AMERICAN ARACHNOLOGY

The Newsletter of the American Arachnological Society

NUMBER 48 **NOVEMBER 1993**

1994 A.A.S. MEETING GAINESVILLE, FLORIDA

The 1994 Meetings of the American Arachnological Society will be held at the University of Florida in Gainesville, Florida from July 30 to August 2, with on-campus housing available the nights of July 29 through August 2.

More information will be forthcoming in the spring Newsletter.

WHAT'S INSIDE

AMERICAN ARACHNOLOGY
is the official newsletter of the American Arachnological Society and is distributed biannually to members of the Society. Items for the Newsletter should be sent to the editor, Alan B. Cady, Dept. Zoology, Miami Univ.-Middletown, 4200 E. Univ. Blvd., Middletown, Ohio, 45042, USA. (E-mail: ACADY@MIAVX3 [BitNet]; Acady@miavx3.mid.muohio.edu [Inter-Net]). Deadline for receip. of material for the spring issue is 1 April, 1994. All correspondence concerning changes of address and information on membership in the American Arachnological Society should be addressed to the membership secretary, Norman I. Platnick, American Museum of Natural History, Central Park West at 79th St., New York, N.Y., USA. Members of the Society also receive the JOURNAL OF ARACHNOLOGY, published triannually.

1993 A.A.S. Meeting Report

The 17th annual meeting of the American Arachnological Society was held at the picturesque campus of the University of Washington in Seattle. For many of us, it was a wonderful excuse to see a part of the USA previously viewed in pictures and movies. Rod Crawford of the University's Burke Museum and John Edwards of it's Zoology Dept. were the co-hosts. They literally came to our rescue at a late moment when plans for holding the meeting in Costa Rica were not realised. From 21 to 25 June a wide variety of papers were presented (see abstracts below). The 70 or so participants also experienced the extremes of Seattle's summer weather, and were offered a taste of the area's unique social and natural wonders. Mount Ranier made a spectacular appearance, and once luncheon diners were treated to the formation of a large (full) rainbow. Thanks to Rod and John for filling in at the last minute and for providing a marvelous place for arachnologists to rendezvous.

Student Paper Awards

Due to the quality of these papers, choosing Marshal Hedin (Washington Univ.) as first place and Jason Bond (Virginia Tech) as second place was a difficult task for the Student Paper Awards Committee. Marshal's presentation (The historical biogeography of Appalachian cave spiders {*Nesticus*}) earned him a one year membership to the Society (and the associated J.O.A. subscription), and $100. He also received a copy of Kaston's *The Spiders of Connecticut*, and Roth's Key to Spider Genera, both generously donated by Vince Roth. Jason acquired a $50 prize and a copy of Roth's key for his talk (Setaspigot homology and silk production in first instar *Antrodiaetus unicolor*). Hearty congratulations to Marshal and Jason !

Field Trip Report

Rod Crawford reports on the field trip, 25 June 1993, to Lake 22 Research Natural Area, Snohomish Co., Washington (Rod Crawford, trip leader and official scapegoat).

"Arranging this field trip nearly drove me crazy; it was the only feature of this year's meeting that didn't run smoothly. After days of increasingly frantic arrangements for drivers, and with only 2 days to go, my months-old arrangements for use of university vans fell through when the university unveiled their latest bureaucratic regulation: conference attendees aren't allowed to ride in university vehicles. By this time, it was too late to get the number of vans needed from one of the more reputable rental agencies, so arrangements had to be made with an agency which shall remain nameless. Friday morning came, the vans were delivered, however, essentially devoid of gasoline !

After a gas stop we arrived at the trailhead for Lake 22, one of the most beautiful spots within 60 miles of Seattle. A not especially difficult trail (as mountain hikes go in this region), brings one through magnificent old growth red cedar to a spectacular rocky lake basin which, at an elevation of only 756 m, has vegetation characteristic of treeline habitats nearly 1000 m higher, due to the late persistence of snowfields.

Inasmuch as many of the participants came from non-mountainous regions, I expected many to collect only partway up the trail, but in fact, most evidently made it to the lake, where we arrived shortly before noon of a beautiful day. I have little data on what was collected, but among the more interesting specimens were *Sitticus lineolatus* (Salticidae), *Sisicottus montanus* (Linyphiidae), and an undescribed but not unknown species of *Callioplus* (Amaurobiidae), all characteristic of much higher elevations. Other salticids included *Phidippus johnsonii*, *Evarcha hoyi*, and *Habronattus oregonensis*.

Having unexpectedly had the energy to climb straight to the lake, yours truly (after talking to the TV folks who accompanied us) decided to take off around the lake to a snowfield on the far side. When almost there, feeling tired, I left my backpack behind a particular rock in a large talus field. Big mistake! On returning, I discovered (surprise!) that all the rocks looked alike; an hour was wasted looking for the pack, and thus was late getting down to the vans. Or to put it in a more face-saving fashion, naturally, the trip leader is supposed to be the last one down in order to watch for possible stragglers or injuries... Anyway, everyone made it down to the parking lot without serious mishap and I understand that most made it back to the dorms in time for dinner."

Those who participated in this trip were treated to one of those infrequent, beautifully clear June days in the Pacific Northwest. I'm sure others who were on this excursion will join me in thanking Rod for an unforgettable experience.

Auction Results

This meeting of the A.A.S. had a new feature at the banquet.... an auction! Auctioneer Al Cady guided the bidding for two items. Ann Mahler successfully acquired galley proofs from Willis Gertsch's *American Spiders*, and Jack Kaspar won a hard-fought battle for a hand-carved wooden spider curio Vince Roth retrieved from Africa. All in attendance were demonstrably envious of Jacks prize. The newly formed (and semi-official) Meeting Committee may feel that such an auction of donated treasures could help punctuate the banquet, and provide $$ for student members of A.A.S.

Financial Statements

The American Arachnological Society
Gail E. Stratton, Treasurer

SECOND QUARTER REPORT 1993
JUNE 17, 1993

Balance from 1993 first quarter report, Checking accounts	$76,163.90
DEPOSITS	
Interest on C.D. and on checking account	$261.74
Page Charges	1,262.50
Subtotal:	$1,524.24
EXPENSES	
Allen Press, JOA Vol 20(3)	$4,726.94
South Central Bell	
phone calls for nominations committee	53.49
Co-collected dues	
British Arachnological Society	3,794.00
C.I.D.A.	3,203.00
Arachnological Society of Japan	600.00
Revue Arachnologique	1,270.00
State of California, filing fee	10.00
US Post Office, postage, treasurer	33.00
Virginia Tech, publication of Newsletter	366.48
Brent Opell, reimbursement for mailing Newsletters	327.79
Subtotal:	$14,384.70
Amount in checking accts:	$63,303.44
Certificate of Deposit	$10,000.00
Total Assets	*$73,303.44*

Respectfully submitted,

Gail E. Stratton, Treasurer

The American Arachnological Society
Gail E. Stratton, Treasurer

THIRD QUARTER REPORT 1993
OCT. 14, 1993

Balance from 1993 second quarter report, June 17, 1993 Checking accounts		$63,303.44
DEPOSITS		
Interest on C.D. and on checking account		$575.34
Page Charges		1,121.90
Donation from Editor, J. Berry		1000.00
Deposit of C.D.		10,000.00
Membership		1029.00
Sales, back issues of Journal		1683.12
	Subtotal:	$15,409.36
EXPENSES		
Allen Press, JOA Vol 21(1)		$4,937.61
Allen Press, JOA Vol 21(2)		5,328.50
Whitehall Publications (first payment for printing of *Spider Genera*)		1266.00
Marshall Hedon, 1st place, student paper award at AAS meeting		100.00
Jason Bond, 2nd place student paper award		50.00
Honoraria		
G. Miller, Associate Editor		1000.00
J. Berry, Editor		1000.00
	Subtotal:	$13,682.11
Amount in checking acct: Chemical Bank of Albion, MI Acct. #759647		*$65,030.69*

Respectfully submitted,

Gail E. Stratton, Treasurer

ABSTRACTS of PRESENTATIONS

Two newly-discovered social spiders from Ecuador, *Tapinillus* sp. (Oxyopidae) and *Theridion* cf. *nigroannulatum* (Theridiidae). Aviles, Leticia. Dept. of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85721.

A web-building lynx spider of the genus *Tapinillus* lives in colonies containing several adult and subadult males and females, as well as juveniles and egg sacs. The nests consist of a three-dimensional irregular web surrounding the distal parts of branches. The spiders cooperate in prey capture and feed communally on the prey. The sex ratio among preadults and embryos is 1:1, even though the colonies appear to be permanent and to reproduce by budding, as occurs in other species of a similar level of sociality which exhibit female-biased sex ratios. Using allozyme electrophoresis, I have determined that the *Tapinillus* colonies are outbred, possibly due to male migration. This explains the even sex ratio and makes *Tapinillus* the only known cooperative spider which is both permanently social and outbred.

Even though the discovery of cooperative behavior in a lynx spider appears unexpected, the existence of a permanently social *Theridion* is not surprising given that extended maternal care is widespread in the genus. Colonies of *Theridion* cf. *nigroannulatum* consist of a few to several thousand individuals, including adults of both sexes, living together on the undersides of leaves. Prey ensnared in the many silk lines descending from the leaves to the ground are caught cooperatively and fed upon communally. Female-biased sex ratios are present among adults and preadults, suggesting a subdivided population structure. Embryonic sex ratios, however, are not yet available. The largest colony seen, which occupied three to four meters in each dimension, disintegrated and gave rise to many small colonies of one to several females with egg sacs. This explosive propagation may have helped the colony escape a growing population of a parasitic theridiid spider found to live within larger colonies.

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Seta-spigot homology and silk production in first instar *Antrodiaetus* unicolor spiderlings (Araneae: Antrodiaetidae). Jason E. Bond. Virginia Tech., Dept. of Biology, Blacksburg, VA 24061-0406.

A scanning electron microscope study of the silk spigots of the first free postembryonic instar of *Antrodiaetus unicolor* shows that their spigots and setae are more similar in early instar spiderlings than in the adult spiders. This ontogenetic evidence supports the hypothesis that the silk spigots of spiders evolved from setae. These observations also suggest that spigots with a deep articulation between the base and shaft are more primitive than the nonarticulated spigots.

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Which factor is more important to spider density; habitat or prey? Bradley, Richard A. Dept. of Zoology, Ohio State University, 1465 Mt. Vernon Avenue, Marion OH 43302.

The goal of this study was to compare the relative influence of habitat structure and prey-availability on population density relationships among spiders exhibiting three different foraging strategies on the same study plots. Work was conducted in Brisbane Water National Park, New South Wales, Australia, approximately 36 km north of Sydney, between September 1983 and March 1987. Habitat characteristics (13 vegetation measures, elevation, soil penetrance) and prey availability (sticky boards, pitfall traps, litter samples) were quantified on 16 small (0.023 ha) study plots. Density estimates were made for 4 species of orb-weaving spiders (*Argiope keyserlingi*, *Leucauge dromedaria, Uloborus* sp?, and *Araneus transmarinus*), 2 large sedentary spiders (*Atrax robustus*, *Misgolas rapax*) and 1 active wandering spider (*Lycosa furcillata*). *Leucauge dromedaria* was the most abundant orbweaver and the only such species whose density was positively correlated with aerial-prey availability. *Argiope keyserlingi* density was strongly associated with habitat characteristics on the plots. *Atrax* and *Misgolas* were common on plots that shared a suite of habitat characteristics and possessed high ground-prey availability. *Lycosa furcillata* density was correlated with both habitat features and ground-prey numbers. This wandering predator was active on all plots, not just those where the majority of active *Lycosa* burrows were located. Thus the spatial scale of this study may have been too small to detect meaningful habitat associations for this species. Habitat characteristics on the plots were stable during this study. Aerial-prey availability was unpredictable in both time and space while ground-prey numbers were more consistent. I suggest that density patterns for the orbweaving species often reflected web-site choices based chiefly on vegetation structure not aerial-prey availability. Because habitat features and ground-prey were interrelated; it is difficult to determine which (if either) factor primarily influenced the distribution of the ground-foraging spiders.

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Acrocerid (Insecta: Diptera) life histories, behaviors, host spiders (Arachnida: Araneida), and distribution records. Cady, Alan*, Robin Leech [University of Alberta], Louis Sorkin [American Museum of Natural History], Gail Stratton [Albion College], and Michael Caldwell [McGill University]. *Dept of Zoology, Miami University-Middletown, Middletown, Ohio 45042, USA.

The family Acroceridae (Insecta: Diptera; "Small Headed Flies") are a seldom seen yet cosmopolitan group of endoparasitoids of spiders. Recent host and distribution records are presented here for six species of acrocerids: *Ogcodes borealis* Cole, 1919; *Ogcodes pallidipennis* (Loew , 1866); *Ogcodes* sp.; *Acrocera bimaculata* Loew, 1866; *Turbopsebius sulphuripes* (Loew, 1869); and *Exetasis eickstedtae* Schlinger, 1972. New hosts for each fly species are: *O. borealis- Schizocosa rovneri* Uetz and Dondale, 1979, *Pardosa* spp.; *O. pallidipennis- Schizocosa rovneri, Schizocosa* spp.; *Ogcodes* sp.- *Anyphaena californica* (Banks, 1904); *Acrocera bimaculata- Coras montanus* (Emerton, 1890) ; *T. sulphuripes- C. montanus.*

Detailed field measurements and behavioral observations of host spiders and fly development are described and compared to known data. Examination of these comparisons suggests that host-parasitoid relationships follow spider guild associations (i.e., ground/surface dwelling hosts or those building webs in close contact with surfaces), especially with the spider family Agelenidae. These affiliations probably result from a combination of the spider's web building, web maintenance, hunting behaviors, and fly oviposition activities, and dispose spiders exhibiting these behaviors to greater chances for parasitoidism. These factors act in concert to increase probabilities for host-parasitoid interactions. Compiled data indicate duration of pupation may be related to ambient temperature. An acrocerid larva may enter a spider host at any stage. A larva infecting a sub-penultimate spider usually remains quiescent until the spider reaches the penultimate instar, whereas a larva infecting a penultimate or adult instar spider initiates feeding.

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Differential host utilization by *Argyrodes trigonum*. Cangialosi, Karen R. Dept. of Biology, Keene State College, Keene, NH 03431.

Although some members of the genus *Argyrodes* are exclusively kleptoparasites that specialize in the webs of a single host species, *Argyrodes trigonum* exhibits a wide range of foraging strategies and utilizes a number of different hosts. Which foraging strategy an *A. trigonum* individual exhibits probably depends on several different conditions including the host species, host age, and type of host web they encounter. The objectives of this study were to determine differences in foraging strategy chosen by *A. trigonum* for three host species: *Neriene radiata, Pityohyphantes costatus,* and *Achaearanea tepidariorum.* Host spiders were maintained in aquaria to which *A. trigonum* individuals were added, either directly into the host web or on the opposite side of the cage. Reaction and positions of *A. trigonum* and hosts were recorded each day thereafter for several days. While *A. trigonum* tends to function as a predator of spiderlings for all host species, relationships to adult hosts are quite different. *A. trigonum* is likely to share a web and steal or scavenge food from older juvenile and adult *A. tepidariorum.* However, it functions as a commensal in the barrier portion of *P. costatus* webs, and appears to be exclusively a web stealer of *N. radiata.* This behavioral plasticity suggests that it is advantageous for *A. trigonum* to switch foraging mode in order to utilize different hosts as their availability changes with season.

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Habitat preferences of two sympatric *Geolycosa* species in southcentral Florida. Carrell, James E., and Jennifer L. Potratz. Division of Biological Sciences, 105 Tucker Hall, University of Missouri, Columbia, MO 65211.

Two species of *Geolycosa* wolf spiders occur at the Archbold Biological Station near Lake Placid in South central Florida. Both species are similar in size and both construct burrows in sandy soil that are identical except for the ornamentation around the entrance. Casual field observations suggest that *G. micanopy* is common but *G. xera* is a rare scrub endemic. In addition, preliminary population studies indicate this difference might be habitat based: *G. micanopy* may exist in many different communities whereas *G. xera* may be restricted to barren sites that are uncommon in the scrub. We tested this idea by measuring the density of spider burrows in the major plant associations, which are well mapped at the 1954 ha station. In February, 1993, we censused *Geolycosa* burrows in 2 x 10 m quadrats randomly located at ten replicate site in each of ten habitats (N = 100 sites total). We found *Geolycosa* densities ranging from 0 to 1.7 spiders/m^2. Analysis of variance showed that habitat, species, and habitat*species are significant variables ($F > 5.39$, $P < 0.005$), indicating that the two spiders exhibit different habitat preferences. A post-hoc contrast using ANOVA showed *G. xera* is at least ten time more common in the rosemary phase of the sand pine scrub association (SSr) (0.49 1 0.16 spiders/m^2, X 1 SEM) than in any other vegetative community. In contrast, although *G. micanopy* is most prevalent in the scrub hickory phase of the southern ridge sandhill association (0.36 1 0.07 spiders/m^2), it also is fairly common (> 0.05 spiders/m^2) in eight of the nine remaining habitat types. We conclude that *G. xera* really is a habitat specialist, strongly preferring rosemary balds in the scrub, whereas *G. micanopy* is a generalist species with regard to habitat use. These findings confirm our initial idea and further support listing *G. xera* as a rare and possibly threatened spider species in Florida.

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Are locality labels scientific data? Crawford, Rodney L. Burke Museum, University of Washington, Seattle, WA 98195.

Specimen locality data, an essential resource of systematic collections, are frequently recorded in ways that sharply limit their scientific value. A good locality data format should be uniform yet flexible, capable of any required accuracy, specifying a definable area which can be relocated by subsequent workers to the same degree of precision as originally specified (scientific reproducibility). Traditional methods of recording localities fail in some or all of these criteria. A

coordinate grid system best fulfills the requirements. Of several available, I prefer (and use) a decimal form of latitude/longitude, which with practice can be calculated from quadrangle maps in about 1 minute per locality. Coordinates given to the nearest 0.001° of latitude and longitude (e.g., 48.086°N 122.345°W) specify an area of 5000-10000 m^2, orders of magnitude better than most locality labels. Gridded localities can be mapped with minimum effort and, if sufficiently precise, can be relocated and revisited after long time intervals regardless of changes in names, roads, or man-altered landscape.

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Immigration of ballooning spiders into terrain depopulated by volcanic eruption at Mt. St. Helens, Washington, U.S.A. Crawford, Rodney L.*, John S. Edwards, and Patrick M. Sugg [UW Dept. of Zoology]. *Burke Museum, University of Washington, Seattle, WA 98195.

The May 18, 1980 eruption of Mt. St. Helens devastated an area of 600 km^2 and swept all fauna and vegetation from a minimum of 80 km^2. This large, naturally sterilized region allowed us to monitor arrival of long-distance ballooning spiders over a long period, undiluted by resident species or those which reached the area by crawling (non-ballooning arachnids and flightless insects first arrived at our Pumice Plain study sites in 1985). During 1981-85, at least 125 spider species arrived on the Pumice Plain north of Mt. St. Helens. Based on representative data from 1983, the proportion of spiders in total arthropod influx was 23.3% by numbers and 11.2% by dry biomass. Arrays of 0.1 m^2 fallout collectors detected the arrival of 100.5 spiders (91 mg dry mass) per m^2 over the 125-day field season, or 0.8 spiders/m^2/day. Different arriving species differed widely in adult/juvenile ratio, adult sex ratio, and seasonal ballooning phenologies; the latter fell into several relatively distinct categories. A large, and annually increasing, influx of penultimate *Pardosa* spp. in fall is a phenomenon not detected in previous ballooning studies; many of these *Pardosa* were near the maximum possible size for ballooners. By 1986, only 6 spider species had founded resident, reproducing populations on the Pumice Plain, being largely limited to isolated sites previously colonized by vegetation. The annual arrival of >100 specimens/m^2, originating from 1.5 to 100 km away, suggests that distant immigrants which may not be able to reproduce in situ form a significant component of many spider communities.

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Spider prey of two mud dauber wasps in Young County, Texas. Davis, Martha. Biology Dept., Midwestern State University, Wichita Falls, TX 76308.

Nest contents of two mud dauber wasps, *Sceliphron caementarium* and *Chalybion californicum*, from Young Co., TX, were examined. Of the spider prey found in nests constructed by *Sceliphron*, 95% were either araneids, thomisids, or salticids. Nests provisioned by *Chalybion* contained only araneids and theridiids. Numerous abandoned mud dauber cells were occupied by segestriid spiders.

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A further look at fighting behavior in male crab spiders. Dodson, Gary. Biology Dept., Ball State University, Muncie, IN 47306, USA.

Males of *Misumenoides formosipes* find and guard penultimate females in order to mate with them immediately after their adult molt. Guarding positions on the flower near a female are contested when intruder males arrive. We (Dodson and Beck) previously reported on characteristics of these male-male interactions based on contests staged in petri dishes. We found 1) a general size advantage and 2) a fighting disadvantage for males that were missing a leg. Here I report on staged contests conducted on a natural substrate in which large intruders displaced small residents. Also on this natural substrate I found that there was no distinguishable disadvantage for males missing a leg in contests with equally sized opponents. Males are known to autotomize legs as an escape mechanism in conspecific interactions. In the field, there was no distinct size class that was more likely to be missing legs.

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Comparing spider communities using biomass and numbers. Edwards, Robert L.. Box 305, Woods Hole, MA 02543.

The large disparity of sizes of spiders can make comparisons of different communities on the basis of numbers of species alone misleading. From a dynamic point of view, relative biomass offers a different and useful perspective. Data for 14 microhabitats containing 304 species were analyzed for both weight and number using the modified Morisista similarity coefficient and the Bray Curtis dissimilarity measure. Weights were determined using preserved material. Phenograms (UPGMA) of microhabitat data show a general agreement summarized by family between relative weight and relative abundance, with habitats clustering separately but with some differences at the microhabitat level. The Bray Curtis measure appears somewhat more conservative and consistent.

The weight-length equations derived from preserved material all had r^2 values greater than 0.9, with the value of exponents varying from 2.3 to 2.8. Weighing enough spiders to be precise can be a tedious procedure. It was found that the proportional representation by weight varied little when weight was estimated by cubing the length. Thus, a simple first approximation of biomass is possible when presenting relative weight.

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Home Sweet Home: The effects of juvenile experience on habitat selection in the wolf spider *Schizocosa ocreata* (Araneae: Lycosidae). Elderkin, Sarah E. Dept. of Biology, The College of Wooster, Wooster, OH 44691.

Schizocosa ocreata and *S. rovneri* are leaf litter-dwelling wolf spiders which have identical genitalia, but are reproductively isolated by differences in courtship behavior (Stratton & Uetz 1986). While these two species may occur sympatrically, each species seems to prefer distinctly different types of litter habitats: *S. ocreata* is most frequently found in upland areas having loose leaf litter, while *S. rovneri* is commonly found in floodplain areas where litter is densely packed. It has been suggested that habitat preference may be related to the effectiveness with which each type of litter transmits visual/vibratory cues used in the species-specific displays. This study sought to discover the mechanism of habitat selection by *S .ocreata*. I tested the null hypothesis that adult *S. ocreata*

choose litter independent of juvenile experience with either loose or floodplain litter. Spiders raised in either one or the other type of litter were given a choice of habitats as adults. Spiders chose the upland, loose litter regardless of which litter type they were raised in. This study suggests that the habitat preference of *S. ocreata* is innate, and unaffected by juvenile experience. This may shed light on the process by which *S. ocreata* and *S. rovneri* became reproductively isolated.

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Population genetics of a cooperative spider, *Stegodyphus sarasinorum* Karsch (Araneae: Eresidae). Engel, Michael Scott*, and Deborah R. Smith. *University of Kansas, Haworth Hall, Lawrence, KS 66045.

Thirty colonies of a population of the cooperative spider *Stegodyphus sarasinorum* Karsch were examined using allozyme protein electrophoresis. Thirty-nine enzyme systems were examined; two, lactate dehydrogenase and glucose-s'-phosphate dehydrogenase, were polymorphic with two alleles each. Wright's F-statistics were calculated for the population. The results of this analysis are similar to those found in three other studies of cooperative spiders - extreme population subdivision, with most colonies consisting of identical homozygotes.

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Female choice and mating success in a colonial orb-weaver. Forkner, Rebecca E.,* and George W. Uetz. Dept. of Biological Sciences, Univ. of Cincinnati, Cincinnati, OH 45221-0006.

In the colonial orb-weaver *Metepeira incrassata*, both intra- and intersexual selection may play a role in male reproductive success. Previous studies have suggested that male-male competition (intrasexual selection) determines access to mates, and larger males have an advantage in combat. In this preliminary study, we examine the relationship between ,male body size and acceptance by females (intersexual selection), and its relationship to potential reproductive success. Males and females were observed in several experimental colonies established in frames in a coffee plantation. Males were measured, marked, and then followed for 4-6 consecutive days, during which all courtship and mating attempts were recorded. Males employ two mating strategies: 1) cohabiting with a penultimate (virgin) female, then mating upon her final molt; 2) courting a mature (non-virgin) female, then mating if the female is receptive. Male mating success and estimates of reproductive success were positively correlated with measures of body size (body length, patella-tibia length). The relationship between mating success and body size of males was different in the core and periphery of colonies, suggesting that males unsuccessful in mating with (preferred) core females sought females on the periphery.

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Relative abundance and diversity of arboreal spider communities in western Oregon. Halaj, Juraj*, Darrell W. Ross [Oregon State University], Richard R. Mason, and Torolf R. Torgerson [USDA Forest Service, LaGrande]. *Entomology Dept., Oregon State University, Corvallis, OR 97331.

Relative abundance and community structure of arboreal spiders were estimated on lower crown branches in sapling stands of Douglas-fir, *Pseudotsuga menziesii* (Beissn). The sampling was done in three geographical provinces in western Oregon: the western and eastern Coast Range and the western Cascade Range. A total of eight sites in each of the geographical provinces were sampled on two dates between June and August, 1992. Mean densities for the two dates were 4.6, 10.4, 5.1 and 13.0, 17.2, 9.5 spiders per square meter of branch area for the three provinces, respectively. On the second date, a total of 5133 spiders of 13 families and at least 34 genera were collected. Across all sites, web-spinning families comprised 57% of the total spider fauna, with the Linyphiidae dominating. The remainder were hunting families dominated by the Salticidae and Philodromidae. *Pityohyphantes rubrofasciatus* Keyserling, *Metaphidippus aeneolus* Curtis, and *Philodromus rufus pacificus* Banks were the most common species re presented in the sample. Although web-spinners were dominant overall, the Salticidae were the most abundant family in the sample from the western Cascade Range, representing 37% of the total spider fauna for this province. Although the densities were significantly different, the Shannon Index of Diversity calculated at the family level indicated no differences among the provinces. Significant differences, however, were found in the proportion of hunting to web-spinning families, and these were 0.55, 0.86 and 1.95 for the three provinces, respectively.

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The historical biogeography of Appalachian cave spiders (*Nesticus*). Hedin, Marshal C. Dept.of Biology, Washington University, St. Louis, MO.

This paper focuses on the biogeographic context of species diversification in the Appalachian cave spiders (genus *Nesticus*). The species of this geographical clade are all found in allopatry, with distributions in the Cumberland Plateau, Appalachian Valley and Ridge, and Blue Ridge Provinces. Species range in ecological breadth from relatively widespread, but montane-restricted surface forms, to highly endemic cave specialists. I have used nuclear DNA sequences to estimate the phylogenetic relationships of fifty-eight populations, comprising 26 described and 2 undescribed species. I use a well-supported maximum parsimony estimate as an historical framework in considering how dispersal and vicariance have influenced distributional patterns, in light of geomorphology, paleoecology, and cross-taxonomic comparisons. I then expand the traditional historical biogeographic approach by asking the degree to which current ecological attributes, which have biogeographic importance, are contingent upon history. Using comparative methods, I examine the phylogenetic component of cross-species variation in niche breadth, and discuss how consideration of this component of trait variation might influence the interpretation of distributional patterns.

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Ploy-counterploy behavioral coevolution in a unique fly-spider predator-prey system. Hieber, Craig S.*, G. Uetz(U. Cincinnati), J. Boyle (U. Cincinnati), S. Wilcox (SUNY Binghamton). *Dept. of Biology, Saint Anselm College, Manchester, NH 03102, USA.

Earlier studies have shown that the sarcophagid fly *Arachnidomyia lindae* is the major egg predator of the colonial orb-weaver *Metepeira incrassata*. Observations of specialized behaviors for defense (spiders) and attack (flies) have suggested that this predator-prey relationship may incorporate elements of coevolved ploy and counterploy behavior. Here we explore this relationship in detail and present evidence for three reciprocal evolutionary steps. We first discuss egg-sac guarding by the spider and the adaptive value of such behavior. We present evidence that the observed behaviors are stereotypic for this particular predator and show that unguarded egg-sacs have a significantly higher probability of being successfully parasitized. We next present a series of experiments that demonstrate that 1) *M. incrassata* recognizes the predatory fly through its air-transmitted wing-beat signature, and 2) can distinguish between predators and prey on the basis of wing beat differences. Finally we present evidence that *A. lindae* has evolved a behavioral ploy for circumventing spider guarding by mimicking captured-prey-in the web so as to draw the spider off the egg sac, and *M. incrassata*, in turn, has evolved a counter-ploy, signal thread cutting, to eliminate this unnecessary and potentially conflicting vibratory information from the predatory interaction.

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Intraguild predation and prey discrimination by the house spider, *Achaearanea tepidariorum* (Araneae: Theridiidae). Margaret A. Hodge. Dept. of Biology, The College of Wooster, Wooster, OH 44691.

The purpose of this study was to examine the aspects of cannibalism and intraguild predation in a population of cliff-dwelling *Achaearanea tepidariorum* from the Cumberland Mountains in Tennessee. Data collected from censusing a 50 m transect showed that at least 25% of *A. tepidariorum* diet was spider prey. A laboratory study was designed to test for the effects of a diet of spider prey on growth rates of A. tepidariorum. Spiderlings were raised on two different diets: insect diet and spider diet. The insect-fed group initially grew faster. This difference in growth rate was apparently due to the differential escape abilities of the insect versus spider prey. This differential behavioral response was quantified in a study which measured latency to attack, wrap and bite each type of prey. Latency to attack was significantly longer for spider prey (mean = 76 seconds) than for insect prey (mean = 7 seconds). This suggests that selection has acted on spider behavior to produce a more cautious approach to potentially dangerous prey.

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Word clones, or ball words, in English usage. Leech, Robin. Dept. of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3, Canada.

It is proposed that juxtaposed identical words, or word clones, be named Ball Words, in honor of George E. Ball, because of their round or cyclic nature. Ball words, such as are used in the sentence, "He gave her her book," are so uncommon in English that spell checks in word processing programs ask for a "Delete 2nd" when a word pair is encountered. Ball words may also occur in sequences of triplets and quadruplets, and they do not contain commas or other punctuation. Ball words have been found only in Chinese, Czech, German, English, and Slovak.

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Manipulation of male secondary sexual characters with video imaging affects female choice in wolf spiders (Araneae: Lycosidae). McClintlock, Will*, Veronica Casebolt, and George W. Uetz. *Dept. of Biological Sciences, Univ. of Cincinnati, Cincinnati, OH.

Males of *Schizocosa ocreata* possess tufts of bristles on the forelegs, which are used in visual courtship displays. In experimental studies with live males, females show receptivity more often to males with intact tufts than to shaved males. However, shaving may affect male courtship behavior, which may influence female receptivity. We used manipulation of video images of the same courting male to control for male behavior and test the hypothesis that these tufts influence female choice. Compared to a control male video with tufts intact, female *S. ocreata* exhibit lowered receptivity to video males with tufts removed, and higher receptivity to males with enhanced tufts. Additional studies tested the responses of female *S. ocreata* and females from a sibling species, *S. rovneri*, in which males do not possess tufts. Video images of *S. ocreata* as above, and images of *S. .rovneri* males (control - without tufts, experimental - with tufts added) were shown to females of both species. Preliminary analysis suggests evidence of sexual selection for sensory exploitation, as females appear more receptive to video images of males with tufts.

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Geographic variation in male courtship behavior of *Habronattus* cf. *pugillis* Griswold (Araneae: Salticidae). McMahon, Michelle*, and Wayne Maddison. *Dept. of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85721.

The geographic diversity of the male courtship behavior of the jumping spider *Habronattus* cf. *pugillis* is outstanding, particularly given that their Arizona sky-islands habitats may have been contiguous as recently as 10,000 years ago. In the male courtship displays we see strong qualitative differences between populations. For example, males from the Santa Rita Mountains circle their palps, males from the Huachucas wiggle their chelicerae, males from the Santa Catalinas and the Rincons shake their bodies, and males from the Patagonias , Atascosas, and Quinlans make a sidling approach to the female. We speculate that unstable forces of sexual selection are behind this remarkable differentiation.

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Differentiation of courtship ornaments among populations of jumping spiders on the montane "sky islands" of southern Arizona (Araneae: Salticidae: *Habronattus pugillis* complex). Maddison, Wayne,*, and Michelle McMahon. *Dept. of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85716.

The mountain ranges of southern Arizona hold isolated islands of woodlands separated by a few tens of miles of desert. *Habronattus* cf. *pugillis* Griswold lives in the oak woodlands of these ranges, and shows striking differences in male courtship ornaments from range to range. These forms differ in the

patterns and colors of the face, chelicerae, palpi, and first legs; in the nature of setae on the face and appendages; and in the shape of the carapace and swollen carapace sides, while 20 miles away the form from the Santa Ritas has a clypeus that is chestnut brown except for a white band along the margin, a sinuous white band above the AME, and a narrow carapace. Forms from 10 mountain ranges are described, and presumably many more forms remain to be discovered in the mountains of Mexico. This differentiation may have been remarkably rapid, for their habitat was more of less continuous between the mountain ranges within the last 10,000 years.

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A computer bulletin board for arachnologists. Marusik, Yuri*, and Robin Leech [University of Alberta]. *Institute for Biological Problems of the North, Magadan, Russia.

Working as an operator for e-mail for the whole institute, I have found one interesting idea for the use of e-mail. A society of palynologists (pollination, pollen, etc) has what you might call an e-mail newspaper. Its center is at The University of Guelph, Guelph, Ontario, Canada. Everyone sends his current news, applications for material, information help with bibliography, plans for meetings etc. Then the operator (or computer)sends these messages to all members of the society. Perhaps this idea can be of help to arachnologists.

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The ability of spider cribellar prey capture thread to hold insects with different surface features. Opell, Brent D. Dept. of Biology, Virginia Tech, Blacksburg, VA 24061.

The stickiness of cribellar threads spun by two species of the family Uloboridae, *Uloborus glomosus* and *Hyptiotes cavatus*, was measured using five insect surfaces. Of these, moth wings were held the least strongly. Their detachable scales easily pulled free of the wing and remained attached to the cribellar threads. The greatest force was required to pull threads from the smooth surface of a beetle elytron, and the next greatest from a fly notum that was beset with stout setae. Hemipteran and dipteran wings with short setae were held less strongly. This demonstrates that insect surface properties affect the ability of a spider's capture threads to retain prey. It also shows that two mechanisms contribute to the stickiness of cribellar thread: 1) setae snag on the cribellar thread's fine fibrils, and 2) forces that are poorly understood also cause threads to cling to smooth surfaces. Together, these mechanisms create capture threads that effectively hold a wide range of insect prey.

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The ground spiders of the genus *Synaphosus* (Gnaphosidae): Taxonomy and zoogeography. Ovtsharenko, Vladimir I. Dept. of Entomology, Zoological Institute, Academy of Sciences, University emb. 1, St. Petersburg 199034, Russia; Department of Entomology, American Museum of Natural History, Central Park West at 79th Street, New York, 10024, USA (present address).

The spider genus *Synaphosus* was established by Platnick and Shadab (1980). Its type species, *S. syntheticus* (Chamberlin), then known from southern California and Baja California Norte east to southern Georgia, had earlier been misplaced in the genera *Nodocion* and *Zelotes*. Subsequent studies of gnaphosids from other parts of the world, notably in Platnick (1989), indicated that *S. syntheticus* is probably not native to North America. .The review of the Old World species that do seem to be closely related to *S. syntheticus* indicates that *Synaphosus* is a valid genus, perhaps most closely related to *Cryptodrassus* Miller (known only from Czechoslovakia). The genus *Synaphosus* is Palearctic in distribution, occurring from France through Kazakhstan (12 species, 8 new), but the type species, *S. syntheticus* (Chamberlin), appears to be native to Libya, Egypt, and Israel, and it has been introduced into the United States and Mexico.

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Secondary sexual characters in male salticids: Foraging costs. Pollard, Simon D. Dept. of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3, Canada.

Intrasexual competition has led to the evolution of secondary sexual characters in many male salticids. These often bizarre, and from a survival perspective, incongruous armaments are usually exaggerated forms of structures found on conspecific females. I will discuss current research on these structures in three salticid species. *Thorelliola ensifera* males have a tusk formed from two enlarged setae that project from below the anterior medial eyes. During intrasexual conflicts, males lock tusks in contests of strength. The tusk appears to limit potential prey size relative to conspecific females. Chelicerae of male *Myrmarachne plataleodes* are 50-70% the length of the male's body, lack a fang duct, and are 4-6 times longer than the chelicerae of females. Chelicerae of male *Salticus scenicus* are also enlarged compared to conspecific females, though not as dramatically as *M. plataleodes*. Modification of behaviour and physiology to accommodate structures previously used only in foraging, but altered through intrasexual selection, are discussed in both these species.

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Effect of food deprivation on mate-searching and spermatophore production by male water mites (Acari: Unionicolidae). Proctor, Heather C. Dept. of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3, Canada.

When ejaculate production and courtship behaviour are physiologically costly, a male's mating activity may be limited by his energy stores. Energy-depleted males may prefer foraging to rebuild these stores rather than expending meagre reserves on potentially unsuccessful mating attempts. Few studies have manipulated male energy level to determine its effect on ejaculate production, mating behaviour, or foraging. Water mites of the genus *Neumania* are ideal candidates for such a study because males deposit groups of spermatophores on a substrate, thus allowing easy determination of ejaculate size, and because males cannot hunt and search for mates simultaneously. I manipulated the energy level of male *Neumania papillator* by varying diet. Males given less food spent less time mate-searching, more time hunting, and produced fewer spermatophores than males given more food. These results suggest that differences in energy level among males should be taken into account in studies of male mating frequency or mate choice.

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Visually vs. non-visually mediated agonistic interactions in male *Rabidosa rabida* (Araneae, Lycosidae). Rovner, Jerome S. Dept. of Biological Sciences, Irvine Hall, Ohio University, Athens, OH 45701-2979.

To determine the importance of vision for agonistic interactions in male *Rabidosa rabida* (Walckenaer), the behavior of 60 males was recorded on videotape and analyzed. Twenty males were used in 10 trials for each of three types of pairings: sighted vs. sighted males, blind vs. blind males, and sighted vs. blind males. When wandering, both sighted and blind males did not detect motionless males prior to contact. When motionless, blind males could not detect wandering males until they were approached to within several mm from contact. Courtship display was the first response of motionless sighted males to the appearance of a wandering male, and of blind males to brief contact with another male. The latter indicated the inadequacy of the chemotactic mechanism in these males for recognizing other males they briefly encountered. If a male was engaged in courtship display, a sighted male could recognize him visually. Using vibratory cues, blind males were less able to recognize courtship display, a limitation which sometimes resulted in the occurrence of mutual courtship. Furthermore, vibratory stimuli yielded less precise orientation information than did visual stimuli; i.e., blind males often made partial rather than complete pivoting turns toward the opponent. Unlike salticids, these lycosids did not require vision to initiate either agonistic display or ritualized fighting; thus, vision was not needed for establishing and maintaining dominance.

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Cannibalism by web-spiders: A stochastic model. Rypstra, Ann L.*, A. I. Houston (Oxford, U.K.), and J. M. MacNamara (Bristol, U.K.). *Dept. of Zoology, Miami University, Hamilton, OH 45011, USA.

Some cannibalistic spiders, such as *Achaearanea tepidariorum*, cease eating one another and can be found in aggregations when prey abundance is high. Once in these groups, spiders seem to capture more prey and larger prey. Stochastic dynamic programming was used to investigate the circumstances under which this breakdown in cannibalistic tendencies will occur. Field and laboratory data allowed estimation of fitness effects of encounters between spiders. Multiple iterations were run until a stable, state-based, population strategy was reached. In all cases, the aggressive strategy was stable; i.e., if all spiders in the population were aggressive and attacked conspecifics, then it would never pay to be non-aggressive. Mixed stable strategies were reached if the population started with individuals who were only aggressive 85-90% of the time. A forward simulation was run once stable strategies were determined in order to investigate the effects of differences in the mean and variance of food availability. At high prey levels, spider groups of all sizes occurred in the population. At low prey levels, only very small and very large spiders were found in groups. Variance in prey availability had little effect on group formation at high prey levels. However, at low prey levels, a sure constant daily food intake resulted in small spiders remaining in groups much longer, whereas an unpredictable food supply caused groups of small spiders to be dispersed.

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Insecticide-induced changes in a spider community. Stark, John D.* and Rodney L. Crawford (University of Washington). *Washington State University, Puyallup Research and Extension Center, Puyallup, WA 98371, USA.

The effects of a neem seed insecticide, Margosan-O, and an organophosphate insecticide, chlorpyrifos, on the spider community inhabiting an isolated turf grass plot was determined. A total of 22 species in six families was captured in turf grass during the study: 15 Linyphiidae, 3 Theridiidae, and one species each in the families Antrodiaetidae, Segestriidae, Dictynidae, and Lycosidae. Fourteen species were likely or possible residents in the plot, and 6 were probable vagrants (such as incoming ballooners). The three most abundant species, *Ergione aletris, Ergione dentigera*, and *Eperigone trilobata*, were all Linyphiidae. Treatment with chlorpyrifos resulted in significantly reduced species richness for at least five weeks. Margosan-O treatments did not significantly reduce the number of species. *E. aletris* was significantly reduced for five weeks after treatment with chlorpyrifos. Levels of *E. aletris* in Margosan-O treated plots were lower than those in control plots, but significant reductions could not be detected. *E..dentigera* was significantly reduced for only one week after treatment with chlorpyrifos. Margosan-O appeared to have no effect on *E. dentigera* initially, but a population increase that occurred five weeks after treatment in control plots did not occur in Margosan-O or chlorpyrifos treated plots. *E. trilobata* was significantly reduced for two weeks after treatment in chlorpyrifos treated plots. Population levels were also lower in Margosan-O treated plots for two weeks, but not significantly. Numbers of juvenile spiders were actually higher in Margosan-O treated plots compared to the other treatments, even though the active ingredient, azadirachtin, is a known arthropod growth regulator. None of the treatments changed the relative abundance of the 3 most common species.

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Harmony and cacophony: Pattern of spontaneous motor activity in spiders. Suter, Robert B. Dept. of Biology, Vassar College, Poughkeepsie, NY 12601, USA.

Endogenous biological rhythms are apparently found in all eukaryotic organisms. The most ubiquitous of these, the circadian rhythm, functions to synchronize physiology and behavior with diel changes in the environment. In this study, individuals of two species of spider were confined to chambers in which their motion could be monitored continuously under conditions of constant darkness or an 8:16 photoperiod. Data presented here demonstrate that, in both the linyphiid spider *Frontinella pyramitela* (Walckenaer) and in the theridiid spider *Argyrodes trigonum* (Hentz), a circadian rhythm modulates locomotor activity in some individuals and not in others. The data also show (a) that higher-frequency endogenous rhythms, at frequencies near 50 cycles per day, play a part in determining the patterns of motor activity, and (b) that the lengths of intervals between bouts of activity are influenced by aperiodic processes that appear to be stochastic.

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Influence of group size on individual time and energy budgets and reproductive success in a colonial orb-weaver. Uetz, George W.*,. and Craig S. Hieber [St. Anselm's College]. *Univ. of Cincinnati, Cincinnati, OH 45221-0006.

It has been argued that in ectothermic animals like spiders, prey capture rates and net energetic gains should be more closely related to growth and fecundity (compared to endotherms), and hence are better estimates of fitness. Field and laboratory studies of solitary spiders have supported that assumption, and in this study, we examine this relationship in a group-living species. Colonies of *Metepeira incrassata* from tropical Veracruz, Mexico vary widely in size, from <10 to >10,000 individuals. Activity (time) budgets, prey capture, and silk expenditure were measured across a range of colony size, and from these data, energetic gains and costs were estimated. Prey biomass captured per spider increased with colony size, as did time spent in active behaviors (foraging, interaction, web maintenance, predator defense). Silk expenditures per spider were lower in colonies than for solitaries, but remained constant across the range of colony size. Overall individual net energy gain increased with colony size, but declined slightly in the largest colonies. Spiders and egg sacs collected from the same range of colony sizes show a parallel trend: spider body size and fecundity increased with colony size but declined at the largest colony sizes. Reproductive success (est. no. of offspring hatched/spider) was lowest for solitaries, highest for mid-sized colonies (50-500) and lower for colonies >1000.

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Differential diagnoses of necrotic arachnidism in the northwestern United States. Vest, Darwin K. 1009 Cassia Ave, Idaho Falls, ID 83402, USA.

Necrotic arachnidism produced by the bite of the hobo spider (*Tegenaria agrestis*) is a relatively new clinical entity in the northwestern United States, presenting considerable challenge to physicians and other health care workers charged with accurately diagnosing and treating suspected cases. A bilateral problem exists; many physicians misdiagnose other conditions as "spider bite," while others fail to recognize necrotic arachnidism until circumstances demand intervention by knowledgeable specialists.

Delayed type hypersensitivity (DTH) and immediate type hypersensitivity (ITH) reactions to bites by parasitic arthropods are the most common conditions misdiagnosed as "spider bite" in the northwest. Local manifestations of these two reactions closely resemble the early local effects of necrotic spider bite, but do not eventuate deep, persistent necrosis. Fungal dermatophytes are the second leading cause of "spider bite" misdiagnosis in this region: *Tinea corporis* (ringworm) is the most commonly involved condition, although other tinea infections have been occasionally referred to the author as suspected "spider bite." The viral infection *Herpes zoster* (shingles) has been the final diagnosis in a significant number of cases, and is sometimes accompanied by systemic manifestations resembling those of systemic *T. agrestis* envenomation. Bacterial infections of staphylococcal origin, particularly bacterial cellulitis and impetigo, are confused with spider bite frequently, but the incidence of these misdiagnoses has decreased over the past several years. Other suspected "spider bites" referred to the author include cases of atopic dermatitis, contact dermatitis, and other allergic syndromes. Stings by hymenoptera which manifest local ecchymosis are referred to as suspected spider bite three to four times per year. Recently, one case of lyme disease, probably vectored by the tick *Ixodes pacificus*, was referred.

The tentative diagnosis of necrotic arachnidism should be considered in any clinical case in which deep, slow-healing necrotic lesions develop, with or without systemic manifestations, unless clear evidence of another cause can be demonstrated. In the northwestern United States, it is important that physicians refrain from attributing necrotic lesions to *Loxosceles* spiders, rather than to *T. agrestis*.

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Protracted reactions following probable hobo spider (*Tegenaria agrestis*) envenomation. Vest, Darwin K. 1009 Cassia Avenue, Idaho Falls, ID 83402, USA.

Envenomation by the hobo spider (*Tegenaria agrestis*) in the northwestern United States produces necrotic lesions similar to those produced by *Loxosceles* bites in humans, but the resultant systemic effects are markedly different: These include severe headache, muscular weakness, visual disturbances, and hallucinations. Laboratory experiments have confirmed the spider's ability to produce marked dermonecrotic lesions as well as systemic hemorrhagic manifestations in laboratory rabbits. The venom of the male *T. agrestis* spider produces more marked effects than that of the female in laboratory experiments: SDS-PAGE electrophoretic studies demonstrate that the venom of the male spider contains significant quantities of two proteins (mol. wt. ~66,000) which are present only in trace amounts in the venom of the female.

This study reports cases of probable envenomation which exemplify uncommon, but severe, protracted reactions. Protracted systemic reactions to hobo spider envenomation may exhibit intractable vomiting, accompanied by secretory diarrhea, which do not resolve for several months, and/or may lead to aplastic anemia two to four weeks after the bite which terminates in a fatal outcome. Protracted local reactions are virtually identical to those produced by *Loxosceles* spiders. These ischemic lesions are most pronounced when they occur in fatty areas, and may require two or more years for satisfactory abatement.

As systemic poisoning following *T. agrestis* bite can be insidious, with far different manifestations than systemic *Loxosceles reclusa* envenomation, the clinical importance of distinguishing between bites by the two species cannot be overstressed. Persistent reports of "brown recluse spider bite" in the northwestern United States are erroneous and add to the confusion and misunderstanding surrounding spider bite and its sociological and medical implications.

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The litter spider community of an Ozark pine/oak forest. Weaver, J.C. Division of Biological Sciences, University of Missouri, Columbia MO 65201.

I collected 96 litter samples from six randomly located plots in each of four forest stands (northeast facing slopes) in June,

1992. I extracted invertebrates from the 0.02 m^2 samples using Tullgren funnels (37° C. for 46 hours). For each sample, I estimated numbers, mg mass (from linear regressions of mass on individual lengths), and richness (number of morphospecies) of all invertebrates found (348 species, 24 orders). The hierarchical sampling scheme (total(stand(plot(sample)))) allowed me to examine the effect of scale of investigation on spider community structure. The examination of the entire invertebrate community allowed me to evaluate the relative importance of spiders as structural (but not functional) components of the litter community. Spiders averaged 2.829 individuals/sample (141/m^2), or 0.245% of total number; mass averaged 8.615 mg/sample (430 mg/m^2), or 6.663% of the sample mass, and richness averaged 1.944 species/sample, or 3.670% of the sample richness. As the scale of examination increased from sample to total, spider species richness increased to 8.621% (30 species). This suggests that different spider species inhabited different parts of the forest (a pattern also seen in beetles), and few species were distributed uniformly (a pattern more typical of mites and collembola). A consequence of this is that total spider (or beetle) species richness could decline more rapidly than mite or collembola richness as forests are cut. There were significant differences among the four stands in spider numbers, mass, and richness, and greater litter volume may have contributed to increases in these values. If litter volume is related to productivity, then more productive forests should have larger and richer spider communities.

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Observations of spiders on the surface of the snow in winter in northeastern Minnesota. Weber, Larry A. Dept. of Biology, University of Wisconsin, Superior, WI 54880, USA.
Representatives of nine families of spiders were observed on the snow-covered forest floor of sites in northeast Minnesota. Observations were made from November through March for the winters of 1985-86 until the the present. During each of these years, the snow cover was continuous from November until April. Of the nine families of spiders observed, the Erigonids, Linyphiids, and Lycosids were the most common. Spiders were most active on the snow surface on calm, cloudy days with a temperature range of 0° C. to -5° C. Warm winter days were not included in the study.
The quantity and variety of the observed spiders seems to indicate that subnivial spiders use the snow surface for their winter wanderings more than previously indicated.

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The population structure of scorpions on habitat islands. Yamashita, Tsunemi. Dept. of Biology, Vanderbilt University, Nashville, TN 37235.
The genetic structure of sand scorpion (*Paruroctonus mesaensis*) populations was investigated using starch gel electrophoresis. These populations were hypothesized to exhibit large genetic differentiation because of the insular nature of sand dunes. Individuals from 28 populations across the scorpion's range were used in the analysis. From these individuals, genetic variability estimates were calculated from eight loci (five polymorphic and three monomorphic). The genetic variability estimates calculated from these data were Wright's F, observed heterozygosity, percentage of polymorphic loci, and allele number. Modified Rogers' genetic distance was also calculated among all populations. The mean Fst was determined to be 0.175. The average observed heterozygosity was 0.143. The mean allele number was 1.65 and the average percent polymorphism was 53.13%. These results indicate that populations of *P. mesaensis* are not as differentiated as expected.

ABSTRACTS OF POSTER PAPERS

in alphabetical order by first author

Effects of spider density manipulations on pest damage to soybeans. Carter, Paul E., and Ann L. Rypstra. Dept. of Zoology, Miami University, Oxford, OH 45056.
Spiders are abundant predators in many agricultural systems, but little is known about their activities in these systems. This study examined the effects of spider density augmentation and removals in soybean monocultures to assess the impact of spiders on soybean pests and damage experienced by plants. Spider density was augmented in wooden crates placed in the fields early in the season and spiders were removed at other field locations. We measured leaf damage at augmentation, removal, and control sites monthly. In two of three years (1990 and 1992), leaf damage was reduced in areas where spiders were augmented, and in one of two years (1992), there was increased damage in areas where spiders were removed. In 1991, the year in which manipulations had no impact, control leaf damage was near the lowest levels recorded at any site in the other two years. The spider community in the crates was dominated by *Achaearanea tepidariorum* (C.L. Koch) in all three years (60-80% by biomass). *A. tepidariorum* is a highly efficient generalist predator which demonstrated potential as a biological control agent. Spider biomass at augmentation sites was positively correlated with biomass of prey carcasses, and mean biomass of prey was negatively correlated with leaf damage. These results suggest that relatively small differences in spider density can have a significant impact on the effects of pest outbreaks in soybeans.

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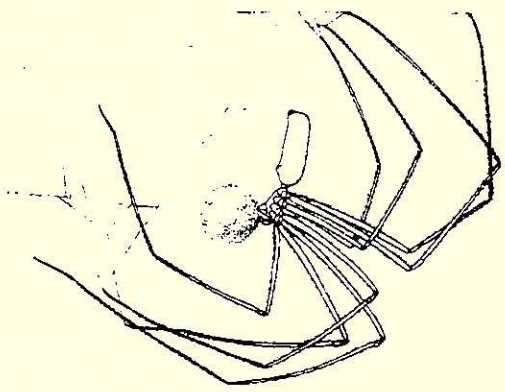
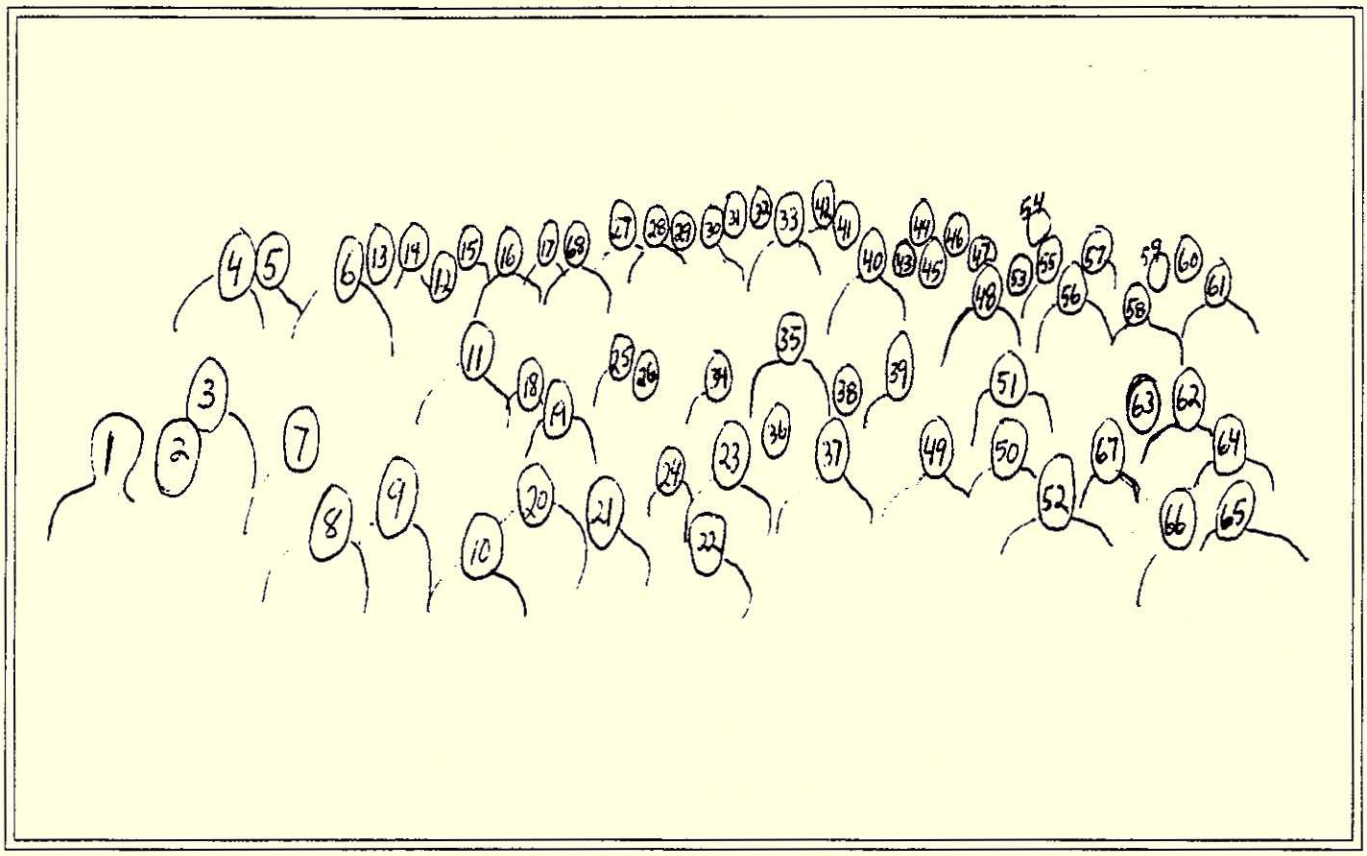
Constructing a small, inexpensive microbalance suitable for field use. Opell, Brent D. Dept. of Biology, Virginia Tech, Blacksburg, VA 24061.
This poster describes the construction, calibration, and operation of an electric balance that is designed for field use and suitable for objects whose weights are less than 60 mg.





Key to Group Photo Silhouette

1. J. Weaver 2. M. Hedin 3. J. Bond 4. T. Yamashito 5. W. Fagan 6. D. Mott 7. D. Vest 8. R. Leech 9. R. Crawford 10. J. Thompson 11. A. Brady 12. G. Dodson 13. J. Dobyns 14. R. Smith 15. G. Uetz 16. M. Greenstone 17. J. Carrel 18. R. Bradley 19. N. Horner20. V. Outsharenko 21. V. Roth 22. ? Moore 23. B. Moore 24. ? Moore 25. J. Miller 26. R. Vetter 27. G.B. Edwards 28. B. Opell 29. J. Kaspar 30. R. Hand 31. R. Suter 32. A. Cady 33. H.D. Cameron 34. S. Elderkin 35. P. Carter 36. L. Aviles 37. W. Maddison 38. H. Proctor 39. P. Oboyski 40. A. Mahler 41. J. Berry 42. C. Heiber 43. B. Berry 44. W. Charles 45. G. Bodner 46. R. Edwards 47. A. Rypstra 48. M. Hodge 49. W. McClintock 50. L. Vincent 51. P. Gerba 52. S. Pollard 53. J. Droz 54. B. Moulder 55. K.Cangialosi 56. G. Binford 57. C. Griswold 58. P. Sierwald 59. S. McMahon 60. M. Engel 61. M. Davi 62. J. Halaj 63. B. Vogel 64. D. Bixler 65. J. Rovner 66. P. Rovner 67. M. Vogel 68. G. Miller

ANNOUNCEMENTS

On Meetings, Sites, and Dates: A Message from the President-Elect

From Matt Greenstone

Those who attended last year's Seattle meetings will be surprised at next year's venue. The explanation goes back more than a year, when the San Jose site fell through. Rod Crawford generously moved his commitment up one year, hence the '93 meetings in Seattle, but that left '94 uncovered. Bob Breene kindly stepped into the breech, offering South Padre Island for '94. Unfortunately, because hotel rates skyrocket to prohibitive levels there after the second week in June, the meetings would have had to been held so early that faculty and students on the quarter system would have been closed out. Fortunately for the Society, not only were our Gainesville colleagues willing to host the '94 meetings, but the necessary facilities were available despite such short notice. Although we could not get our usual week, our goal of avoiding overlap with the Behavior meetings was met.

It has been a narrow squeak, but with the '95 site already committed, we have a grace period to build a secure calendar into the Twenty-first Century (Presidents-Elect have a penchant for grandiloquence....). Please consider whether your campus would be a good place for a meeting, and check your schedule to see whether you could host one in the next half-dozen years.

If you are among those whom I've already spoken about hosting the meetings in '96, '97, or '98, please let me know by the time we convene in Gainesville whether you can make a firm commitment.

Proposed Amendment to the By-Laws of the Society

During the '92 meetings in Manchester, the Executive Committee proposed that the Associate Editor be added to the Executive Committee. Amendments to the By-Laws require a two-thirds vote of the membership, following at least two month's notice (Article V of the By-Laws). Here is the wording which will appear on the mail ballot:

Shall Article II, Section 2 of the By-Laws, which now reads as follows:

"The elected officers, Membership Secretary, Editor, and Board of Directors shall serve as the Executive Committee. Fifty percent of the Executive Committee represents a quorum;"

be changed (proposed change in **boldface**) to read as follows:

"The elected officers, Membership Secretary, Editor, **Associate Editor**, and Board of Directors shall serve as the Executive Committee. Fifty percent of the Executive Committee represents a quorum;"

New Journal of Arachnology Policies

The Executive Committee has considered a few changes to policies concerning the Journal.

1. New Page Charges:

Due to changes in printing costs, it was necessary to modify the page charges. This also provided an opportunity to streamline the somewhat cumbersome page charge structure. If a floppy disk bearing an electronic copy (WordPerfect or ASCII text format) accompanies the submitted printed manuscript, charges would be $20 per printed page.

If the manuscript is submitted conventionally (no electronic version), charges would be $35 per printed page.

These charges apply for both members and non-members.

The editorial board still retains the authority to reduce or waive page charges for those unable to pay.

2. Italics:

Italics may be included in submitted manuscripts. Any other questions may be addressed by referring to the latest "Instructions to Authors", found in the Journal Of Arachnology, **21**(1).

CIDA: Call for references by authors in the U.S.

Dear Colleague,

Each year the Centre Internationale de Documentation Arachnologique (CIDA) in Paris publishes a list of all non-acarine arachnid works published or in press during that year. The list is a bibliographic tool. As the U.S. representative, I am responsible for collation of all citations published by workers in the United States. This year, for the first time, the plea from your U.S. CIDA representative is being included in the newsletter of the American Arachnological Society. PLEASE MAIL ME THE CITATIONS OF YOUR PAPERS PUBLISHED OR IN PRESS DURING 1992 BY DECEMBER 20,1993.

To improve the efficiency of the CIDA process and decrease costs, I would love to receive your citations on e-mail. If this is possible, please do so to my internet address CASENT@sfsuvax1.sfsu.edu, specifying "CIDA" as the subject. If you do not have access to e-mail, please mail the citations to me, Charles Griswold, at Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118.

Spider Course in North Carolina

The Highlands Biological Station, Highlands, North Carolina, has announced that the course, Biology of Spiders, will again be offered in the summer of 1994, from 1 August to 12 August. The course is taught by Fred Coyle (Western Carolina University) and Bill Shear (Hampden-Sydney College). Biology of Spiders can be taken on a credit or non-credit basis; credit is granted through Western Carolina University or the University of North Carolina at Chapel Hill. Daily morning lectures and several evening seminars and film sessions are presented, but the emphasis is on field work and gaining a knowledge of the

extraordinarily diverse local fauna. Daily field trips include a wide variety of communities over an 1800 m elevation gradient, from oak-pine and stream bottom communities of the Piedmont through mesophytic cove forests of the Appalachian slopes to the spruce-fir forests and balds of the higher mountains, as well as many successional communities (old fields, pine woods, bogs). Unusual families encountered include Antrodiaetidae, Atypidae, Hypochilidae, Ctenidae, Leptonetidae, and Nesticidae. Students amass a take-home personal collection of spiders, identified using an extensive, computer-indexed library of taxonomic papers and a syntopic collection of local species. The 1992 Biology of Spiders class collected and identified 187 species in 126 genera and 26 families. All supplies and equipment, including high quality microscopes, are provided. Course enrollment is limited to 12 students.

The Highlands Biological Station is located in Highlands, in southwestern North Carolina, near the Georgia and South Carolina borders, at an elevation of 1170 m (3510 ft). Nearby peaks reach 1525 m (4575 ft) and access to peaks over 2166 m (6500 ft) is easy. Highlands is near escarpments of the southern Blue Ridge and is surrounded by National Forest Lands and several Wild and Scenic Rivers which have cut spectacular waterfall-punctuated gorges in the escarpment. The immediate area has been documented as the most biologically diverse in eastern North America. The station offers comfortable accommodations at very low prices, and maintains extensive research facilities, classrooms, a botanical garden, and a nature center.

Some financial aid may be available for qualified students. If you are interested in taking Biology of the Spiders in 1994, please contact Dr. Richard Bruce, Highlands Biological Station, P.O. Drawer 580, Highlands, N.C. 28741, USA.

One of those Odd Spaces

Those wishing copies of the official participant photograph of the 1993 meeting of the American Arachnological Society, please contact the Secretary, Alan B. Cady, Dept. Zoology, Miami University-Middletown, 4200 E. University Blvd., Middletown. Ohio, 45042.

NOTES AND RECENT INTERESTS

New Edition of Spider Genera Guide to be Published by End of Year.

Vince Roth has informed us that the second edition of the "Spider Genera of North America, with Keys to Families and Genera and a Guide to Literature" will be rolling off the presses by December. This new edition will be 20% larger, have an index and glossary, include references for each genus, have new illustrations and many more improvements. Several families have been divided and one added. Applicable literature through September, 1993 will be cited.

To order the second edition of "Spider Genera of North America" by Vincent D. Roth [A guide to the literature and keys to families and genera, 1993], send your name and address to:

Dr. Jon Reiskind
American Arachnological Society
Department of Zoology
University of Florida
Gainesville, FL 32611 USA

$12 US ($10 for AAS members) if pre-paid (include check or money order made out to "American Arachnological Society" or send cash).

$15 US if you wish to be billed or are utilizing a purchase order.

The rich arachnid collection of the Hungarian Natural History Museum, Budapest.

Address: Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, Hungary. Tel: 36-1-113-0035 Fax: 36-1-113- 88XX.

During a recent visit (21-25 September 1992) to the Hungarian Natural History Museum we learned of the rich arachnid collection housed there. Since only a few arachnologists have ever visited the collection, we will use this opportunity to draw attention to a neglected, but important collection. The arachnid collection is housed in an old building in the city center of Budapest. The curator responsible for the arachnid collection is the Deputy Director General, Dr. S. Mahunka, who studies oribatid mites. All material is stored in alcohol and kept in jars in a number of large wood cabinets, three of which hold the determined spider collection. However, most of the arachnid collection is made up of unsorted/unidentified material. The museum has actively collected material from all over the world during the last 30-40 years and thus holds large quantities of material from many parts of the world, including areas that

are (or rather were) difficult to visit for many western arachnologists just a few years ago. Most of the material is kept in 4 dram vials with approximately 10 vials in each jar. There are three large cabinets with determined spiders. Eurasian material is most strongly represented, but there is global coverage in some groups, particularly Araneidae (including tetragnathids, nephilines and large amounts of West Pacific gasteracanthines), Salticidae, and Thomisidae. The salticids are perhaps the best studied part of the collection with much material sorted and identified by Proszynski and Zabka. The collection of Salticidae is very rich in species from all over the world and as such, very important for any salticid worker. The major strength of this collection is, however, the large amount of unidentified material and especially the extensive collection of Berlese samples. Many of the samples have been cleaned of dirt, but no taxonomic sorting has been done and most samples therefore include a mixture of spiders, mites, pseudoscorpions, schizomids, etc. Among the unsorted material, we found: 600 unsorted Berlese samples from Africa (including Tanzania, Kenya, Ethiopia, Ghana, Zaire, Nigeria, Tunisia and Seychelles), more than 600 Berlese samples from Asia (including India, the former USSR, N. Korea, Mongolia and Vietnam), more than 200 samples from Caribbean (especially Cuba) and several hundred Berlese samples from South America (including Chile and Peru). Additional (non-Berlese) unidentified material includes: 3 jars from Australia (plus approx. 50 small bottles of small unsorted litter samples from Australia), 3 jars from the Antilles (especially St. Lucia), 3 jars from the Neotropical Region, 3 jars from the Ethiopian Region, more than 30 jars from the Palaearctic Region, 7 jars from Ethiopia and many additional jars from India, Vietnam, New Guinea and Africa. During our visit, we managed to go through 255 Berlese samples from Africa (out of a total of more than 1600 such samples from all over the world) and found the spiders few but interesting (mainly symphytognathids, tetrablemmids, oonopids and ochyroceratids). The remaining unsorted material varied in quality, with much material of high quality (such as litter samples with many small terrestrial spiders and pseudoscorpions). No doubt, people working on gnaphosids, thomisids, salticids, zodariids, linyphiids, oxyopids, dictynids, oonopids and ochyroceratids, as well as pseudoscorpions and schizomids will have to come and sort through this collection. Nearly all the material is labeled with a code referring to more detailed descriptions of localities published in varies issues of Folia Entomologica Hungarica. Some information on the collection has not been published (e.g., the collections of Topal, 1967). The museum offers excellent facilities for the visiting researcher. A visitor work room is situated in the collection and is equipped with two good Zeiss Jena stereo microscopes. The museum can furthermore provide cheap accommodation, having a two room apartment within the museum for visitors. The apartment has a kitchen and shower and can be rented for approximately $6 per person per day. If you want to visit the museum and stay in the apartment, you are advised to notify Dr. Mahunka well in advance, since the apartment is a popular alternative to the rather expensive hotels in downtown Budapest ($80-150 for a tourist class hotel). Our visit to the Hungarian Museum of Natural History was extremely successful, not least due to the hospitality and help rendered by Dr. Mahunka and his staff. We thank them all for a rewarding stay at the museum. Should we give any further advice to people wishing to visit the museum we would strongly recommend that you bring a menu-translator. Hungarian has no relationship to most other European languages and restaurants in Budapest do not normally have menu cards in English, German or French. Bon appetit! Nikolaj Scharff, Zoologisk Museum, Department of Entomology, Universitetsparken 15, DK-2100 Copenhagen, Denmark. (current address: Entomology, NHB 105, Smithsonian Institution, Washington D.C. 20560 USA) and Charles E. Griswold, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA.

W. David Sissom writes a request:

"I am working on two taxonomic projects on scorpions and could benefit from examining on loan material collected by fellow arachnologists. The first project is an attempt to update our knowledge of the identity and distribution of scorpions from northern Mexico, specifically the states of Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas. Because of my general interests in the Mexican scorpiofauna (other manuscripts are currently in progress), specimens from other areas would also be welcome.

The second project, a study of the scorpions of New Mexico, is one for which I have been doing substantial field work since 1987. I particularly need specimens from the northern half of the state, but those from the other areas can be incorporated into the manuscript as well.

Please note that my address has changed to: Dept. of Biology & Geosciences, West Texas A&M Univ., Canyon, TX 79016. Please send specimens and inquiries to that address."

Robin Leech writes that he is now visiting at CSIRO in Canberra, Australia for at least at year. His unofficial duties will include identifying all their unidentified spiders to family, and making an effective key for the families of Australian spiders.

Paula Cushing writes "I am working on the ecology of an undescribed species of *Masoncus* (Linyphiidae; Erigoninae) and have been trying to track down specimens of the other congeners. I have been able to find specimens of *M. arienus* and *M. conspectus*, but have had no luck finding the only remaining species, *M. dux* (Chamberlin ,1948). If anyone has these specimens in their collection or has collected them, please let me know. Paula Cushing, Univ. of Florida, Dept. Zoology, Gainesville, FL 32611 CUSH@NERVM"

In The Next Issue .....

- More on the 1994 A.A.S. Meeting
- More on the new enigmatic deep sea arachnid
- M.C.Z. Computer Database of Spider Types
- Student Paper Competition procedures
- And Much, Much More ! .....

AMERICAN ARACHNOLOGY

The Newsletter of the American Arachnological Society

Number 48 November 1993

E-Mail Happenings

The E-mail directory distributed at the Seattle meeting has had good reviews and apparently is a useful item. However, as this First edition was outdated even as it was being produced, a second edition is in the works. Look for it early in 1994.

In the meantime, here's some of the newer addresses (or corrections) of which I have been notified. Please excuse anyone who has been left out....

Please contact your Secretary (see masthead on page 1) concerning e-mail addresses.

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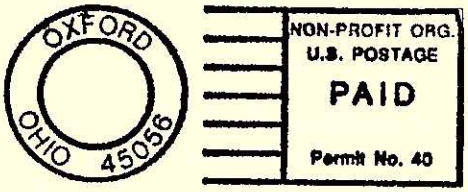

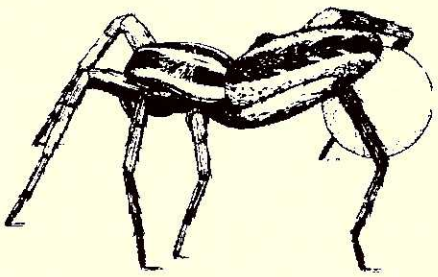

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