstrap analysis and decay indices. Using both nucleotide and amino acid data, we were able to determine the taxonomic levels within Araneae at which EF-1a was informative.

CHANGES IN THE ABUNDANCE AND DIVERSITY OF LEAF LITTER ARACHNIDS IN TREEFALL GAPS AND INTACT FOREST AFTER HURRICANE GEORGES.

Paul Klawinski

On September 21, 1998, Hurricane Georges swept through the Luquillo Mountains of eastern Puerto Rico. As is typical of hurricane damage in mountainous terrain, the damage to the existing forest was patchy, leaving some areas of the forest relatively undamaged while uprooting trees in other parts of the forest. An ubiquitous effect of the hurricane was the alteration of the forest floor which saw a large increase in allochthonous inputs (leaf litter) and an abrupt change in the litter microclimate. Leaf litter in treefall gaps generally experienced greater fluctuations in temperature and probably lost moisture more rapidly during periods between rains than leaf litter in stands. After the hurricane, I collected leaf litter once per month in four gaps and four stands that were within 200 m of one another. Two collections were made at each site and arthropods were extracted using Burlese funnels. Specimens were identified to morphospecies and counted. Preliminary data show that the litter arthropod community in treefall gaps was generally lower in abundance than in stands. Arachnids (mites, pseudoscorpions, harvestmen and spiders) mirrored this trend. However, the effect of hurricane damage on litter arthropods was also affected by the past disturbance history of the areas where the samples were collected. Areas that had been previously disturbed by either past coffee plantation activities or by commercial logging showed larger differences than areas of primary tabonuco forest.

EFFECT OF FEMALE PRE- AND POST-MOLT AGE ON SEXUAL CANNIBALISM IN DOLOMEDES TRITON

Nancy Kreiter

Intraspecific cannibalism by adult females on adult males, or sexual cannibalism, has been widely reported in

many spiders. The evolutionary benefits provided to both males and females by this behavior have been widely discussed. Although cannibalized males may receive direct advantages through increased reproductive success in some species, most of the hypotheses presume that the food provided by sexual cannibalism benefits the female at a distinct cost to the male. Female fishing spiders (*Dolomedes* spp.) cannibalize intraspecific males both in the field and in the laboratory. Our previous field supplementation study demonstrated that reproduction in female *D. triton* is significantly limited by food availability in the natural situation. This limitation may be a result of increased energy requirements during yolk deposition in the developing eggs. Cannibalism of males by females may therefore provide significant benefit to females in the form of increased offspring. However, laboratory studies of *D. fimbriatus* and caged field studies of *D. triton* by others failed to find a significant advantage for females that cannibalized males. Since cannibalism by female *D. fimbriatus* occurs in the laboratory even by unmated females, it has been suggested that sexual cannibalism is nonadaptive in fishing spiders. I tested the hypothesis that cannibalism of males by females is related to the increasing energy requirements of yolk deposition in the eggs across time following the penultimate molt. I introduced either penultimate or virgin adult females of differing pre- and post-molt ages to males in the laboratory. While penultimate juvenile females did cannibalize males up to 10 days prior to their adult molt, cannibalism decreased as they neared the adult molt. Adult females that were within 6 days post-molt did not cannibalize males, but cannibalism increased with increasing post-molt age. This suggests that cannibalism of males by females is suppressed during both the pre- and post-molt period, when association between the sexes is most likely to occur. Thus, it is unlikely to interfere with mating under natural situations.

ASSESSING SPIDER SPECIES RICHNESS IN TWO FORESTS OF SUBMEDITERRANEAN SLOVENIA

Matjaz Kuntner, Rok Kostanjsek & Jonathan A. Coddington

Quantitative sampling protocols for estimating spider species richness were carried out in two forests of Submediterranean Slovenia in Sempas and Podgrad. At Sempas (27-29 July 1998, 18-19 September 1998) six collectors sampled a 1 ha forest plot using five sampling techniques for 67 person-hours. At Podgrad (31 July - 1 August 1996) four collectors sampled a 200 x 200 m forest plot using four sampling techniques for 30 person-hours. In Sempas 2338 spiders were collected of which 502 (21.5 %) were adults, from 59 species, 43 genera, and 19 families. In Podgrad 1030 spiders were collected of which 316 (30.7 %) were adults, from 74 species, 53 genera, and 19 families. Sample intensity (mean no. adult individuals per species) varied from 8.5 in Sempas to 4.3 in Podgrad. Percent singletons (species known from only one adult individual) varied from 39.0% in Sempas to 44.6 % in Podgrad. Although both inventories still exhibited signs of undersampling bias, the total richness of species at these sites that were adult at the time of sampling, and accessible to the methods used is conservatively estimated to be at least 85-107 in Sempas, and 106-124 in Podgrad. When compared to previous and roughly comparable work in the Slovenian Subpannonian region, these Submediterranean sites support higher spider species richness. Spider community structure is compared among sites as is the effectiveness of different sampling techniques. Finally, possible applications of the quantitative sampling protocols are discussed.

PIRATA WOLF SPIDER SPECIES IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK: HABITAT DISTRIBUTION, LIFE HISTORY, AND CLUTCH SIZE

Michael C. Lowder & Frederick A. Coyle

Pirata, with over 60 described species worldwide (including 33 from North America), is the most species-rich and abundant wolf spider genus in the Great Smoky Mountains National Park (GSMNP), but its natural history is poorly known relative to that of larger-bodied lycosids. Habitat distribution patterns of Pirata species were studied by analyzing 398 one-hr ground samples from 17 focal sites representing 16 major biotic communities in GSMNP. These samples yielded 1020 adult Pirata specimens from nine focal sites ranging in elevation from 395 to 1505 m; none were found in any of the six high elevation sites (1550-1830 m). Seven species were found: *P. alachuus* Gertsch & Wallace, *P. hiteorum* Wallace & Exline, *P. insularis* Emerton, *P. montanus* Emerton, *P. sedentarius* Montgomery, *P. suwaneus* Gertsch, and *P. sylvanus* Chamberlin & Ivie. *Pirata montanus* is abundant in four mesic forest habitats and is the only Pirata species in the GSMNP associated with forests. *Pirata insularis* is abundant in the two montane wetland sites and common at the native grassland site. The other five species are restricted to grassy habitats and are uncommon. Size frequency distribution histograms of seasonal samples of juvenile and adult *P. montanus* show that this species has a two-year life cycle. Spiderlings emerge from the egg sac in the summer and over-winter in the second and third post-emergent instars. These spiders develop to the antepenultimate or penultimate instar during the following year before over-wintering, and then mature and mate during the following spring. Regression analyses of 95 *P. insularis* females and the contents of their egg sacs reveal a significant positive correlation between female body size (live weight, tibia I length, or carapace width) and clutch size. There is no correlation between female body size and mean egg volume, which varies little, indicating that females do not adjust egg size when allocating egg-making resources.

A TEST OF ALTERNATIVE PHYLOGENETIC HYPOTHESES FOR THE INTERRELATIONSHIP OF THERAPHOSID SUBFAMILIES USING A CLADISTIC ANALYSIS OF MORPHOLOGICAL TRAITS

Samuel D. Marshall, Robert J. Raven & Walter R. Hoeh

Doubt regarding the history of phylogenesis within the Theraphosidae has hampered attempts to understand evolutionary trends within the group and to establish a stable classification system. Several different classification schemes for the Theraphosidae have been proposed in recent years (Raven 1985, Smith 1990, Schmidt 1993). However, only Raven (1985) proposed a phylogeny for the group. While certain clades have remained fairly stable, the placement of some genera has been problematic (e.g., Ephebopus, Psalmopoeus, Hapalopus). To test alternative hypotheses of theraphosid interrelationships, we obtained a morphological data matrix containing 33 characters representing both morphological and behavioral features. We used characters obtained from Raven (1985), $Pi\frac{1}{2}rez$ -Miles et al. (1996; with amendments, $Pi\frac{1}{2}rez$ -Miles pers. com.) as well as characters we derived for the present analysis. The character states were obtained from direct observation of specimens and/or from the literature for 31 species representing 31 genera within the Theraphosidae (= ingroup) and one species (*Sason colemani*) representing the Barychelidae (= outgroup). The parsimony algorithm from PAUP* was employed to generate phylogenetic trees from the data matrix. PAUP* found eight equally parsimonious trees of 95 steps and the strict consensus tree obtained was as follows: (((((((((Acanthoscurria, Aphonopelma), (Brachypelma, Pamphobeteus)), (Ceropelma, Cyclosternum, Grammostola, (Lasiodora, Theraphosa))), Hapalopus), ((Avicularia, Tapinauchenius), Ephebopus), (Ceratogyrus, Eucratocelus, Pterinochilus), (Heterothele, Holothele)), (((Citharischius, Hysterochrates), Phoneyusa), (Heteroscodra, Stromatopelma))), ((Chilobrachys, (Coremiocnemus, Lyrognathus)), (Poecilotheria, Psalmopoeus))), ((Cyriopagopus, Haplopelma), Thrigmopoeus)), Barychelidae). Our analysis, in general, supports the phylogeny of Raven (1985). We found no support for the placement of Psalmopoeus in the Aviculariinae as proposed by Schmidt (1993), but instead support its placement in the Selenocosmiinae as proposed by Raven (1985). We did find support for placing Ephebopus in the Aviculariinae as proposed by Lucas et al. (1991) as opposed to placement in the Theraphosinae, as proposed by Raven (1985). Hapalopus has been placed in the New World Ischnocolinae (Schmidt 1993, Rudloff 1997) and Theraphosinae (Raven 1985, $Pi\frac{1}{2}rez$ -Miles et al. 1990). Our analysis supports the latter placement, although Hapalopus does not

have a sister group relationship with any of the genera we analyzed. The structure of the New and Old World Ischnocolinae has long been debated (Raven 1985, Schmidt 1993) and our finding that the east African Heterothele and the Puerto Rican Holothele (=Ischnocolus) are sister taxa is surprising given the observation that the Ischnocolinae subfamily is a problematic group and that the Old and New World ischnocoline taxa probably do not together represent a monophyletic group (Raven 1985, Schmidt 1993). We mapped two behavioral features onto the strict consensus tree; life style and egg sac type. While theraphosid lifestyles are highly diverse, we crudely categorized them as either arboreal or terrestrial and found that arboreality has evolved independently at least three times (once each in the Aviculariinae, Selencosmiinae, and the Eumenophorinae). Theraphosid egg sacs may be free (an unattached spheroid carried by the female) or attached to the silk lining the interior of the retreat. While most theraphosids have free egg sacs, attached egg sacs have evolved independently at least three times (once in the Harpactirinae and twice in the Eumenophorinae {Citharischius and Heteroscodra + Stomatopelma}).

THE RESPONSE TO PATCH REMOVAL BY POPULATIONS OF HOGNA HELLUO AND PARDOSA MILVINA IN REPLICATED EXPERIMENTAL LANDSCAPES.

Samuel D. Marshall & Ann L. Rypstra

Landscape fragmentation may reduce the available habitat to islands too small to allow viable populations to persist either by reducing the locally sustainable population size below some minimal threshold, or by interfering with spatial behaviors such as foraging and territoriality. We experimentally exposed populations of the lycosids *Hogna helluo* and *Pardosa milvina* to regimes of habitat fragmentation and destruction in replicated soybean fields and found that they exhibited an opposing response. In the habitat fragmentation experiment we created 25 m² areas of mulched, weedy habitat within 6 fields in four configurations: single island (5 X 5 m), two islands (each 3.53 X 3.53 m), four islands (each 2.5 X 2.5 m) and eight islands (each 1.77 X 1.77 m). At the end of the season we censused an equal area of each or the four configurations and found that while *H. helluo* populations declined, *P. milvina* populations showed a tendency to increase with increasing habitat fragmentation. In the habitat destruction experiment we created three arrays of mulched and weedy islands within each of six replicate soybean fields. Each array consisted of 25, 2 X 2 m islands in a 5 X 5 array, each 0.5 m apart. We randomly selected one array in each replicate field for 80% habitat destruction and another for 20% habitat destruction. The third array was kept undisturbed as a control. Five weeks after the arrays were established, we randomly selected 20 islands within each 80% destruction array and 5 islands within each 20% destruction array and removed all standing vegetation by hand and covered the soil surface with a synthetic landscape fabric. After 5 weeks more, we censused all five remaining islands in the 80% destruction array and five randomly selected islands in the 20% destruction and control (0% destruction) arrays. We found a very strong and opposing response to patch thinning by the two species, with *H. helluo* declining sharply with only 20% destruction and *P. milvina* increasing with increasing habitat destruction.

EFFECTS OF FIRE ON THE SPIDER ASSEMBLAGE OF A PINE-OAK FOREST COMMUNITY IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK

Denise M. McNabb & Frederick A. Coyle

In the Great Smoky Mountains National Park, a controlled burning program was recently initiated to determine whether the Park Service's fire suppression policy has promoted dominance by oaks and the loss of red-cockaded woodpeckers and other species in the presumably fire-dependent pine-oak forests. We used a modified Coddington sampling protocol to test the effect of one of these fires, which was chiefly a ground fire, on the spider assemblage of one such forest. In each season (spring and summer) in each of the two pre-

fire years (1996 and 1997) and again in 1998 after the August 1997 fire, identical numbers of method-specific samples were collected (8 aerial, 8 beat, 8 ground, and 6 litter samples). We predicted that, if the fire affected the spider assemblage, the differences in important assemblage attributes between pre- and post-fire sample sets (1996 vs. 1998; 1997 vs. 1998) should be greater than the differences between the two pre-fire sample sets (1996 vs. 1997). These comparisons indicate that the fire caused moderate change in the species composition of the assemblage (as revealed by increased complementarity and turnover indices and decreased similarity indices) and increased its species richness (as revealed by higher post-fire richness estimates) and species diversity. The large increase in singletons and uniques that boosted the post-fire richness estimates supports the conclusion that the fire destabilized the assemblage. Collectively, ground taxa exhibited higher fire-correlated species turnover and markedly higher fire-related changes in relative abundance than did aerial taxa, a pattern consistent with the high intensity of this fire on the ground. After the fire, several previously common ground-dwelling species (especially *Lathys maculina*, *Neriere variabilis*, and *Pholcomma hirsutum*) became much less abundant, while other previously rare (or absent) ground taxa (especially several species of *Meioneta*) increased markedly, suggesting, in concert with other published data, that many *Meioneta* species are essentially pioneer species that are well-adapted to colonizing woody communities disturbed by fire.

CLADISTIC ANALYSIS AND DIVERSITY OF THE FAMILY GONYLEPTIDAE (ARACHNIDA: OPILIONES)

Ricardo Pinto-da-Rocha & Adriano Brilhante Kury

The neotropical harvestmen family Gonyleptidae Sundevall, 1833 is composed of 15 subfamilies, 279 genera and 848 species. It is recorded in Costa Rica and all South American countries. Despite this broad range, the diversity of the family is strongly concentrated in the Atlantic Rain Forest of southern and southeastern Brazil. Ten of the subfamilies and more than two-thirds of the species are endemic to this area. One other subfamily is endemic to northeastern Brazil, while the remaining subfamilies are found almost throughout South America. A cladistic analysis of the Gonyleptidae was undertaken with the program Hennig86 program, using the mh* and bb* algorithms for 74 characters in 35 taxa (4% of known species) representative of all subfamilies. The preliminary results indicate that: 1) the described subfamilies are all valid but need re-characterization, 2) Metasarcinae should be raised to family level (related to Cosmetidae and Stygnidae), 3) Ampycus and Nanophareus should be raised to subfamily level, 4) Pachylinae is a polyphyletic group that should be divided in several subfamilies, and 5) Tricommatidae should also be included in Gonyleptidae.

EYES WIDE OPEN: MAKING A BBC DOCUMENTARY ON JUMPING SPIDERS

Simon D. Pollard

In 1998 Simon Pollard and Robert Jackson, Associate Professor of Zoology, University of Canterbury, Christchurch 8002, New Zealand were scientific advisors on Spiders from Mars a BBC Natural History Unit documentary on jumping spider behaviour, featuring and narrated by David Attenborough, and produced for the BBC's "Wildlife on One" series. The production was filmed in New Zealand, Australia and the UK by Kevin Flay, an award-winning cameraman, and features superlative sequences of salticids from around the world. Simon and Robert travelled to Australia, Singapore, and Sri Lanka to recruit the eight-legged stars and Simon spent fourteen weeks in dark studios directing many miniature pre-Madonnas. A central theme to the documentary was how the evolution of acute vision in such a small-brained predator appeared to have paved the way for the development of behavioural complexity and plasticity. Sequences of *Portia* using aggressive

mimicry to catch salticids and other spiders, and detouring to catch an orb-web spider were filmed. Another theme was the evolution of secondary sexual characters in male salticids; an obvious platform for sequences on vision-based courtship behaviour and male-male competition. In a sequence on mimicry, male *Myrmarachne*, ant-mimics with chelicerae exaggerated by sexual selection, fight like diminutive samurai-like swordsmen. Simon will show the documentary and talk on the making of it.

TAKING THE STING OUT OF SCORPION SYSTEMATICS: PROGRESS IN UNDERSTANDING OPISTOPHTHALMUS

Lorenzo Prendini, Timothy M. Crowe, H. Peter Linder & Ward C. Wheeler

Burrowing scorpions of the genus *Opisthophthalmus* C.L. Koch (Scorpiones: Scorpionidae) are a conspicuous element of the southern African terrestrial arthropod fauna, where they make up more than 50% of the scorpion species. These scorpions display unusually high levels of endemism and an array of specialised ecological and behavioural strategies for life on different substrata (rock, sand, etc.). As such, the genus represents an ideal model for research into the biogeography and evolution of arid-adapted arthropods. In addition, it is in taxonomic chaos, only the Namibian species having been re-appraised since the 1900s, and thus in serious need of systematic revision. The aim of this research programme is to delimit the approximately 80 ingroup species (and a selection of appropriate outgroup taxa) and to infer a phylogeny, based on morphological and molecular data. The resultant cladogram will be used in a comparative framework for the testing of biogeographical, ecological, and behavioural hypotheses concerning the group (e.g. the evolution of psammophily and the biogeography of southern African sand systems). This research also aims to test the monophyly of the Scorpionidae, to which *Opisthophthalmus* belongs, and the relationships among its component genera. The morphological component of the project involved an examination of freshly-collected and museum material, wherein approximately 180 qualitative characters were scored for phylogenetic analysis. The molecular component involved automated DNA sequencing of four genomic regions (28S rDNA, 12S rDNA, 16S rDNA and cytochrome oxidase I), comprising approximately 2 kilobases per species, from freshly-collected material. Sensitivity analysis of the combined data, where congruence (the Mickevich-Farris ILLD) is employed as an optimality criterion, is currently underway. I present here a summary of preliminary results obtained during the past three years. These comprise an overview of progress in our understanding of *Opisthophthalmus* phylogeny, the position of *Opisthophthalmus* in the family Scorpionidae, and the number of species currently recognised in the genus.

SPIDERS OF THE ARID SOUTHWEST- A LIST AND MANUAL IN REVISION

David B. Richman & Bruce Cutler

Over the last 10-15 years we have accumulated data on the spider diversity of the southwestern United States. The project was originally started by the senior author as the Spiders of New Mexico. More material was added to the list by Don Lowrie, who donated his notes on a similar project on the New Mexico fauna. The format of the current manuscript is similar to that used for a manual of New Mexico Grasshoppers. The manuscript was expanded in 1995 to include Arizona and Trans-Pecos Texas. Vince Roth and David Allen Dean both contributed their notes on the Arizona and Texas faunas. Other records have been added by David Lightfoot, Sandra Brantley, William O'Keefe, Greg Forbes, and Peter Pache. A web page was constructed in 1997, with a simple list of the spiders now known to occur in the region, along with the state or states in the area in which they are found. A list of references was recently added. At present the list contains 52 families, 258 genera and 968 species and is at <http://taipan.nmsu.edu/people/richman/southwest.html>. The most prominent families include the Salticidae, Gnaphosidae and Linyphiidae, each with over 100 species in the area, with Lycosidae, Araneidae, Dictynidae, Philodromidae and Thomisidae containing over 40 species

each. Southwestern endemic families include Diguetaeidae, Plectreuridae and Homalonychidae. The current manuscript form is over 200 pages and includes description, general distribution, county distribution within the area covered, habitat notes, time of adult presence, and references. We hope to expand this to include introductory materials and eventually either place it on the web and/or publish it as a manual.

ISLANDS IN THE DESERT: POSTZYGOTIC BARRIERS TO POPULATION MIXING

Susan E. Riechert

The grass spider, *Agelenopsis aperta* frequents arid habitats throughout the desert southwest USA. It achieves its largest population sizes, however, in riparian islands associated with springs, streams and rivers in this region. Spiders inhabiting riparian areas are exposed to different selection pressures (i.e., bird predation) than spiders inhabiting the surrounding arid habitats (competition for limited food). Population exchange largely during the mating season conflicts with local population adaptation because arid environments select for aggressive spiders while riparian environments select for more fearful spiders. The results of reciprocal transplant experiments and mating censuses will be presented that enumerate the gene flow problem riparian populations of *A. aperta*, in particular, experience. First, arid-land and riparian *A. aperta* freely cross-breed and mating can be equated with gene flow as the eggs produced in cross-matings are just as viable as eggs produced by within population matings. Ten percent of the matings in the riparian habitat in a typical dry year involved one arid-land parent; 5% of the matings in an unusually wet year involved an arid-land parent. The reciprocal transplant experiments demonstrated that riparian spiders fail to survive to reproduction in the arid, dry woodland environment. However, woodland spiders that exhibit less aggressive behaviors survive equally well as native riparian spiders in riparian habitats. Postzygotic factors, nevertheless, limit the incorporation of arid-land genes into the riparian population. Genetic mixing leads to the production of two classes of spiders that fail to reproduce, super chickens and super cannibals. In both years of mating censuses, 21% of all females ran from every mating opportunity (super chickens), while 5% of the females attacked every male they encountered (super cannibals). It is expected that a mutation leading to mate discrimination will rapidly spread through these riparian populations as it would prevent the wastage of gametes that now occurs.

DETRITAL SUPPLEMENTATION ENHANCES THE TOP-DOWN EFFECT OF SPIDERS IN SOYBEAN AGROECOSYSTEMS

Ann L. Rypstra & Samuel D. Marshall

It has been well documented that communities of spiders can have a top-down effect in the food web leading to reduced herbivore damage. In order to further investigate this phenomenon, we created habitat islands within three tilled and three non-tilled soybean fields by mulching the soil surface with straw and increasing plant diversity. To half of the islands we added composted vegetable matter every other week to attract prey. At the end of the summer, we surveyed the spider community and obtained a measure of damage that pest insects inflicted on the soybean plants. Overall, the compost subsidy increased the number of spiders in an island and decreased leaf damage. In fact, spider abundance was negatively correlated with leaf damage across all subplots. The correlations between spider abundance and herbivore damage were the strongest in tilled fields. An interesting exception to this is that there was a strong negative correlation between the abundance of one large wolf spider, *Hogna helluo* (Araneae; Lycosidae), and leaf damage in the no-till fields. Since this species lives on the soil surface, we hypothesize that its influence on leaf damage is through indirect effects on the foraging behavior of other spider species.

RECENT ISSUES IN ARACHNID PHYLOGENY

Jeffrey W. Shultz

Progress toward resolving interordinal relationships within Arachnida over the last decade has been slow, but several issues have emerged in recent years. Here I present new morphological and molecular evidence relevant to four problems in arachnid phylogeny.

1. Monophyly of Arachnida: Most arachnologists regard xiphosurans and arachnids as sister groups. However, based on a single character, Dunlop (1) proposed that tetrapulmonate arachnids (= Araneae + Pedipalpi) form the sister group to a clade including xiphosurans and scorpions. Here, I report results from phylogenetic analyses of nuclear protein-coding genes and skeletomuscular characters that strongly support a monophyletic Arachnida that excludes Xiphosura.

2. Monophyly of Pedipalpi: For the last decade or so, many arachnologists have accepted the hypothesis that Amblypygi and Uropygi (= Thelyphonida + Schizomida) form a monophyletic group (Pedipalpi). This view was commonly accepted early in this century but was replaced for several decades by the view that Amblypygi and Araneae are sister groups. Now, the latter hypothesis has been resuscitated by Wheeler and Hayashi (2). Here I present over 30 apparently unique (non-homoplasious) synapomorphies derived from exhaustive myological surveys of a thelyphonid, amblypygid and other chelicerates which support the monophyly of Pedipalpi.

3. Evidence for the Monophyly of Opiliones + Scorpiones. The scorpions have long been regarded as "primitive" arachnids that are either the sister group to eurypterids or all arachnids, but empirical support for both views is virtually non-existent. About 10 years ago, I proposed the alternative view that scorpions form a monophyletic group with Opiliones, Pseudoscorpiones and Solifugae. Here I present new morphological characters that further corroborate this hypothesis and suggest that Opiliones alone is the sister group to Scorpiones.

4. Internal Phylogeny of Opiliones: For the past two decades, opilion systematics was dominated by a system that placed Cyphophthalmi among the palpatorean superfamilies to form "Cyphopalpatores." Recent phylogenetic analyses using molecular (3) and morphological (4) characters have falsified this hypothesis and have decisively placed Cyphophthalmi as the sister group to all other opilions. However, these analyses differ in the internal topology of the non-cyphophthalmid opilions. Here I report preliminary results from analysis of nuclear protein-coding genes that support the morphology-based view that Laniatores and Palpatores are monophyletic sister groups.

References: 1) Dunlop, J.A 1998. Proc. 17th Intern. Colloq. Arachnol. Edinburgh 1997. P.A. Selden, ed., 9-16. 2) Wheeler, W.C. & C.Y. Hayashi. 1998. Cladistics 14: 173-192. 3) Giribet, G. et al. 1999. Mol. Phyl. Evol. 11:296-307. 4) Shultz, J.W. 1998. J. Arachnol. 26: 257-272.

ANANSI THE SPIDER-MAN: A WEST AFRICAN TRICKSTER IN THE WEST INDIES

Christopher K. Starr

The folklore of many peoples includes a traditional trickster figure, the subject of many stories. These form a "cycle", in which there is no particular sequence and the different adventures are independent of each other. Trickster tales are almost always placed in the "animal tales" genre, with the trickster himself _ he seems always to be male _ identified with a particular animal. These include the mouse deer in Southeast Asia, the fox in Japan, the coyote and the spider among the North American Indians, the tortoise, rabbit (or hare) and

spider in West Africa, and the mantis in Southern Africa. The outstanding exception to this rule is Till Eulenspiegel of Western Europe, depicted as a young man. The most salient shared feature of trickster figures is their small size, relative to the large, strong animals that appear in the same folktales. Even the tortoise is depicted as helpless when faced with such other animals as the lion or the python. Tricksters survive by their wits, but they do more than just survive. As the term implies, they are forever playing tricks on the large, fierce animals around them that not only get them out of difficulties but may actively dupe the others in the absence of any danger. Furthermore, tricksters delight in outwitting and mistreating their powerful neighbours even when these have done nothing to deserve it. It should be noted, however, that the trickster does not always come out on top. Occasionally he overreaches himself and finds that he has been too clever for his own good. Two of the West-African trickster animals mentioned above have a significant presence in the New World, imported as part of the folklore of enslaved Africans. The rabbit is best known as Br'er Rabbit in the folktales preserved by Joel Chandler Harris in the USA (and in his modern avatar, Bugs Bunny). The spider is best known as Anansi, the Asante name by which he is called throughout the former English and French colonies of the West Indies. Our present understanding is that demographic history can account for the prominence of the rabbit in the USA versus the spider in the West Indies. The patent relationship between the popularity of these tricksters and the longing of enslaved peoples to dominate their situation and their oppressors through ruse has often been noted. In the folklore of the West Indies, Anansi enjoys a dominant position not paralleled by any other trickster figure. While most Americans have probably at least heard of Br'er Rabbit, and Till Eulenspiegel is similarly recognized in Germany and the Netherlands, each of these tricksters is merely one among a great many well-known folk figures in his respective country. Anansi, in contrast, is the West Indian folk hero. Folktales are often referred to as "Anansi stories", and a collection of folktales in which he does not figure very prominently would be unthinkable. A pan-african literary journal which began publication this year is called Anansi. Anansi continues to be the subject of new stories, some of them true folktales and others originating in as published literary works by named authors. To a West Indian, there is nothing incongruous about a story in which Anansi and his family ride in a car, go to the supermarket, play cricket or even use a computer. My research into the comparative folklore of trickster tales has given rise to two hypotheses, each applicable to Anansi. The first is that animal trickster figures undergo a progressive humanization. This is by no means an original idea. It seems, in fact, to have the status of a vague conventional wisdom in folktale research. However, I am not aware that it has yet been tested or even closely examined. The considerable variation in Anansi's spiderness/humanity between stories and versions is readily apparent. It is also seen in the various published illustrations of Anansi, which range from entirely spider-like to entirely human. Our conference logo was commissioned to represent the middle range of this continuum, in which Anansi has some spider and some human features, a true spider-man. However, it is by no means proven that this variation represents a historical progression, such that over time the spider features are more and more de-emphasized. The hypothesis, then, is easy to pose and in principle testable, but formulation of a satisfactory scientific test continues to be a problem. The second hypothesis is somewhat bolder and has to do with the relationship between peoples, their traditional trickster figures, and the exploits of these tricksters. Arising out of a remark in Walter Jekyll's classic treatment of the folklore of Jamaica, it is hypothesized that folklore will at once show extreme conservatism in the identity of the trickster figure and great adaptability in the particular stories associated with him. Preliminarily, this hypothesis seems well corroborated. Especially among traditional peoples, trickster exploits are attributed to consistent figures. However, where two neighbouring peoples have very different trickster figures, as a rule many of the same stories are told about each. It is even plausible that, where a trickster figure is the subject of an apparently unique story, this is in fact due to uneven collecting by folklorists. The most striking observation in favour of this second hypothesis is those stories that show up in the folklore of widely dispersed peoples, many of whom would appear to have very little social contact with each other. The famous story of Br'er Rabbit and Tar Baby, for example, appears in clearly homologous versions not only among various peoples of West Africa but as far afield as Asia and among the Indians of North America. The hypothesis of the immobility of trickster figures combined with extreme vagility of their exploits, if demonstrated, seems likely to be a general principle of folklore. In the meantime, it provides me with a

convenient scholarly pretext to delectate the adventures and foibles of Anansi, the West Indian spider-man.

DOLOMEDES: SIZE AND LOCOMOTION ON THE WATER SURFACE

Robert B. Suter & Jessica Gruenwald

Newly emerged fishing spiders, *Dolomedes triton* can achieve rowing velocities as high as those of adults despite an approximately 600-fold difference in mass (1.7mg vs. 1.1g). In contrast, when velocity is measured in relative terms (body lengths/sec), small spiders move much more rapidly than adults, with $V_{rel} \propto m^{-0.31}$. This surprising performance of very small spiders can be attributed both to the rapid rise in stride frequency with decreasing size ($f \propto m^{-0.43}$) and to the rapid rise in the angular velocity of the propulsive legs with decreasing size ($\omega \propto m^{-0.33}$). Calculations of leg tip velocities, based on measurements of both angular velocities and leg lengths, reveal that maximum leg tip velocities are achieved by spiders of about 33mg, nineteen times more massive than the smallest spiders we tested. Some very small spiders perform conspicuously and consistently less well than do others of the same size. A detailed dissection of the motion of these underachievers reveals that a disproportionate amount of their rowing effort goes into vertical as opposed to horizontal work: the ratio of vertical to horizontal work during rowing is 1.03 + 0.89: 1 in normal fishing spiders and 5.18+ 1.73: 1 in the underachievers.

DEVELOPING AN INTERACTIVE WEB SITE FOR SPIDER IDENTIFICATION

James D. Wagner

We are designing an interactive guide to the spiders of Kentucky which will be publicly accessible on the World Wide Web. We are utilizing the technology of HTML hyper text with embedded color photographs, black & white figures, and Quicktime video (when appropriate) to create an organized interactive taxonomic key to the rich diversity of spiders found in Kentucky. Habitats in Kentucky are diverse as second- and third-growth, mixed, mesophytic forests in the Cumberland plateau region of eastern Kentucky, agricultural land in central Kentucky and wetlands, swamps and bottomland hardwood forests in low hills and flat land of western Kentucky. Currently the state lacks a species list or biodiversity study for arachnids. Although the project goal is a reference resource to aid in the identification of spiders for researchers, undergraduate and graduate students, and extension service individuals, the organization and ease of use of the web pages will be designed with the lay person in mind. There are a variety of proprietary software packages available for creating dichotomous keys, but our site (<http://kaston.transy.edu>) will be freely accessible to all with access to the Internet. The success of this project has required the combined talents and expertise of undergraduates from three different disciplines - biology, computer science and art (graphic design). I will discuss some of the technical and logistical challenges of developing a site that synthesizes the diversity of materials required for a visual interactive dichotomous key which is also compatible with the diversity of web browsers cruising the Internet.

MORPHOMETRIC ANALYSIS OF SEXUAL DIMORPHISM IN WOLF SPIDERS

Sean E. Walker & Ann L. Rypstra

Numerous studies have examined differences between male and female spiders in a single characteristic, usually length, but few have looked across a number of characteristics. In this study, we describe differences between the sexes and between species for four species of wolf spiders, *Hogna helluo*, *Rabidosa punctulata*, *Pardosa milvina*, and *Schizocosa rovneri* using geometric and traditional morphometrics. Differences

between species were evident in both shape and size. However, examining differences between the species and sexes using traditional morphometrics, groups are formed mainly on the basis of size. This results in clusters for each species which can be split into males and females. Geometric morphometrics, which involves the analysis of configurations of landmarks (in this case in two dimensions), shows more clearly the differences between the sexes and species in shape. In fact when analyzing shape differences, females were usually more similar to females of another species than to males of the same species. Although both analyses are interesting, the analysis of landmark data provide more information on the shape of the spiders than do the traditional morphometric data and also a visually pleasing way of displaying the data. Also given the similarities between females of the different species and the differences between males, one could speculate that divergences between the sexes in spiders have been driven by changes in male form rather than female form.

SEXUAL DIFFERENCES IN CHELICERAE AND FANG SIZE, VENOM GLANDS, AND FEEDING BEHAVIOR IN HOGNA HELLUO AND PARDOSA MILVINA

Sean E. Walker & Ann L. Rypstra

The degree and nature of sexual dimorphism exhibited by spiders is quite variable across species. The paradigm is that males do not eat much and roam widely across the landscape in search of females whereas females consume as much as they possibly can in order to make more eggs. If this is true then we should see evidence in of sexual dimorphism in both foraging behavior and trophic morphology. In order to test this hypothesis, we selected two species of wolf spider (Araneae; Lycosidae) that differ in the degree of sexual dimorphism they display (*Hogna helluo* and *Pardosa milvina*). We examined prey capture success of males and females of both species across a range of prey sizes in the laboratory. We also measured chelicerae, and fangs of both sexes of both species and the venom glands of the larger species. Females captured larger prey relative to their body size than males of both species. Likewise, the chelicerae and fangs of females of both species were larger even after accounting for differences in body size and the venom glands of *Hogna* females were also larger than those of males. In *Pardosa*, the species in which males and females are more similar in body size, males and females are also more similar in prey capture and trophic morphology. Whereas in *Hogna*, which displays more sexual dimorphism, we found more extreme differences in prey capture behavior and trophic morphology. Thus we have confirmed that there is a link between feeding performance and morphological differences between the sexes and that those differences scale with the overall degree of sexual dimorphism evident in these two species. In addition, it seems likely that selection for sexual dimorphism is a result of the different strategies males and females use to maximize their fitness and the differing energetic needs of these strategies.

PROGRESS IN NEOTROPICAL ERIGONINE SYSTEMATICS (ARANEOIDEA: LINYPHIIDAE, ERIGONINAE)

Jeremy Zujko-Miller

I report preliminary results from an investigation of the higher level systematics of erigonine spiders with emphasis on genera endemic to the Neotropics. The cladistic analysis builds on the previous work on erigonine phylogeny of Gustavo Hormiga. I have added exemplar taxa representing genera endemic to the Neotropics and new characters. The relatively small number of studies that have concentrated on Neotropical linyphiids indicate that there are many new erigonine taxa yet to be discovered. However, neglect of the older literature has also led to the generation of junior synonyms. Three quarters of the erigonine genera represented in the Neotropics are endemic to the Neotropics. Among these endemics, 67% are monotypic. These monotypic genera are typically known from few specimens, often representing only one sex.

Monotypic genera convey no grouping information and thus do not provide a testable phylogenetic hypothesis. By using systematic methods to identify clades supported by putative synapomorphies, genera can be redefined as testable hypotheses of monophyletic groups.
