DIVERSITY, DISTRIBUTION, AND ABUNDANCE OF GROUND DWELLING SPIDERS AT LICK CREEK PARK, COLLEGE STATION, TEXAS

A Thesis

by

TAKESHA YVONNE HENDERSON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

August 2007

Major Subject: Entomology

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Approved by:

Chair of Committee, Marvin Harris
Committee Members, John Jackman
Kirk Winemiller
Head of Department, Kevin Heinz

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ABSTRACT

Diversity, Distribution, and Abundance of Ground Dwelling Spiders at
Lick Creek Park, College Station, Texas. (August 2007)

Takesha Yvonne Henderson, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Marvin Harris

Lick Creek Park is a 515 acre nature park that was acquired in 1987 by the City of College Station, Texas. The site has a variety of indigenous plant and animal species and is an important natural resource for citizens of the region. There is a long-term commitment to inventory this natural park to monitor the changes as our urban community expands to surround the park. There are 989 species of spiders currently recorded from Texas and 332 of them are known to occur in Brazos County. My focus was on improving the ground spider inventory at Lick Creek Park. Spider collections were made using 18 regularly-sampled pitfall traps distributed evenly among three habitats. Spiders from 24 families, 66 genera, and 111 species were identified from 918 specimens, including 627 immature and 291 adult spiders, captured in pitfall traps from April 2005-April 2006. Of the 111 species found, 45 were represented by one specimen only and 20 were represented by two specimens. Rarefaction analyses indicated that the majority of spider species were readily detectable using pitfall traps and inventoried during this study (111 found and 168 estimated to be present). Simpson's Diversity measure bootstrap estimates determined species diversity overall to be very diverse (0.966), as did a Shannon Weiner Diversity bootstrap estimate (5.483). Also, Simpson's measure of species evenness (0.264) indicated a low species evenness. Those species found in only one habitat comprised 50% of the total species, and their densities ranged from 1-5 individuals. Those species found in just two habitats comprised 25% of the total species, and their densities ranged from 2-21 individuals. Species found in all three habitats comprised the remaining 25%, and their densities ranged from 4-53 individuals found. Most species occurred at low densities in this study and this often precluded conducting more detailed analyses. Additional sampling is expected to, first, detect known species occurring in previously unrecorded habitats and, second, to detect species not previously found in the park. This inventory of spiders at Lick Creek will provide a basis for further studies on biodiversity and the assessment of human impact on the environment.

To God
To my deceased brother, Douglas Keith
To my deceased Uncle, Chris Johnson
To my precious grandparents on both sides of my family
To my educated and uneducated ancestors, who have passed on before me.
To Everyone who supported me in the Entomology Department of Texas A&M
To all the people who said I would not succeed in Life

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I want to thank GOD for allowing my dreams to become real and giving me the opportunity to attend graduate school: I thank Louis Stokes Alliance for Minority Participation Fellowship for funding this research.

I cannot express enough gratitude and thanks to Dr. Marvin Harris, who sought out and convinced an undergraduate to join his program for believing that I was an excellent arachnologist, while conducting a preliminary study in learning spider genera. While having many enjoyable conversations, I embrace his humourous unique, witty insight immensely. He encourages individual thought and critical thinking, which is immeasurably appreciated. He has taught me how to be a better scientist and a better person. His kindness and patience are strongly appreciated and his program inspired me to be the best that I can be for my career and to society.

I would like to thank Drs. Manuel Pińa and James Woolley for encouraging me when I needed it the most and, for being great long time friends and mentors to me.

Many thanks go to Drs. Kirk Winemiller and John Jackman who supported me and added invaluable critiquing comments for the conclusion of this project.

I would like to thank Alejandro Calixto, for those long hours getting traps in the park, his guidance, support and kindness.; Robert Puckett, for his guidance, support, kindness on ecological knowledge; co-workers in the Pecan Insect Lab for encouraging and supporting my dream when needed and seeing the potential I have in the science community, showing me its ok to play hard, but working hard is a priority.

Gratitude and many thanks to Allen Dean for showing me how to order materials, and for checking to make sure the identifications were accurate and correct, for his unconditional friendship, for always being there for me when I needed him to have a second look at a spider species, guidance, kindness and support throughout these years.

I would like to thank Monique Reed, who has an expertise in knowing the geographical and botanical taxonomy aspects of Lick Creek Park, and for taking time out of her busy schedule to show me habitat differentiation among plants. I would like to thank Ed Riley for support and for allowing me to donate my voucher collection to the Insect Museum.

Last but not least, I would like to thank my parents for supporting, and encouraging me for many years, even when it appeared to be strange that a 10-year old girl was interested in spider biology; Family and friends (every single one), for encouragement, patience, and support.

Finally, many thanks go to all the people I forgot to mention but who assisted /supported me through my academic journey to success.

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CHAPTER I

INTRODUCTION

Spiders have often been confused with insects, but in truth they belong to the class Arachnida, with major differences being that spiders have two body divisions and eight legs and insects have three body divisions and six legs. Orders within the arachnids include daddy longlegs, scorpions, mites, and ticks. About 39,000 species of spiders have been named so far (Platnick 2007) representing what is believed to be only about one-fifth of the total spider species (Levi et al. 2002). Some 3,000 species have been thoroughly examined and named from Europe, and approximately 3,500 have been identified from North America (Levi et al. 2002). Spiders are one of the more diverse arthropod taxa, ranking seventh in global diversity (Coddington and Levi 1991), which makes them a fascinating group to study.

The number of known spider species within the state of Texas has increased over the past two years, however, we are only just beginning to identify and catalog spider species. In 2004, there were 975 species of spiders recorded from Texas, and, of these, 218 were from Brazos County (Dean 2004). Just one species had been identified in Lick Creek Park as of the spring of 2004. Material previously collected from Lick Creek Park as sorted and active collecting at Lick Creek Park was begun during 2004. This work has also increased the recorded number of species in Brazos County from 218 to 250 spider

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This thesis follows the style of the Journal of Environmental Entomology.

species.

This research thesis endeavors to determine the number of spider species that occur within Lick Creek Park and to determine if the type of microhabitat available for colonization influences presence/absence of particular species. The goal is to collect and record spider species in three different microhabitats within Lick Creek Park, located in College Station, Texas, and to compare species occurrence with microhabitats where they are found. The objectives are to identify the different species of spiders in three habitats within the boundaries of Lick Creek Park and to quantify distribution, relative abundance and diversity of the ground spiders found within the park.

CHAPTER II

LITERATURE REVIEW

Spiders play a significant predatory role in nature. Insects are the largest part of the spider diet, but they also feed on other arthropods, such as sowbugs, millipedes and other spiders. Among the insects, flies and the wingless collembolans contribute to the bulk of a spider's diet. Collembola occur in huge numbers and are very important in diets of small spiders. Spiders even prey on insects larger and stronger than they are, including beetles, grasshoppers, and butterflies. However, spiders do not prey upon all insects. Most spiders generally avoid certain insects such as stinkbugs, ants, and wasps, as well as certain beetles, moths, and caterpillars. These insects use chemical excretions to defend themselves (as do ladybugs), or they may have an unpleasant taste. Spiders are abundant and their continued impact on the natural food chain can have numerous effects on insect densities (Foelix 1996).

Spiders exhibit various survival techniques. Many spiders can adjust to the availability of their food supply by eating more prey when it is abundant. This maximal energy uptake allows the spider to not only survive and grow, but also to mature quickly. If a long period of food deprivation follows, the well-fed spiders have a better chance of surviving the food drought. Similar strategies of this "optimal food uptake" are also found in different groups of animals such as snakes. Small spiders consume less "biomass" than large spiders (Foelix 1996). For example, the small wolf spider, *Pardosa*, eats about 3.5 mg of insects daily, which is equivalent to 12% of its body weight. Comparably, the larger wolf spider, *Trochosa*, eats about 3-12% of its body weight daily, and the sheet web spiders, Linyphiidae, eat about 10-25% (Foelix 1996). Droughts may result in fewer species in a habitat; perhaps the larger spiders that consume more food may survive this better. Survival techniques can affect diversity in a given habitat. In comparing these factors, I assessed distribution, abundance and diversity of spiders in different habitats.

Wandering Spiders

Wandering spiders are common in most communities, inhabiting the ground and lower vegetation. Representative inventories require special techniques to detect them. Wandering spiders are abundant and diverse in forest litter micro-communities, constituting more than 43% of ground dwelling spider species; their small size allows differences in species diversity to occur within a single habitat (Uetz 1975). Ground spiders feed on soil dwelling animals such as collembolans. Nearly all spider prey consists of soft-bodied arthropods, for example, termites, e.g. *Gnathamitermes tubiformans*, and others select chitinous beetles as a major part of their diet. Greenstone (1984) found that spider diversity was correlated with prey availability and vegetation structure, however, Wise (1993), as referred by Bell et al. (2001), concluded that food availability is not a limiting factor to the number of insects. Thus, the role of spiders in determining insect abundance remains unclear.

Phenology

Spider phenology studies have been conducted in many other countries, for example, e.g. Scandinavia, England, and others, by means of pitfall traps (Tretzel 1954, Polenec 1962, Broen and Moritz 1963, Merrett 1967, 1968, 1969, Hauge 1976, Schaefer 1976, Toft 1976, Flatz 1979, Puntscher 1979) , and other sampling techniques such as sweeping (Toft 1976), beating bushes (Palmgren 1939, 1976, Hauge 1976, Toft 1976) , and sieving litter (Palmgren 1939, 1976, Huhta 1965, Schaefer 1976, Toft 1976) (Aitchison 1984). Within North America, some research on the phenology of spiders has been obtained from individual habitats. These types of field investigations by researchers are limited because they are generally restricted to snow-free areas and seasons (Aitchison 1984).

Aitchison (1984) postulated that to present a comprehensive picture of the life history of a species in its natural habitat, it should be continually monitored throughout the year. Spiders play numerous roles within the ecosystem at different times of the year. Spider diversity and abundance in temperate forest ecosystems (Moulder and Reichle 1972, Turnbull 1973, Buddle et al. 2000, Buddle 2001) are prominent. The only way to properly assess a true habitat-type effect on species diversity is to resample the same sites at different times of the year (Whitmore et al. 2002).

Ecology

Spiders may respond to temperature and water conditions (there may be other factors) so as to occupy favorable microenvironments most conducive for their survival. De Keer et al. (1989) demonstrated that not only were there different microhabitats between long and short grassland, but also that some spiders use these habitats (grassland) interchangeably at different times during a 24 hour-period. Adaptation to different microhabitats is important to increased survival of spiders. Therefore, structural changes caused by management (i.e., grazing, cutting, and human trampling) can affect the climate and impact spider behavior. Separating microclimate from climate and from habitat structure is complex as they are often correlated, but partial correlations have been found between species diversity and temperature in a litter habitat. For example, Almquist (1973) reported that temperature, and to a lesser extent humidity, were critical in determining the distribution of some spiders. Based on past research it seems that species have varying thermal tolerances to high (Almquist 1970) and low temperatures (Aitchison 1984), and changes in microclimates may not affect all spiders in the same way. The effects of management affect spider communities as listed below.

Grazing

Animals such as deer, boar, etc. that graze at Lick Creek Park may affect spider ecology. Spiders living in grazed grasslands are affected directly through effects on vegetation structure and microclimate, and this also indirectly impacts spider's prey availability. Spiders may benefit from selective grazing, which encourages pernicious weeds that may support more insect prey. However, grazing animals are also drawn to pernicious weeds, which may lessen vegetation and thus lessen spider food availability.

Cutting

Rapid change caused by cutting the vegetation (upkeep and maintenance at Lick Creek Park) may have an impact on the abundance and diversity of spiders. The timing and the way vegetation is cut may affect how some spiders are favored by increasing short grass habitat and others are affected by reduction in tall grass habitat. Different levels of grass, thinning of vegetation, and the time the vegetation is cut may affect the abundance, diversity, distribution and life cycles of spider species.

Human Trampling and Path Creation

In heavily used nature reserves, human trampling may become too intense for even the most resilient plant and animal species. The more intense the trampling, the more compact the litter becomes. This leads to a substantial decline in spiders, although, some species such as in the family Linyphiidae may tolerate intense treading of the surrounding vegetation. Problems caused by grazing may be intensified by trampling, reducing the height and cover of the vegetation. Once this occurs there is a severe reduction in the number of spider species available, with no clear indication of recovery even a year after the trampling episode. As such, human trampling needs to be kept to a minimum by providing limited and defined routes in sensitive areas of intense use (Bell et al. 2001).

Platnick (2007) estimated there are about 110 families of spiders containing 39,000 species worldwide. Spiders are the most abundant insectivorous predators of terrestrial ecosystems (Nyffeler and Benz 1987, Wise 1993, Nyffeler 2000). Spiders are among the highest ranked predators in food chains, and their phenology and community structures are closely affected by disturbance and vegetation structures compared with species inhabiting undisturbed temperate areas. Species in habitats subjected to a high level of disturbance tend to have more than one generation per year (Maelfait and DeKeer 1990, Draney and Crossely 1999). Habitats exhibiting a higher level of spatial heterogeneity are associated with high abundance and species richness of spiders

(Greenstone 1984, Dobel et al. 1990). Lower spider abundance and species diversity are characteristics of areas subjected to high levels of disturbance, such as grazing, agricultural practices, forestry, and burning. Spiders are suggested to be good indicators of the effect of environmental impact on biodiversity (Hsie et al. 2003). The abundance and diversity of spiders complements most other invertebrate groups, making spiders suitable as ecological indicators of riparian habitats (river margins) (Bell et al. 1999).

The ecology, phenology, and character of spiders are also important to agriculture. Spiders prey on a broad range of prey types, even if prey densities are low, and even if the prey itself is larger. Prey preference, foraging methods, and timing of predation vary among spider species. The successful suppression of pests has been reported where spiders act as multi-species assemblages (Riechert 1999, Sutherland and Samu 2000).

The precise effect of spider predation on pest density will vary according to other factors that may influence the rate of pest increase at particular times. It was estimated that, depending on local conditions, spider predation can reduce peak aphid density by 37% (Fraser 1982, Sutherland and Samu 2000).

Debarro (1992) showed that an eighteen-fold decrease of Lycosidae and Linyphiidae spiders inside enclosures in a perennial grass pasture resulted in a sixteen-fold increase in density of a cereal aphid. Sutherland and Samu (2000) suggested that a promising option for utilizing the specific predatory characteristics of spiders for biological control of pests was to increase their density and distribution within crops to keep spiders as physically close to pests as possible. If this is achieved early in the cropping period, at the very start of the pest density increase phase, even a moderate spider density can create a favorable predator pest ratio (Chiverton 1986, Holland and Thomas 1997, Sutherland and Samu 2000). Agriculture diversification is a potentially powerful means of achieving enhanced spider density in the right place at the right time (Sutherland and Samu 2000).

My goal in this research is to identify spider species present and examine their diversity, abundance, and seasonality in three different habitats. Data collection for this research was collected using pitfall traps monitored regularly for one year.

This constitutes the first recorded research that has used pitfall traps at Lick Creek Park to examine life history, habitats, abundance, diversity, and distribution of spider species.

CHAPTER III

MATERIALS AND METHODS

Study Site

The study site is Lick Creek Park, located in the southeastern corner of College Station. The park encompasses 515 acres comprised of Post Oak Savannah vegetation, hardwood forest, open marshland, oxbow meadows, upland oak forest, sandy prairies, and well developed riverine microhabitats (Lick Creek is a major tributary of the Navasota River). Lick Creek Park contains a diversity of plants, animals, and insects. This park is the property of the city of College Station and provides a community resource for bicycling, hiking, equestrian and natural resource conservation activities.

Pitfall Traps

Pitfall trapping involved the placement of open containers in the ground to estimate the abundance and species composition of active spiders in the area. Six pitfall traps per habitat were located in each plot and were inspected every two weeks (first 3 months), then monthly, for a year. Each trap consisted of a 592ml, 10cm dia. plastic cup: inside was a smaller cup filled with animal-safe antifreeze (propylene glycol) (Sierra®, www.sierraantifreeze.com) and a funnel that prevented escape of spiders that fell into the trap. Traps with lids were set in the field and opened 48 hours later to minimize "digging in" effects (Greenslade 1973). Pitfall traps in each microhabitat were placed 61m apart and located within ~ 4 meters of the public trail.

Pitfall trapping is among the most frequently used methods to sample surface-active terrestrial arthropod communities. Typically, pitfall traps are open containers sunk into the ground, flush with the substrate surface. These traps passively collect organisms moving across the ground and have provided relative measures of activity rather than absolute density (Work et al. 2002). Pitfall traps capture both diurnal and nocturnal species continuously and impartially, and are easy to maintain. Furthermore, they are well recommended for comparative community studies (Bell et al. 1999). Data collection is affected by weather. Some data may be lost due to heavy rains or to snow (freezing). Despite their deficiencies, pitfall traps are recommended as a collecting technique suitable for monitoring the presence or yearly fluctuation of a species and for providing a suitable sample for detailed analysis (Standen 2000).

From 15 April 2005-15 April 2006, samples were obtained from pitfall traps placed in Lick Creek Park in College Station, Brazos Co., Texas (30°33’44”N, 96°12’54”W); GPS coordinates were determined using a handheld GPS device. Six pitfall traps were placed in each of three microhabitats: upland woods, post oak woodlands, and disturbed areas. The pitfalls were positioned so that they were not close to heavily trampled areas but close enough to pathways for servicing. (Appendix Fig. 20). The data was collected and recorded every two weeks from 15 April-15 July 2005, when they were checked and/or replaced on the 15th and 30th of each month, and then sampling was conducted monthly until 15 April 2006. Sorting consisted of removing samples from pitfall traps with trap replacement. Samples were stored in the lab in their cups through processing. They were processed according to identification number on the cup and numbers of spiders per sample were recorded and then separated into different families, genera and species. I identified the captured spiders and assessed their abundance, diversity, and distribution during the collection period.

Identification

Specimens were identified by using spider keys and literature (Kaston 1978, Roth 1993, Jackman 1997, Levi et al. 2002, Ubick et al. 2005). Illustrations provided by Dean (2001-2005) and reference specimens from the Texas A&M University insect collection were also used. Spiders, like many invertebrates, require care in identification because species differences are rarely based on color, but on morphological characters, which normally demand some taxonomic expertise. The difficulty of spider identification has been partly alleviated with the publication of guides of the British fauna, which have also increased ecological interest in the group.

Voucher Specimens

Specimens were labeled for: date, habitat, locality, trapping method, collector's information and comments. Voucher specimens minimally consisted of an individual of each sex from each species (if possible) deposited in the Insect Collection of the Department of Entomology, Texas A&M University at College Station, TX. The voucher specimens have been assigned an identifier number (662) by the curator and this identifier will be noted in publications, etc. that result from this work. This will allow future workers to access actual specimens found in this study and will aid in verification and confirmation of future work.

Biodiversity sample data was transferred into Excel® spreadsheets, from which graphs were generated to assist in analysis. Data was analyzed using ANOVA, a statistical package SPSS (2002) that shows where significance is indicated. Separation analysis was conducted using appropriate tests like Tukey's. Further analysis using diversity indices such as Shannon's *H* and *E* Test were conducted as needed.

CHAPTER IV

RESULTS

Spiders from 24 families, 66 genera, and 111 species were identified from 918 specimens, including 627 immature and 291 adult spiders, captured in pitfall traps deployed in Lick Creek Park (Appendix Table 2). There were also 85 Opiliones (harvestmen) captured and recorded, but not analyzed further, in this study.

Ground dwelling spiders were found in pitfall traps throughout the one year sampling period and densities were highest during the late April to mid-June period (Fig.1). Species identifications (Table 1) were made from the 291 adults captured, since reliable keys were not typically available for identifying immatures to species. Spider seasonality at LCP displayed the highest densities in the late spring-early summer period (Fig. 1). Note that sampling occurred twice a month until July 15 and at monthly intervals thereafter, so that pooling the densities for May 1 yielded an average of ~8 spiders/trap, and averages of ~11.5 and ~9 for June 1 and July 1, respectively.

Table 1. Densities of various life stages of 24 families of spiders found at Lick Creek Park in pitfall traps from 15 April 2005-15 April 2006.

Family	Adult Male	Adult Female	Penultimate Male	Penultimate Female	Immatures	Total
Agelenidae	2	1				3
Amaurobiidae	1					1
Anyphaenidae					1	1
Araneidae		1				1
Clubionidae	6	6	1		11	24
Corinnidae	14	11	3		12	40
Ctenizidae	1					1
Cyrtaucheniidae	29			1	9	39
Dictynidae	8	4			2	14
Gnaphosidae	26	6	5	1	10	48
Hahniidae	45	10	1		4	60
Linyphiidae	40	20			7	67
Lycosidae	217	72	7	15	106	417
Mimetidae		1			1	1
Mysmenidae	1	1				2
Oxyopidae	2				3	5
Philodromidae	1				1	2
Salticidae	25	8	5		23	61
Segestriidae	5					5
Sicariidae	1					1
Tetragnathidae	1	3				4
Theridiidae	5	4	1			10
Thomisidae	10	1	2		16	29
Titanoecidae	1					1

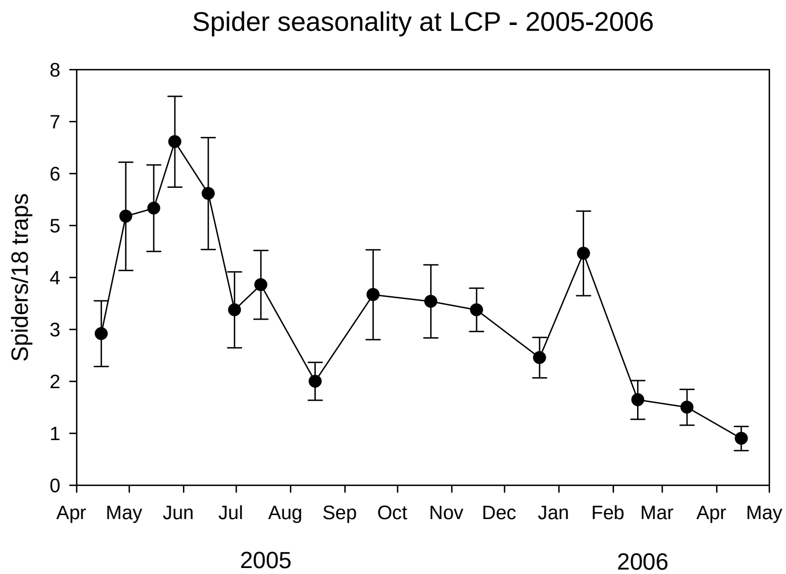

Figure 1. Number of spider species found in pitfall traps regularly monitored from 15 April 2005 until 15 April 2006 at Lick Creek Park.

This further accentuated the seasonality peak referred to earlier. The small standard deviations across data points (<20% of the means) indicate a consistentency in spider distribution among traps within and among sample dates, and spider densities varied within an order of magnitude through time (~1-10 spiders/trap). The seasonality observed (Fig. 1) was consistent with adult spiders with an annual life cycle (Anderson 1974) provided an increased abundance of prey that typically occurs in the spring (Riechert 1974, 1976, Rypstra 1985, Foelix 1996), consisting of flies, collembolans, beetles, grasshoppers, and butterflies. Increased food availability also allows growth and quick maturation (Miyashita 1968, Ward and Lubin 1993), and production of large egg masses (Kessler 1973, Blanke 1974, Wise 1975, Foelix 1996), which may explain the increased incidence of immatures in the summer/fall. This appears to be the best explanation for the seasonality observed.

However, other factors that may have played a role were weather and the effects of the sampling methods used in the study. The 10^{th} warmest year on record in College Station, Texas occurred in 2005 and the 6^{th} warmest occurred in 2006 and 2005 was among the driest of years on record for the region (Lawrimore 2006). My one year data base is insufficient to analyze these effects further, but this is noted to ensure investigators are alerted to this if comparisons with this data base were to be made in the future.

The sampling methods used resulted in traps being maintained at fixed locations that removed spiders without replacement throughout the study. Given that the captured spiders had an annual life cycle, their removal combined with the dynamics of the remaining spiders may have resulted in biasing the trap captures during the initial phases of this study as follows: spiders may disperse more when prey is abundant (spring) or mating opportunities with virgin females increase (spring) and less as prey availability or virgin female densities decrease, so that the probability of capture also decreases even at the same spider density in the area; This, combined with a presumed increase in territoriality and increased cannibalism as prey availability decreases, could also contribute to fewer trap captures at other times. Given the low incidence of > 50% of the taxa (66 species with <3 total individuals captured) found in this study, this factor cannot be ruled out of consideration, however, the area of each trap comprised $<8*10^{-6}$ of the area in which the trap was placed and trap-out effects were expected to be minimal.

The rate at which the 111 species appeared in the samples was analyzed to obtain some insight into how well the sampling effort had characterized the actual number of species present that could be found using this sampling technique at this location. The cumulative number of new (species not found in previous sample(s)) spider species found increased rapidly through the first 5 sampling periods and then tapered off through the 14th sample, appearing to reach an asymptote with samples 15 and 16 (Fig. 2). A true asymptote would mean that all species present that were detectable using this technique had been found. Interpretation of the data was conducted using Chao-1 (Chao 1984) and Chao-2 (Colwell and Coddington 1994). Chao (1984) devised a predicted total species estimator (Chao-1) based on total species found and the number of species found only once or twice. There were 111 total species in my collection and 45 were found only once and 20 were found only twice: the calculation is $111 + (45^2/20*2)$, suggesting that 161 spider species would be expected to be detected in habitats examined in Lick Creek Park using pitfall traps. Simpson's Diversity measure bootstrap estimates determined species diversity overall to be very diverse (0.966). Shannon Weiner Diversity bootstrap estimate also determined high diversity (5.483). Also, Simpson's measure of species evenness determined to be low by 0.264 (Krebs 2002). This analysis suggests that 68% of the species present were found in this study and that an estimated 53 species remain to be found.

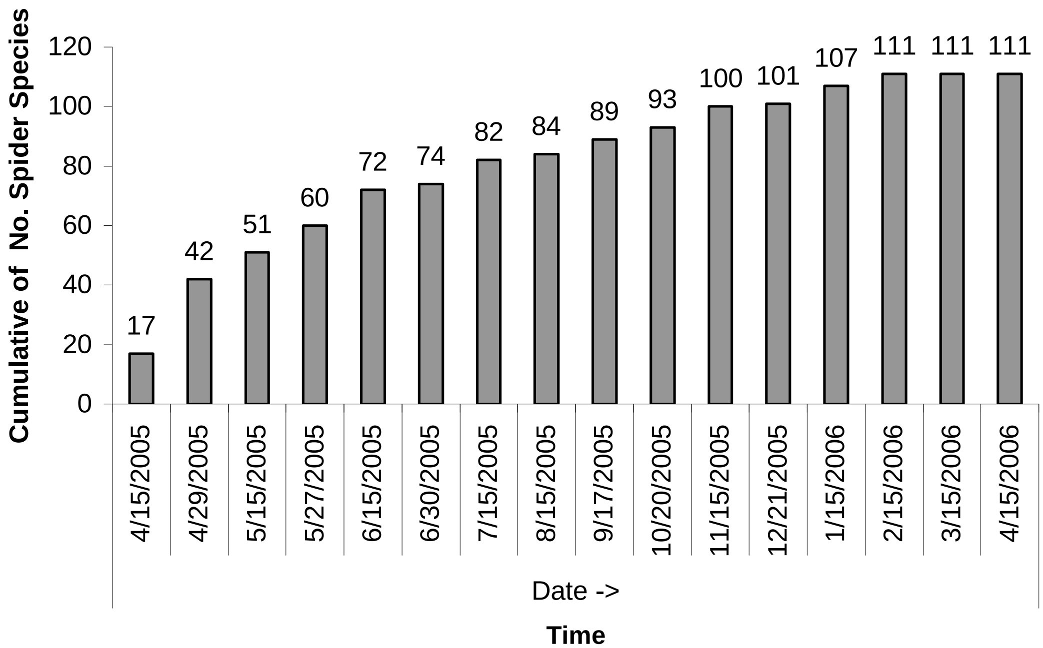

Figure 2. Cumulative number of spider species detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Rates of species accumulation were also determined for the three habitats examined within Lick Creek Park using Chao-2. The patterns of accumulation reflect the expected initial rapid rise followed by a tapering to a slower rate of increase. Inspection of these results showed that new (species not found in previous sample) species continuing to appear in individual habitats had often already been seen in adjacent habitats as the study progressed. Using the same estimator of total species expected in each habitat as noted above (Chao 1984), Upland Woodlands calculates to 148 (71 actually found), Post Oak, 111 (61 actually found) and Disturbed, 78 (56 actually found), indicating that 48%, 55%, and 72%, respectively, of expected species present in these habitats had been captured in this study. These data were also analyzed using rarefaction analysis that allows placement of a confidence interval (0.05) for each data point (Fig. 3) using Chao-2 (Colwell and Coddington 1994). These results indicate that the present study has provided a substantial inventory of these ground spider species that comprises about two-thirds of the fauna that may ultimately be found there using this sampling method.

Spider abundance and phenology in Lick Creek Park varied by life stage, with immatures predominating from July to January (Fig. 4), penultimate males showing a small peak at the end of April and penultimate females in September (Fig. 5), and adult males showing a distinct peak and females a modest peak in May-June (exceeded by higher but fluctuating densities of females in winter) (Fig. 6). Adult males (438) significantly (i.e., deviating from a presumed 50:50 sex ratio) outnumbered adult females (150) by a 3:1 ratio (X^2, P<.001, 1df), however, penultimate males (27) did not significantly differ from penultimate females (20) (X^2, P=.31, 1df). Gender frequencies in spiders have not been well studied. Exact determination of gender in penultimate females is also confounded by an indistinct epigynum that prevents their separation from immatures in some groups and thus probably underestimates this category to a small degree in the data base. The failure to reject the null hypothesis of a 50:50 sex ratio occurring in penultimate males and females, implies that this ratio may exist when adulthood is reached. Thus, presuming that a 50:50 sex ratio actually exists in adulthood (Appendix Table 3), the preponderance of adult males could be due to increased peripatetic behavior in search of the more sessile females.

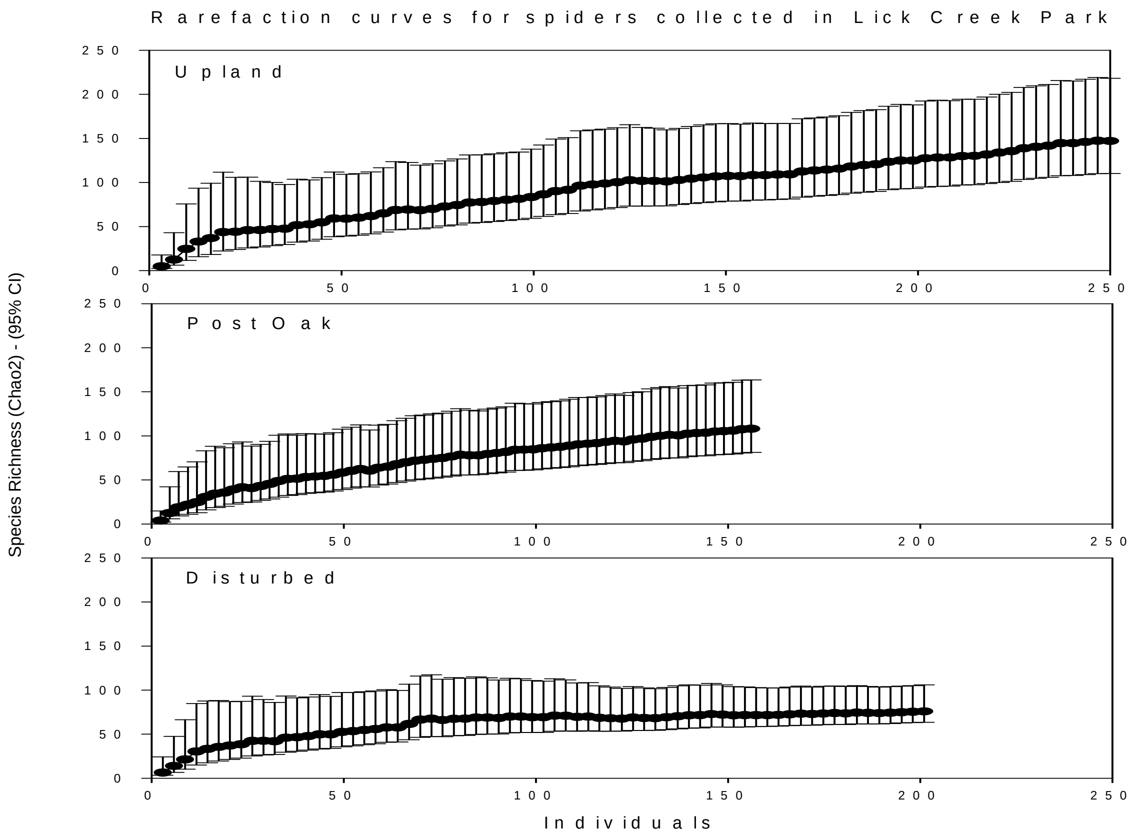

Figure 3. Species richness estimates for spiders found in three habitats in pitfalls at Lick Creek Park during 15 April 2005-15 April 2006.

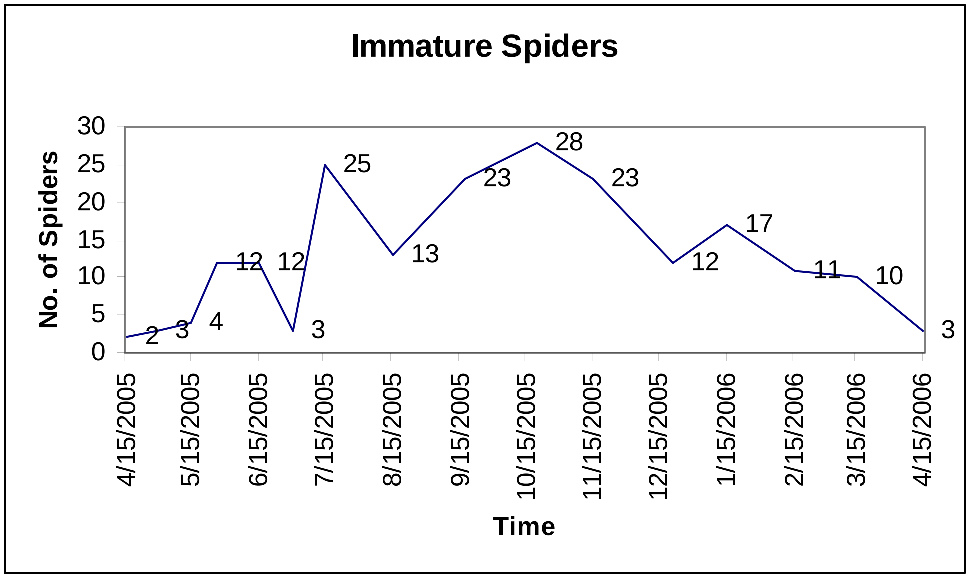

Figure 4. Seasonal occurrence of immature spiders in all pitfall traps at Lick Creek Park from 15 April 2005-15 April 2006.

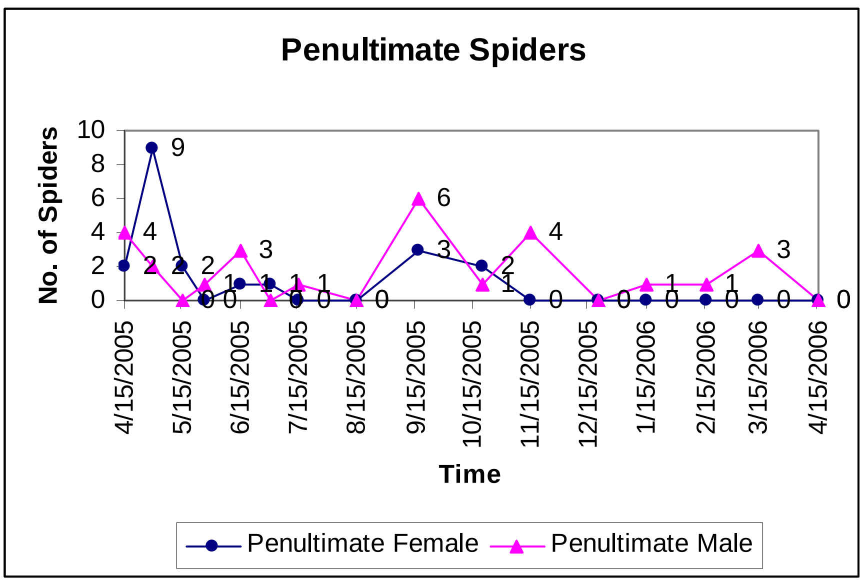

Figure 5. Seasonal occurrence of penultimate male and female spiders in all pitfall traps at Lick Creek Park from 15 April 2005-15 April 2006.

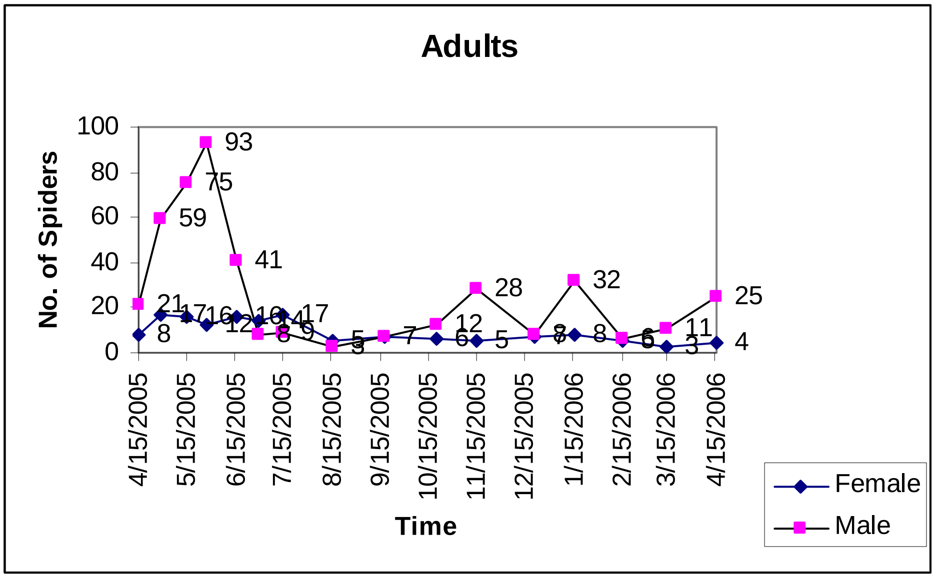

Figure 6. Seasonal occurrence of adult spiders in all pitfall traps at Lick Creek Park from 15 April 2005-15 April 2006.

Spider abundance per sample was not shown to be statistically significantly different among habitats (Fig. 7), indicating that the spider carrying capacity was similar among these habitats. Spider phenology was also similar among habitats with obvious peaks occurring in mid-spring and fluctuating lower densities occurring at other times (Figs. 4-6). These phenologies indicate that temporal resource availability was also similar among habitats. The distribution of spider taxa represented by a single individual (45 of them) were also analyzed by habitat and 18 were found in upland woods, 16 in disturbed and 11 in post oak; this distribution does not differ from a uniform distribution across habitats.

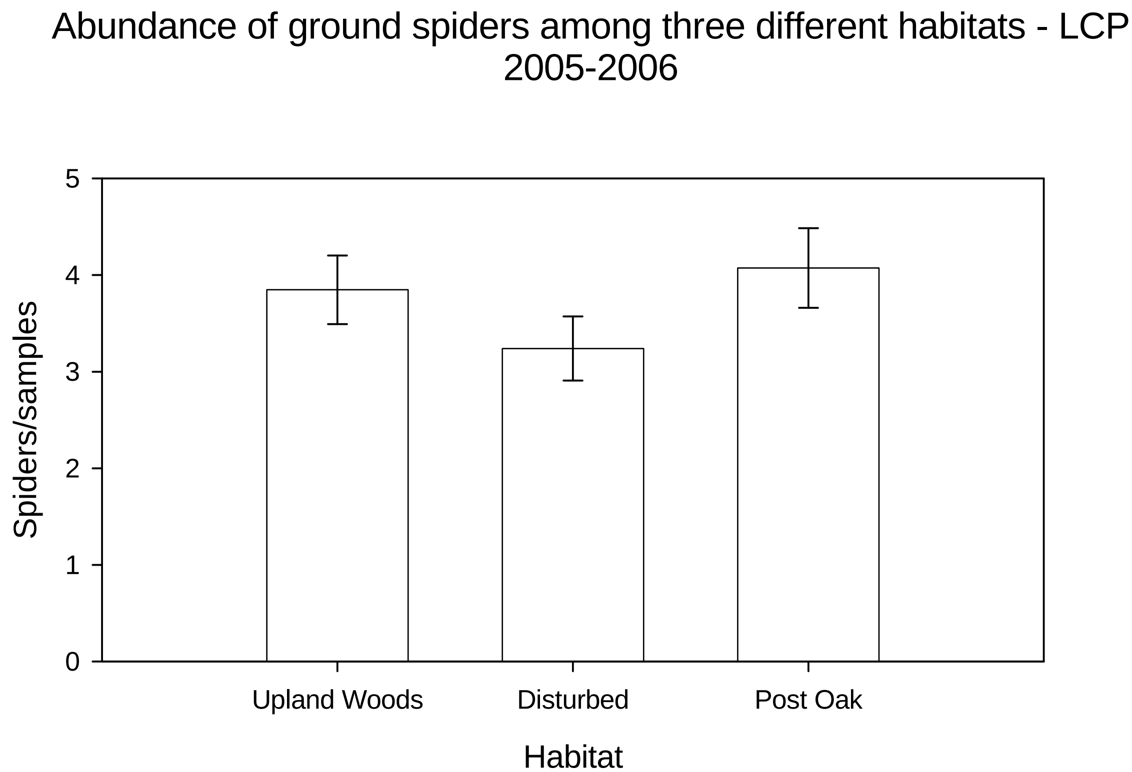

Figure 7. Average spider density detected in three habitats by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park. Analysis using ANOVA and Tukey's test indicates spider densities were not significantly different among habitats.

Spiders were disproportionately distributed among families in this study (Table 4). Lycosids were significantly the most abundant in every habitat (Fig. 8), with 9 other families occurring at intermediate densities (24-60 total) and the remaining 15 families at low (<15 total) densities. Spider densities within families were not shown to be significantly different among habitats, but low densities and the absence of some families in specific habitats constrained more detailed analyses in many instances. The presence of a particular family in one or two habitats, but absent in another habitat (or two), was only observed among the rarer families whose members were at low densities when they occurred at all (Fig. 9). Given that detection of additional accumulation of species was still occurring within habitats at the end of the sampling period (Fig. 3), little significance should currently be placed on the absence of a family from a particular habitat or two, until colaboration is obtained through additional sampling. The 10 most abundant families were selected for additional analyses because their densities provided tractable sample sizes with which to conduct them.

Spider Families

This prelude to an analysis of data by spider family emphasizes limitations that are imposed by a study of this kind and various factors may prevent drawing broad generalities from this work. These include: 1) Spiders are known to be generalist predators that can subsist on a wide variety of prey and our findings may simply reflect the opportunistic meanderings of the extant spiders in search of that prey; 2) sampling methodology using pitfalls, although productive in demonstrating the presence of many species, may not be the best method to detect habitat partitioning within a species because this relative measure of density may not be reflective of the absolute density occurring in each habitat; 3) the intensity of sampling in space and time may have been insufficient to allow detection of habitat partitioning, if it was occurring, using this methodology; and, 4) the partitioning that may be occurring may be taking place based on factors other than those used to delineate the habitats erected for this study in the first place. The results presented here provide a basis for further study of this question of

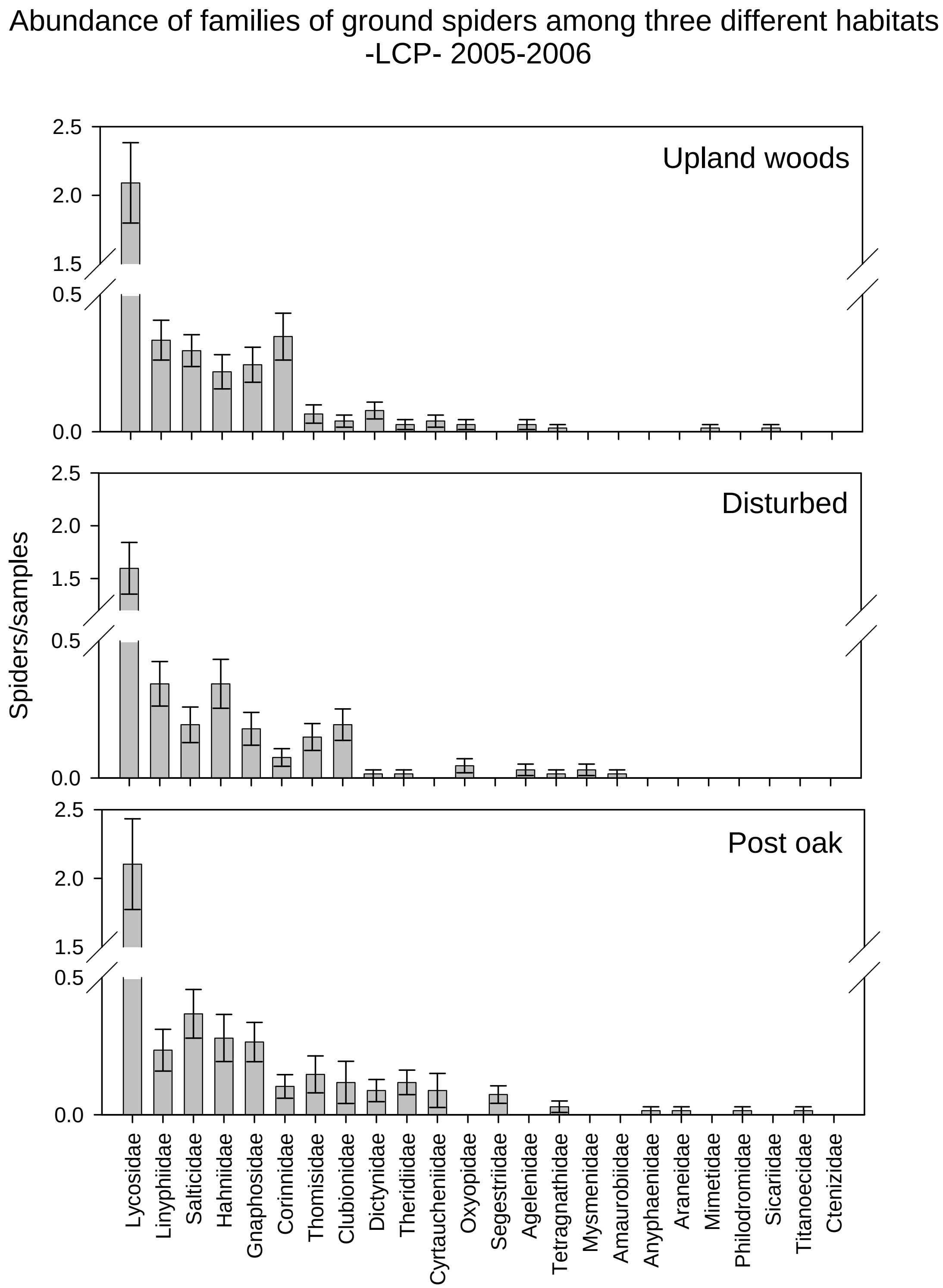

Figure 8. Average spider density for each of 24 families detected in 6 pitfall traps per habitat over 16 sample dates from 15 April 2005-15 April 2006 at Lick Creek Park.

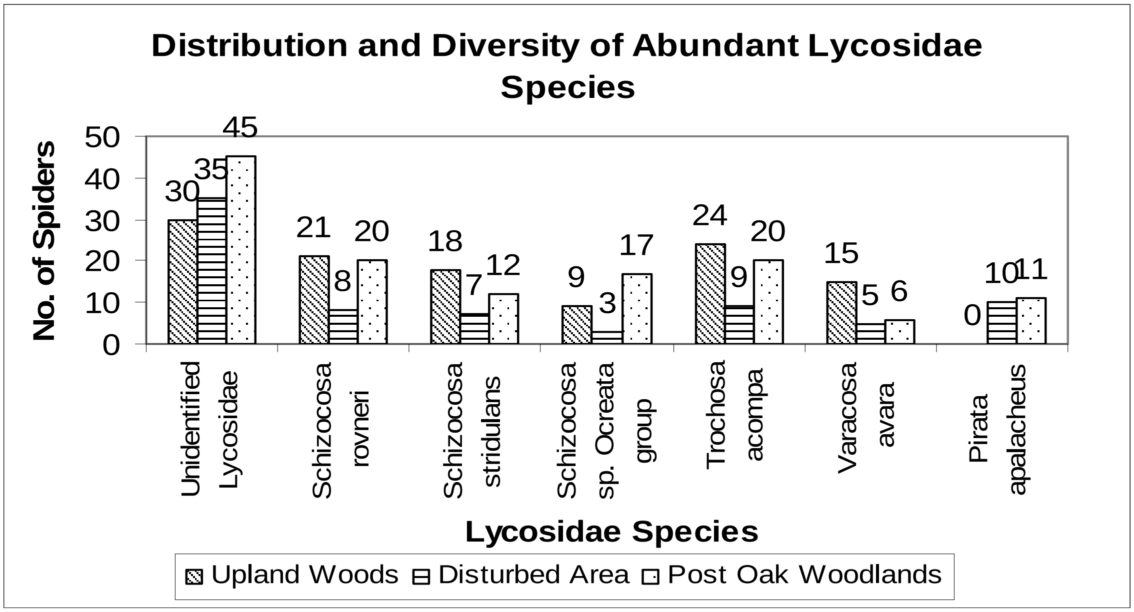

Figure 9. Lycosid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

methodologies and taking into account more factors to address this question. Therefore the presentation of results and discussion of these families is abbreviated to include pertinent data and additional analyses were only undertaken when warranted by that data. Abundance is demonstrated in families, genera, species, and by gender and life stage. Lycosidae, Salticidae, Hahniidae, Gnaphosidae, Corinnidae, Thomisidae, Clubionidae, Cyrtaucheniidae, Tetragnathidae, Theridiidae and Linyphiidae were generally the most abundant and found to occur in each habitat (Appendix Table 4); the remaining families occurred in low densities (<15 total individuals) and were represented in only one or two habitats (Fig. 8).

Family Lycosidae

The 417 lycosids found constituted 45% of all spiders found in this study (Fig. 9). Species compositions of lycosids were determined from 217 lycosid adult males and 72 females that were categorized as belonging to 29 species. The remaining 22 lycosids were penultimate gender identified only to family level and immatures consisted of 106 specimens. Lycosids (adults plus immatures) occurred at significantly different densities among habitats with 117 in Upland Woods, 78 in Disturbed and 131 in Post oak Woodlands (P = .05, 2df), indicating that the Post oak Woodlands was a more supportive habitat than Upland Woods and that Disturbed was the least supportive habitat. However, analyses of lycosid adult distributions among the three habitats show Upland Woods and Post oak Woodlands to support about equal numbers with the Disturbed supporting a significantly lower density (P = .05, 2df). This may be due to differential dispersal to or higher survival of immatures in Post oak Woodlands.

Among the 29 lycosid species, the 6 most abundant were selected for further analyses. The most abundant lycosid was *Trochosa acompa* (n=53), followed by *Schizocosa rovneri* (n=49), *Schizocosa stridulans* (n=37), *Schizocosa* sp. o*creata group* (n=29), *Varacosa avara* (n=26) and *Pirata apalacheus* (n=21). These six species occurred at significantly different densities (P = .05, 5df) in Lick Creek Park and five of them occurred at significantly different intraspecific densities among habitats (P = .05, 2df), with *Schizocosa stridulans* not being significantly different among habitats (Fig. 9).

Among the five most abundant species, distribution was about equal between Post oak Woodlands and Upland Woods and significantly lower in Disturbed. However, the 6th most abundant species, *Pirata apalacheus*, was found evenly divided between Post oak Woodlands habitat (n=11) and Disturbed habitat (n=10), but was not found in Upland Woods during the study period; this suggests that Upland Woods habitat may be less supportive of *P. apalacheus* compared to the other two habitats. The 23 remaining lycosid species occurred at densities too low to warrant more detailed analyses.

The most abundant lycosid species indicate there are differences in their occurrence among the habitats at Lick Creek Park, indicating there may be some habitat partitioning. Lycosids only identified to the family level consisted primarily of immatures (Fig. 10). Analyses of their distribution among habitats were not conducted.

Family Linyphiidae

The 67 linyphiids identified represented 18 taxa from 54 adults. Of the three most abundant species, *Erigone autumnalis*, *Meioneta* sp. nr *llanoensis* and *Meioneta* sp. nr *unimaculata*, only the latter was found in all three habitats (Fig. 11). Species densities were too low to warrant additional analyses.

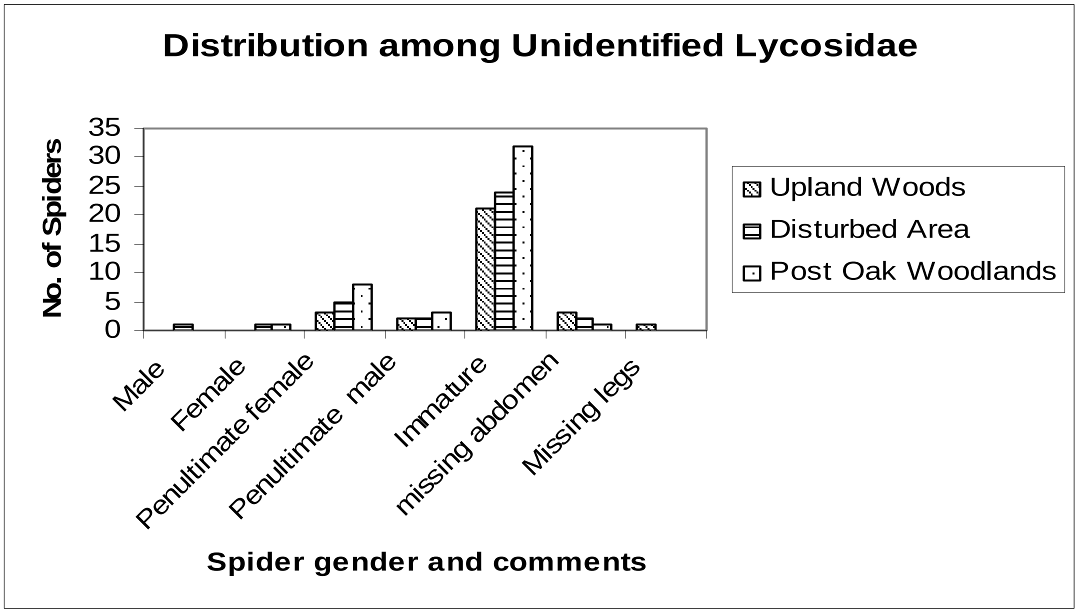

Figure 10. Categories of lycosids that could not be identified to species.

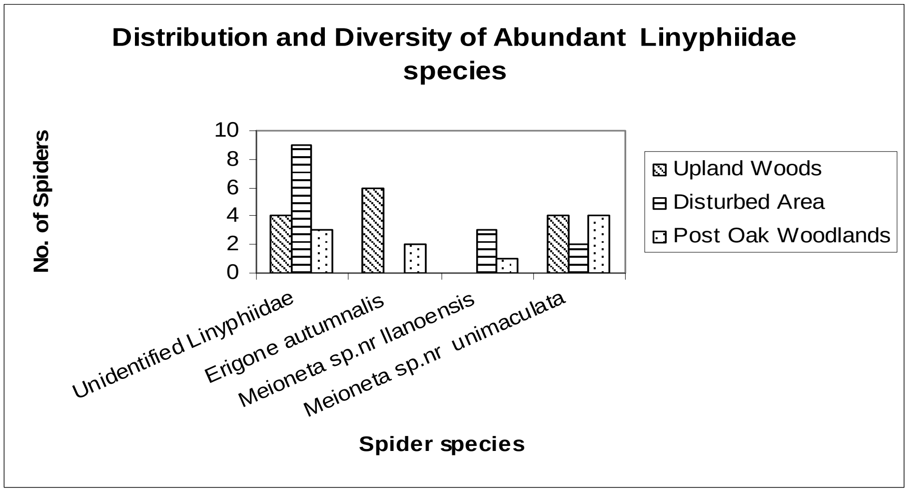

Figure 11. Linyphiid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Family Salticidae

The 73 salticids were identified to represent 10 taxa from 41 adults. *Habronattus* sp. nr *moratus* was significantly most abundant (chi-square=6.84, 2df, P=0.033) in Post oak Woodlands (Fig.12). Other species densities were too low to warrant additional analyses.

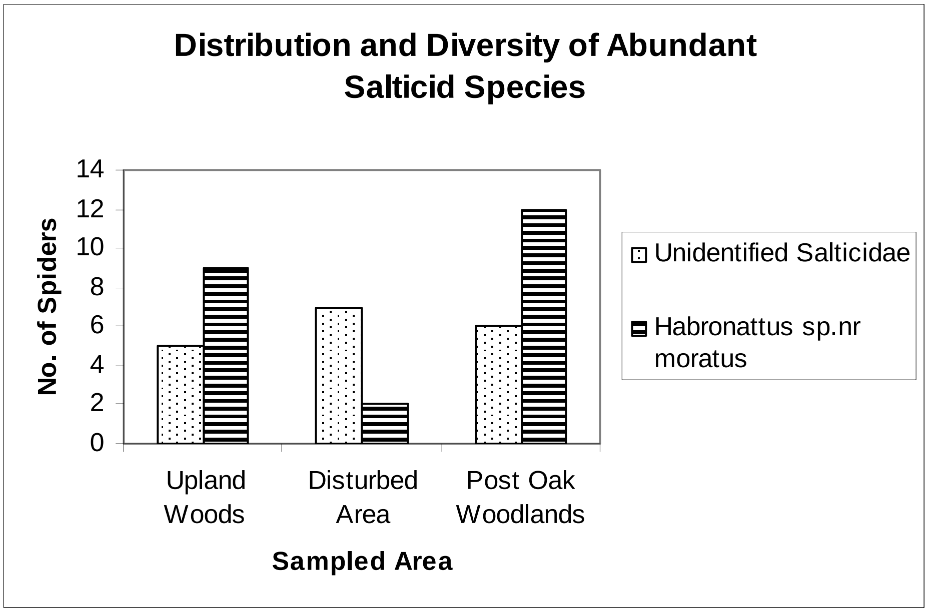

Figure 12. Salticid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Family Hahniidae

The 60 hahniids were identified to represent 4 taxa from 55 adults. *Neoantistea agilis* and *N. oklahomensis* were the most abundant species (Fig. 13). Chi-square analyses did not indicate significant differences in distribution among habitats for either species. Other species densities were too low to warrant additional analyses.

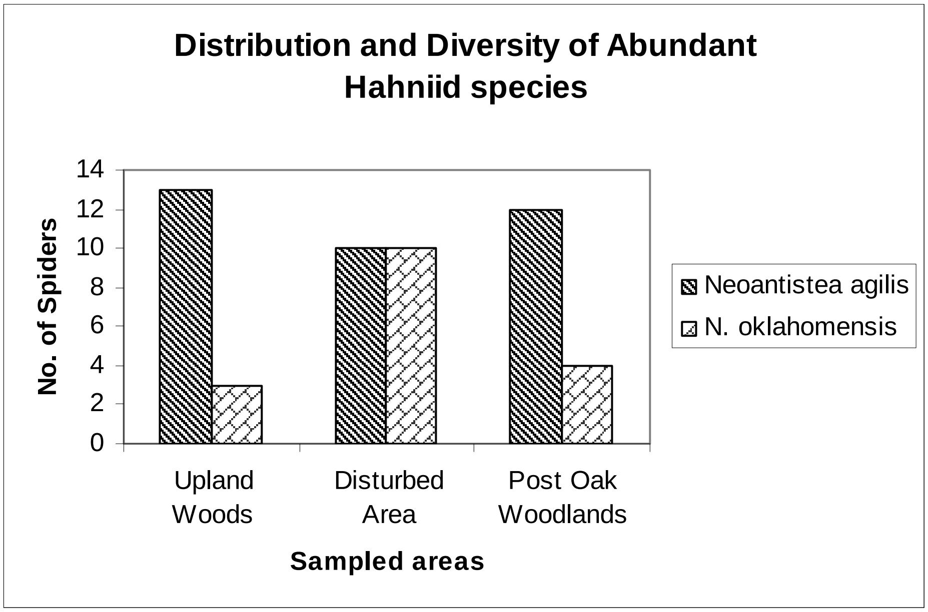

Figure 13. Hahniid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

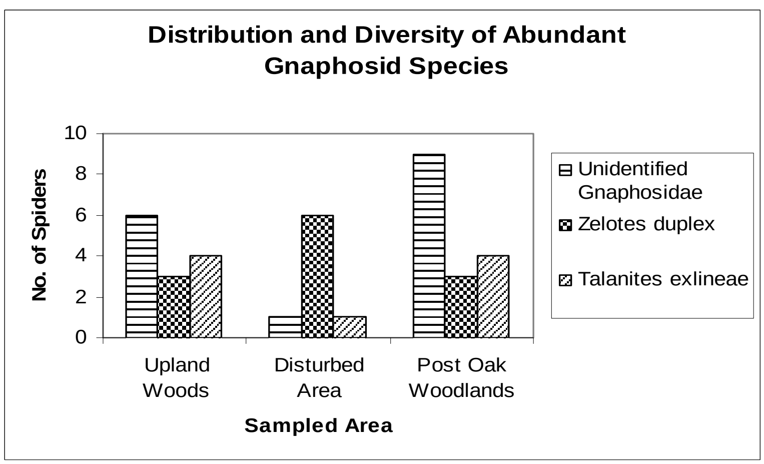

Figure 14. Gnaphosid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Family Gnaphosidae

The 48 gnaphosids were identified to represent 8 taxa from 32 adults. Neither of the two most abundant species, *Zelotes duplex and Talanites exlineae*, was sufficiently abundant to warrant additional analyses (Fig. 14).

Family Corinnidae

The 40 corinnids were identified to represent 8 taxa from 25 adults. *Phrurotimpus alarius* was insufficiently abundant to warrant additional analysis (Fig.15), but one can observe this species was not found in the disturbed area.

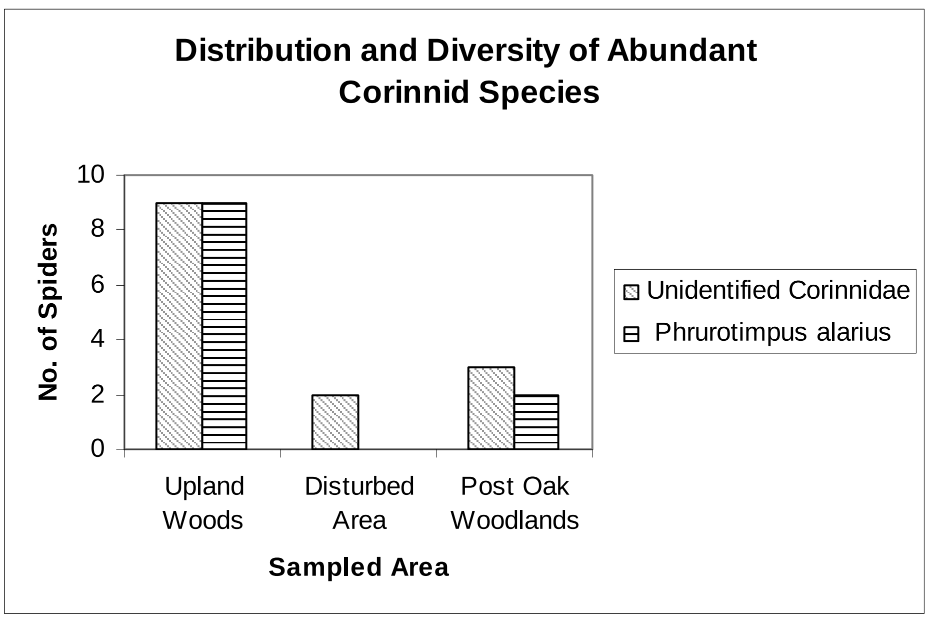

Figure 15. Corinnid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Family Thomisidae

The 29 thomisids were identified to represent 5 taxa from 11 adults. The most abundant species were *Misumenops* sp., *Xysticus* sp., and *Xysticus fraternus* (Fig.16). *Xysticus fraternus*, and *Xysticus* sp. occurred in all three habitats and *Misumenops* sp. occurred only in the disturbed area. Densities were insufficient to warrant additional analysis.

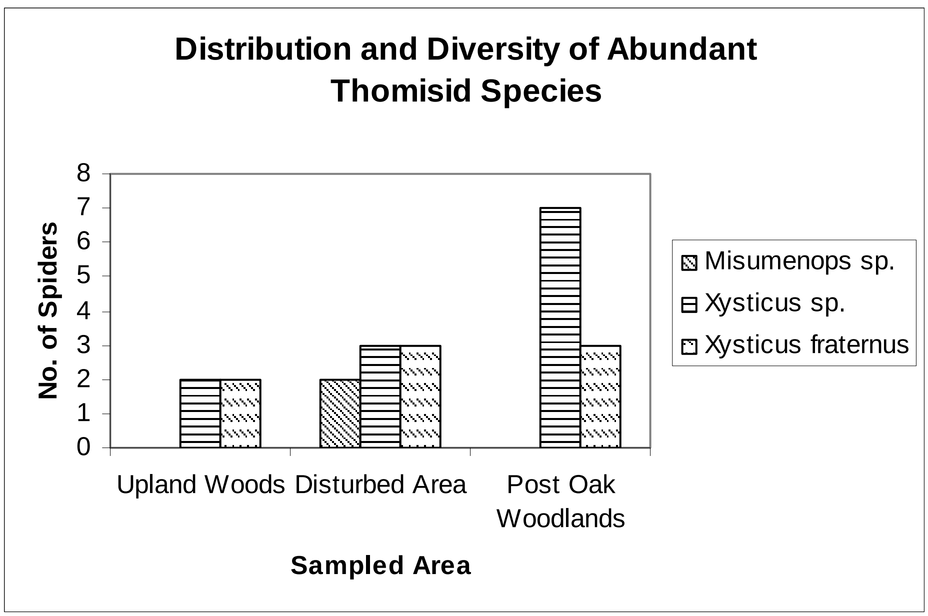

Figure 16. Thomisid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

Family Clubionidae

The 12 clubionids found were all adults. The species identified as *Clubiona* sp. nr. *littoralis* (Fig. 17), occurred in all three habitats. Densities were insufficient to warrant additional analysis.

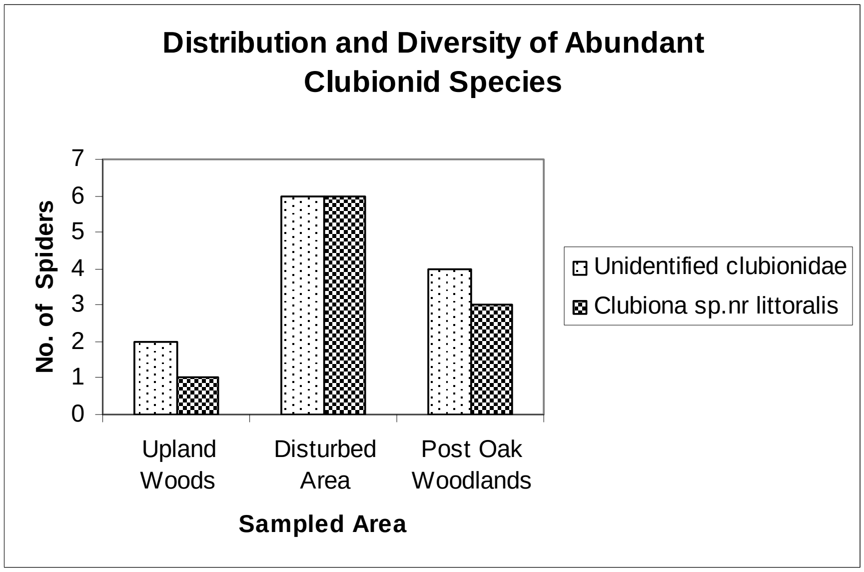

Figure 17. Clubionid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-15 April 2006 at Lick Creek Park.

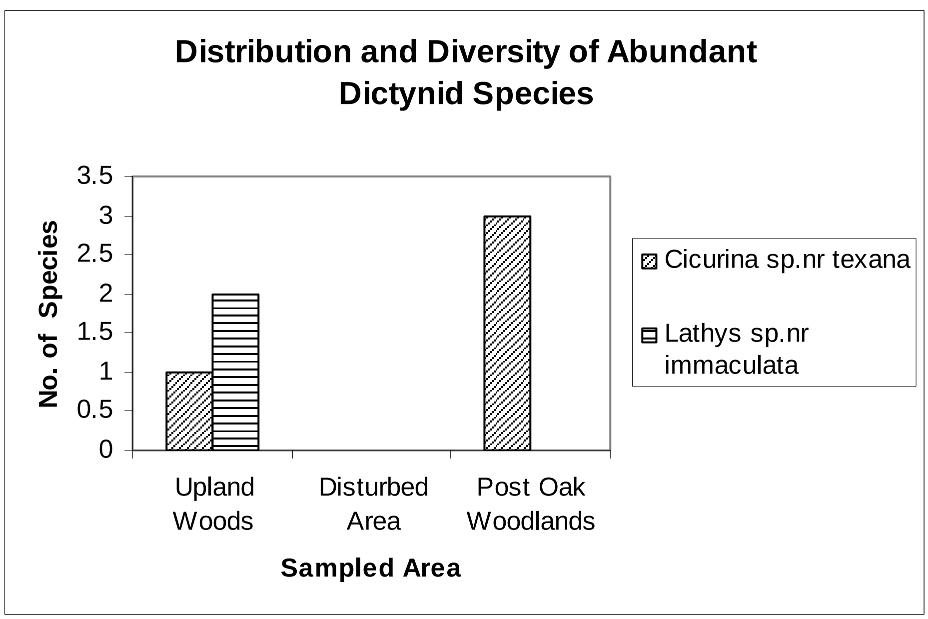

Figure 18. Dictynid species density distribution among three habitats detected by pitfall trapping from April 15, 2005-April 15, 2006 at Lick Creek Park.

Family Dictynidae

The 14 dictynids were identified to represent 6 taxa from 12 adults. Abundant species were *Cicurina* sp. nr *texana*, and *Lathys* sp. nr *immaculata* (Fig. 18). Neither species occurred in the Disturbed. Densities were insufficient to warrant additional analysis.

Family Cyrtaucheniidae

The 39 cyrtaucheniids were identified to represent 1 taxon, *Myrmekiaphila fluviatilis*, from 29 adults (Fig. 19). *Myrmekiaphila fluviatilis* did not statistically differ among habitats (CHI² 4.77, 2df, P=0.09).

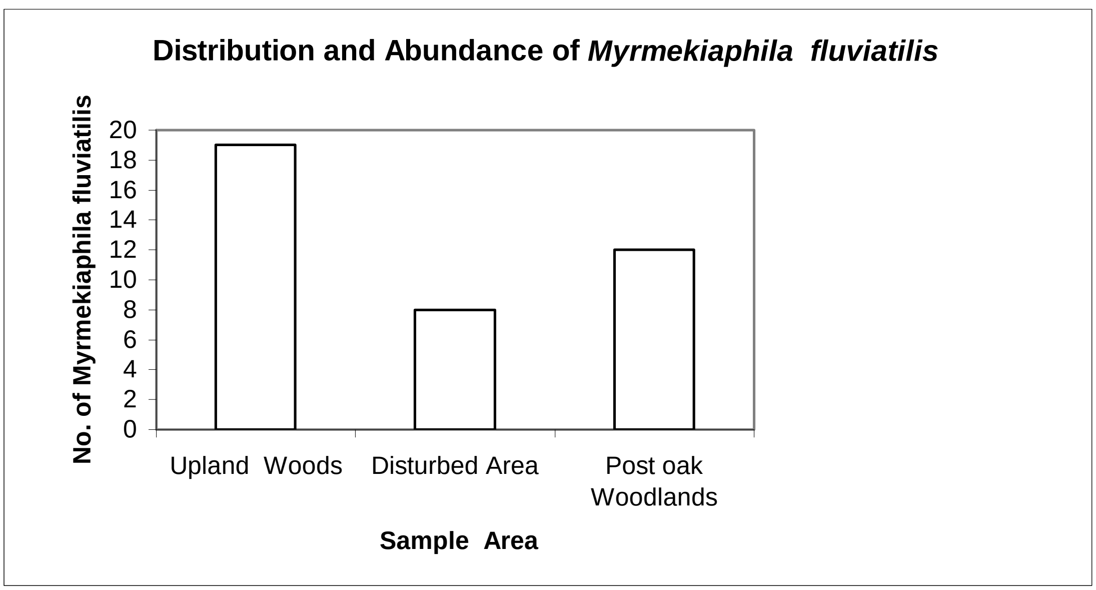

Figure 19. Cyrtaucheniid species density distribution among three habitats detected by pitfall trapping from 15 April 2005-April 2006 at Lick Creek Park.

Remaining Families

The remaining 13 families were represented by 32 individuals (Table 1). Densities were insufficient to warrant additional analysis.

CHAPTER V

DISCUSSION AND CONCLUSION

This study of the diversity, abundance and distribution of spiders at Lick Creek Park (LCP) is compared and contrasted to what is currently known of spiders in the United States. LCP is ~2 km^2, or 2.2 x 10^{-7}, the land area of the United States. LCP minimally contains 35% of the families (24 vs 68), 12% of the genera (66 vs 569), and 3% (111 vs 3,700), of the spider species found in the United States (Selden et al. 1991, Foelix 1996, Cushing 2005, Ubick et al. 2005). This inventory shows LCP is rich in spider diversity and contains a disproportionately large number of the taxa found in the United States. This may be due, in part, to spiders being generalist predators capable of occupying a wide range of habitats. Allred and Kaston (1983) report 621 spider species (~17% of the United States total) occurring in Utah and 975 species (~26% of the United States total) are currently reported from Texas (Dean 2004). Thus, the LCP inventory appears to be consistent with findings elsewhere that species richness is a common occurrence (Appendix Table 4). However, spider inventories are lacking for most areas. There is a paucity of spider taxonomists (Riechert et al. 1985, Coddington et al. 1990), few museum collections exist, and funding for systematic studies of spiders is minimal. Also, despite the species richness found at LCP and elsewhere, there is a concern that individual species may have specific requirements that can only be satisfied by particular habitats.

Most of the spider species found at LCP, despite intensive sampling, occurred at very low densities; 45 species were represented by a single specimen and another 20 species were represented by just two specimens. This low abundance of many species may indicate they face a precarious existence. Similar concerns are expressed by Allred and Kaston (1983) who note that 265 (42.7%) of the spider species in Utah are known from only one site. This aspect of the state of spider endangerment requires further investigation and that will require more trained systematists and more resources than are presently being devoted to this work. The low densities of most species found at LCP also pose problems for investigating spider distributions among habitats.

Clearly, the 45 species represented by a single individual could only have been found in one habitat and the 20 species represented by just two individuals had to be absent from at least one habitat. The remaining taxa that occurred in sufficient densities to allow statistical analyses indicate some habitat specificity is occurring. Lycosid adult distributions among the three habitats show Upland Woods and Post oak Woodlands to support about equal numbers with the Disturbed supporting a significantly lower density (P = .05, 2df). The 6 most abundant lycosid species (*Trochosa acompa* (n=53), followed by *Schizocosa rovneri* (n=49), *Schizocosa stridulans* (n=37), *Schizocosa* sp. o*creata group* (n=29), *Varacosa avara* (n=26) and *Pirata apalacheus* (n=21)) occurred at significantly different densities (P = .05, 5df) in Lick Creek Park and five of them occurred at significantly different intraspecific densities among habitats (P = .05, 2df), with *Schizocosa stridulans* not being significantly different among habitats (Fig. 9). The salticid, *Habronattus* sp. nr *moratus*, was significantly most abundant (chi-square=6.84, 2df, P=0.033) in Post oak Woodlands (Fig.12). Interestingly, those few taxa in sufficient abundance to allow statistical examination of their partitioning among habitats were often found to occur at statistically different densities among habitats, with Post oak Woodlands usually supporting the higher densities of spiders and the Disturbed habitat supporting the fewest. Moulder and Reichle (1972) note that all spiders are predaceous and may occupy a variety of often poorly defined ecological niches; they suggest that disturbance may increase diversity by fluctuating niche availability faster than dominant species can prevail in them. The Disturbed habitat in this study is not differentiated from other habitats in species evenness and has the least species richness (Fig. 2, 3).

My research design included an area in the Post oak Savannah ecotype considered to have a high rate of disturbance, and species diversity was lower within the disturbed habitat compared to the other two habitats with relatively low disturbance (Fig. 3). However, species richness did not significantly differ among habitats (Fig. 8), and all three habitats examined supported similar densities of spiders in so far as this can be determined by pitfall trap sampling. Thus, on the micro-scale of a single ecotype at LCP, great similarities in spider species diversity are shown with the macro-scale of the United States, and spider species richness appears similar among micro-habitats within LCP.

The extreme species richness found in the small area of LCP provides an opportunity to examine co- occurrence patterns that would allow inferences about inter-specific competition. This high diversity, represented by 111 spider species, is obligatorily predatory on a presumed relatively finite and widely shared fauna. Literature that addresses the competitive exclusion principle in natural systems is largely theoretical (i.e., Kaplan and Yorke 1977). This focuses essentially on how competition between two+ species is disrupted by external perturbations through space and time such that the competitive interaction can rarely proceed unperturbed to culminate in the exclusion of one of the species. The data gathered in this study are not sufficient to rigorously test the competitive exclusion principle. But it does demonstrate that spiders in LCP are natural resources worthy of this and other studies.

The primary attributes of spiders at LCP are: they are comprised of a large number (111+) of relatively long lived species (months) of similar size and life cycles (apparently annual, with immatures predominating in the summer/fall) occupying the same location in the food chain (as an obligate predator) and relying on the same or similar prey. This results in very similar niche requirements so that substantial if not complete niche overlap would be expected among at least some of the species.

Most members of the public may not relate to the details involved in such studies (and Lick Creek Park is a natural resource owned by the taxpayers of College Station), but local residents share with the society at large a concern for and an appreciation of the environment, and do relate to issues like biodiversity. The spiders of LCP represent a model system at the local level to investigate issues of broad concern to society.

There is increasing concern that human impact on the ecosystem will adversely affect biodiversity, by reducing or eliminating species niches through homogenization of the environment via agriculture, industrialization, urbanization and transportation activities to meet human needs. The data gathered on spiders in LCP does not provide a definitive answer to the question of human impact on biodiversity, but, there are ongoing studies of most of the flora and fauna in LCP, and this work taken together with ongoing and future work is expected to provide additional insights into this and other questions. This and other inventories of the flora and fauna of LCP are a necessary first step to investigating, understanding and appreciating biodiversity in this region and elsewhere.

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APPENDIX

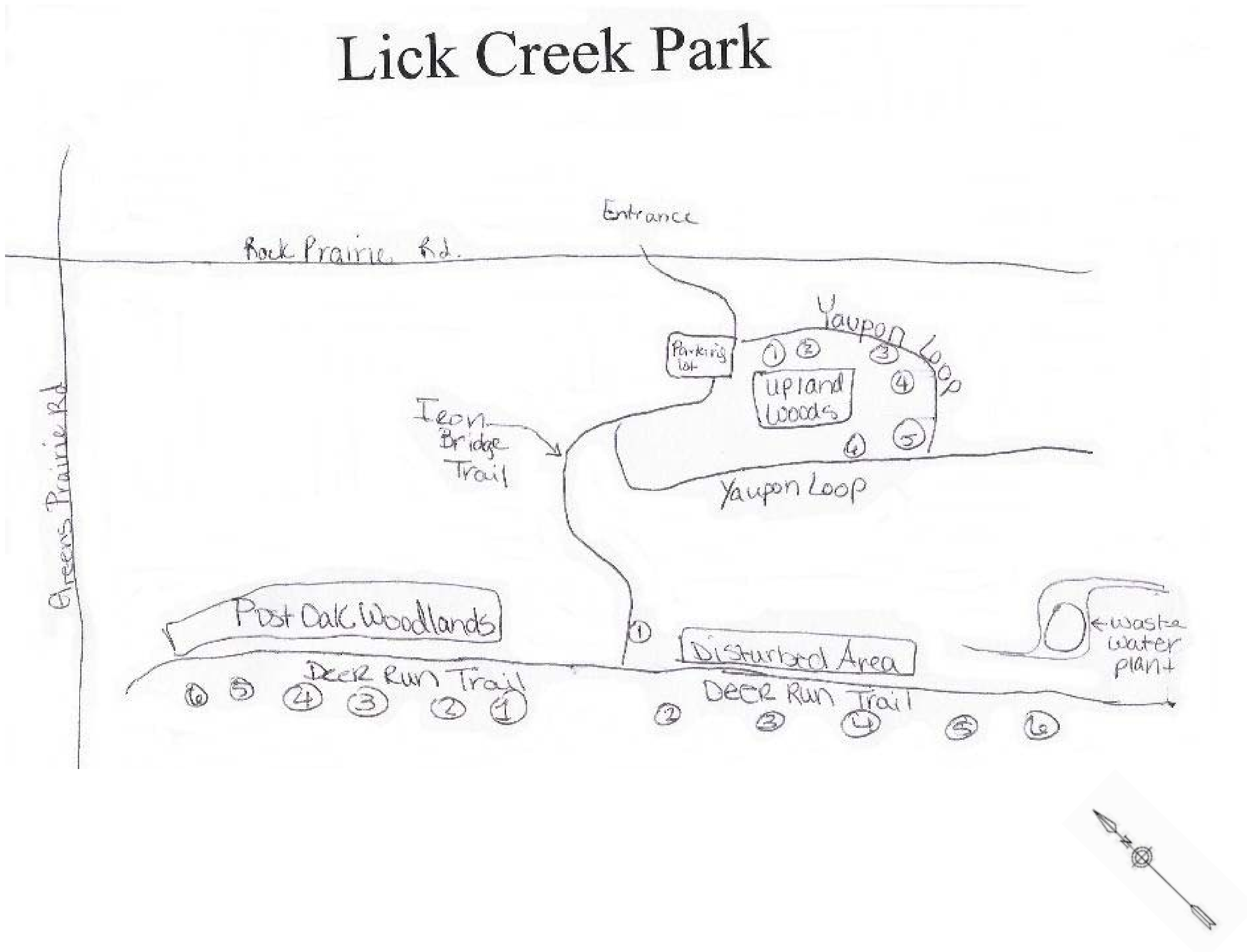

Figure 20. Sampling map of Lick Creek Park (circled numbers indicate trap numbers).

Table 2. Recorded spider data collected from pitfall traps from 15 April 2005-15April 2006 at Lick Creek Park.

Date	Site	Family	Genera	Species	Sex	Comments
15-Apr-05	a1					Trap destroyed/ missing
	a2					Trap destroyed/ missing
	a3	Corinnidae	Phrurotimpus	alarius	5 M	
		Linyphiidae	Mermessus	maculatus	M	
		Lycosidae	unidentified		I, PM	
	a4	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Corinnidae	Phrurotimpus	alarius	F	
		Gnaphosidae	unidentified		PM	
		Linyphiidae	Ceraticelus	sp. nr laticeps	M	
		Lycosidae	Varacosa	avara	F	
	a5					Trap destroyed/ missing
	a6	Linyphiidae	Erigone	autumnalis	M	
	b1	Gnaphosidae	Drassyllus	aprilinus	M	
		Lycosidae	unidentified		PM, PF	
	b2	Hahniidae	Neoantistea	oklahomensis	F	
		Lycosidae	unidentified		I	
		Thomisidae	Xysticus	fraternus	M	
	b3	Lycosidae	Pirata	apalacheus	M	
	b4	Linyphiidae	Meioneta	sp. nr llanoensis	3 M	
	b5	Agelenidae	Agelenopsis	emertoni	M	
	b6					Trap destroyed/ missing
	c1	Oxyopidae	Oxyopes	salticus	M	
		Salticidae	Habronattus	viridipes	F	
	c2	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Linyphiidae	Meioneta	sp. nr llanoensis	M	
		Lycosidae	Allocosa	sp. nr georgicola	F	
	c3	Lycosidae	unidentified		PM	
	c4					Trap destroyed/ Missing

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
	c5					Trap destroyed/ missing
	c6	Corinnidae	Phrurotimpus	alarius	F	
		Lycosidae	Pirata	alachuus	M	
		Lycosidae	Schizocosa	saltatrix	M	
		Lycosidae	Varacosa	avara	2 F	31 spiderlings
		Lycosidae	unidentified		PF	
29-Apr-05	a1	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	Trochosa	acompa	2 M	
		Lycosidae	unidentified		PF	
	a2	Gnaphosidae	Zelotes	pseustes	F	
		Linyphiidae	Erigone	autumnalis	M	
		Lycosidae	Schizocosa	saltatrix	F	
		Lycosidae	Trochosa	acompa	M	
		Salticidae	Habronattus	sp. nr moratus	M	
		Salticidae	Synageles	noxiosus	F	
	a3	Agelenidae	Agelenopsis	sp. nr oklahoma	M	
		Corinnidae	Phrurotimpus	sp. nr alarius	2 M	
		Gnaphosidae	Drassyllus	aprilinus	M	
		Lycosidae	Allocosa	sp. nr georgicola	F	
		Lycosidae	Hogna	sp.	M	
		Lycosidae	Schizocosa	saltatrix	M	
		Lycosidae	Trochosa	acompa	3 M	
		Lycosidae	Varacosa	avara	F	
		Thomisidae	Xysticus	fraternus	2 M	12 spiderlings
	a4	Corinnidae	Phrurotimpus	sp. nr alarius	M	
		Lycosidae	Schizocosa	saltatrix	M	
	a5	Lycosidae	Pirata	sedentarius	M	
		Lycosidae	Rabidosa	punctulata	F	47 spiderlings
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	2 M	
		Salticidae	Habronattus	sp. nr tuberculatus	F	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Thomisidae	Xysticus	ferox	M	
		Tetragnathidae	Pachygnatha	tristriata	F	
	a6	Linyphiidae	Mermessus	maculatus	M	
		Lycosidae	Schizocosa	saltatrix	M	
		Lycosidae	unidentified		I, PF	
	b1	Lycosidae	Hogna	helluo	M	
		Lycosidae	Schizocosa	saltatrix	F	
	b2	Lycosidae	unidentified		PF	
	b3	Lycosidae	Trochosa	acompa	2 M	
		Lycosidae	unidentified		F	39 spiderlings; missing abdomen
	b4					Trap destroyed/ missing
	b5	Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Linyphiidae	unidentified		I	
		Lycosidae	Schizocosa	perplexa	M	
		Mysmenidae	Calodipoena	incredula	M	
		Thomisidae	Xysticus	ferox	M	
		Thomisidae	Xysticus	fraternus	M	
	b6	Linyphiidae	Meioneta	sp. nr meridionalis	F	
	c1	Linyphiidae	Erigone	autumnalis	M	
		Linyphiidae	Meioneta	sp. nr unimaculata	2 M	
		Salticidae	Habronattus	sp. nr moratus	M	
	c2	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Linyphiidae	Meioneta	sp.	F	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	unidentified		I	
	c3	Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	unidentified		PF	
		Theridiidae	Steatoda	americana	M	
	c4	Lycosidae	Schizocosa	sp. ocreata group	F	
	c5	Gnaphosidae	Talanites	exlineae	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Lycosidae	Allocosa	sp. nr georgicola	F	
		Lycosidae	Arctosa	littoralis	M	
		Lycosidae	Pirata	alachuus	M	
		Lycosidae	Pirata	hiteorum	M, F	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	Trochosa	acompa	2 M	
		Lycosidae	unidentified		2 PM, 2 PF	
		Thomisidae	Xysticus	fraternus	M	
		Titanoecidae	Titanoeca	americana	M	
	c6	Gnaphosidae	Talanites	exlineae	M	
		Lycosidae	Pirata	hiteorum	M	
		Lycosidae	Schizocosa	saltatrix	2 M	
		Lycosidae	Schizocosa	sp. ocreata group	M	
		Lycosidae	Trochosa	acompa	M	
		Lycosidae	unidentified		3 PF	
15-May-05	a1	Lycosidae	Pirata	hiteorum	F	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Trochosa	acompa	5 M	
	a2	Lycosidae	Hogna	helluo	M	
		Lycosidae	Trochosa	acompa	M	
		Lycosidae	unidentified		PF	
	a3	Agelenidae	Agelenopsis	sp. nr pennsylvanica	F	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Lycosidae	Hogna	sp. nr frondicola	F	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Trochosa	acompa	5 M	
		Lycosidae	Varacosa	avara	F	
	a4	Corinnidae	Phrurotimpus	alarius	M	
		Gnaphosidae	Zelotes	duplex	2 M	
		Gnaphosidae	Zelotes	sp.	PF	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Linyphiidae	Meioneta	sp. nr unimaculata	F	
		Lycosidae	Schizocosa	saltatrix	M	
		Lycosidae	Trochosa	acompa	5 M	
		Oxyopidae	Oxyopes	sp.	I	
		Salticidae	Marpissa	lineata	M	
	a5	Linyphiidae	Erigone	autumnalis	2 M	
		Lycosidae	Trochosa	acompa	2 M	
		Lycosidae	Varacosa	avara	F	
		Salticidae	Habronattus	sp. nr moratus	M	
		Salticidae	Habronattus	sp. nr tuberculatus	F	
	a6	Gnaphosidae	Talanites	exlineae	2 M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	Trochosa	acompa	M	
	b1	Lycosidae	Trochosa	acompa	M	
	b2	Linyphiidae	unidentified		F	
	b3	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	2 M	
	b4	Gnaphosidae	Zelotes	duplex	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	Schizocosa	sp.	M	
		Lycosidae	Schizocosa	sp. ocreata group	M	
		Lycosidae	unidentified		M	
	b5	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	unidentified		I	
	b6	Lycosidae	Trochosa	acompa	M	
	c1	Lycosidae	Allocosa	sp. nr georgicola	F	
		Lycosidae	Hogna	helluo	2 M	
		Lycosidae	unidentified		I, F	
	c2	Linyphiidae	Mermessus	maculatus	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Linyphiidae	unidentified		I	
		Lycosidae	Pirata	alachuus	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Thomisidae	Xysticus	fraternus	M	
	c3	Gnaphosidae	Talanites	exlineae	2 M	
		Gnaphosidae	Zelotes	duplex	M	
		Lycosidae	Pirata	apalacheus	M	
		Lycosidae	Trochosa	acompa	2 M	
		Lycosidae	Schizocosa	rovneri	M	
	c4	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	M	
	c5	Lycosidae	Pirata	apalacheus	3 M	
		Lycosidae	Pirata	hiteorum	M	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Schizocosa	saltatrix	M	
		Lycosidae	Trochosa	acompa	2 M	
	c6	Lycosidae	Hogna	helluo	F	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	Trochosa	acompa	M	
		Salticidae	Anasaitis	canosa	M	
27-May-05	a1	Clubionidae	unidentified		I	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Schizocosa	stridulans	4 M	
		Lycosidae	Schizocosa	sp. ocreata group	M, F	
	a2	Lycosidae	Pirata	spiniger	M	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Schizocosa	saltatrix	F	
		Lycosidae	Schizocosa	stridulans	4 M	
		Lycosidae	Schizocosa	sp. ocreata group	F	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Salticidae	Habronattus	sp. nr moratus	M	
	a3	Corinnidae	Phrurotimpus	alarius	F	
		Gnaphosidae	Talanites	exlineae	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	M	
	a4	Lycosidae	Allocosa	sp. nr georgicola	F	8 spiderlings
		Lycosidae	Hogna	helluo	M	
		Lycosidae	Schizocosa	stridulans	2 M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	2 M	
	a5	Gnaphosidae	unidentified		I	
		Lycosidae	Schizocosa	rovneri	6 M	
		Lycosidae	Trochosa	acompa	F	
	a6	Lycosidae	Rabidosa	rabida	I	
		Lycosidae	Schizocosa	rovneri	3 M	
		Lycosidae	Schizocosa	stridulans	4 M	
		Lycosidae	unidentified		I	
		Salticidae	Habronattus	sp. nr moratus	M	
	b1	Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	unidentified		I	
	b2	Clubionidae	unidentified		PM	
		Clubionidae	Clubiona	sp. nr pomoa	F	
		Gnaphosidae	Zelotes	duplex	2 M	
		Salticidae	Anasaitis	canosa	M	
	b3	Clubionidae	unidentified		I	
		Gnaphosidae	Zelotes	duplex	M	
		Gnaphosidae	unidentified		I	
		Lycosidae	Allocosa	noctuabunda	2 F	
		Lycosidae	Pirata	apalacheus	8 M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	sp. nr terricola	M	
	b4	Clubionidae	Clubiona	sp. nr littoralis	M	
		Corinnidae	Castianeira	trilineata	F	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Gnaphosidae	Talanites	exlineae	M	
		Gnaphosidae	Zelotes	duplex	F	
		Lycosidae	Hogna	helluo	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	2 M	
		Lycosidae	Trochosa	acompa	M	
		Salticidae	Habronattus	sp. nr moratus	M	
	b5	Gnaphosidae	Zelotes	duplex	M	
		Lycosidae	Allocosa	noctuabunda	M	
		Lycosidae	Schizocosa	rovneri	2 M	
		Lycosidae	Trochosa	acompa	M	
		Salticidae	unidentified		I	
	b6	Lycosidae	Hogna	sp.	M	Palp expanded too much
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	2 M	
	c1	Gnaphosidae	unidentified		I	
		Lycosidae	Schizocosa	stridulans	M	
		Salticidae	Habronattus	sp. nr moratus	M	
	c2	Gnaphosidae	Zelotes	duplex	M	
		Gnaphosidae	unidentified		I	
		Linyphiidae	Erigone	autumnalis	M	
		Lycosidae	Schizocosa	rovneri	M	
	c3	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Trochosa	acompa	M	
		Lycosidae	unidentified		I	
	c4	Lycosidae	Schizocosa	stridulans	M	
		Salticidae	Habronattus	sp. nr moratus	M	
	c5	Lycosidae	Trochosa	acompa	2 M	
	c6	Lycosidae	Hogna	helluo	M	
		Lycosidae	Pirata	apalacheus	F	
		Lycosidae	Schizocosa	rovneri	3 M	
		Lycosidae	Schizocosa	stridulans	3 M	
		Lycosidae	Schizocosa	uetzi	M	
		Lycosidae	Trochosa	acompa	M	
		Lycosidae	unidentified		I	
		Salticidae	Habronattus	sp. nr moratus	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
15-Jun-05	a1					Trap destroyed/ missing
	a2					Trap destroyed/ missing
	a3	Linyphiidae	Mermessus	maculatus	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	M	
		Salticidae	Eris	militaris	M	
		Thomisidae	Tmarus	sp.	I	
	a4	Lycosidae	Varacosa	avara	F	
	a5	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	sp. ocreata group	M	Legs missing
		Lycosidae	Varacosa	avara	F	
	a6	Lycosidae	Hogna	sp. nr frondicola	F	
		Lycosidae	Rabidosa	punctulata	PF	
		Lycosidae	Schizocosa	stridulans	2 M	
		Lycosidae	Schizocosa	uetzi	M	
		Lycosidae	unidentified			Missing abdomen
	b1	Lycosidae	Hogna	sp. nr watsoni	F	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	2 M	
		Lycosidae	Schizocosa	sp. ocreata group	2 M	Missing legs
	b2					Trap destroyed/ missing
	b3	Corinnidae	Phrurolithus	emertoni	F	
		Gnaphosidae	Litopyllus	temporarius	M	
		Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	unidentified		2 (I)	
		Oxyopidae	Oxyopes	acleistus	M	
		Salticidae	unidentified		I	
		Thomisidae	Tmarus	sp.	I	
	b4					Trap destroyed/ missing
	b5	Gnaphosidae	Zelotes	duplex	M	
		Lycosidae	Schizocosa	rovneri	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	Schizocosa	uetzi	M	
	b6					Trap destroyed/ missing
	c1	Corinnidae	Falconina	gracilis	M	
		Corinnidae	unidentified		PM	Transparent
		Lycosidae	Schizocosa	stridulans	M	
	c2	Clubionidae	Clubiona	abboti	F	
		Clubionidae	Clubiona	sp. nr littoralis	2 F,1 M	
		Clubionidae	unidentified		I	
		Gnaphosidae	Zelotes	duplex	M	
		Hahniidae	Neoantistea	oklahomensis	F	
		Linyphiidae	Walckenaeria	spiralis	M	
		Lycosidae	Pirata	apalacheus	M	
		Lycosidae	Pirata	hiteorum	M	
		Lycosidae	Rabidosa	punctulata	I	
		Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Lycosidae	unidentified		I	
		Segestriidae	Ariadna	bicolor	M	
		Tetragnathidae	Pachygnatha	tristriata	F	
	c3	Salticidae	Habronattus	sp. nr moratus	M	
	c4	Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	Schizocosa	sp. ocreata group	M, F	Missing legs/ 12 spiderlings
		Lycosidae	Varacosa	avara	F	
		Salticidae	Phidippus	sp.	2 I, 2 PM	
	c5	Lycosidae	Hogna	sp. nr helluo	F	
		Lycosidae	Pirata	apalacheus	F, 2 M	
		Lycosidae	unidentified		I	
		Salticidae	Anasaitis	canosa	M	
		Segestriidae	Ariadna	bicolor	M	
	c6	Lycosidae	Schizocosa	rovneri	M	
		Lycosidae	Schizocosa	stridulans	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Lycosidae	Schizocosa	sp. ocreata group	F /M	14 spiderlings/ missing forelegs
		Segestriidae	Ariadna	bicolor	M	
30-Jun-05	a1	Lycosidae	Hogna	sp. nr helluo	2 F	
	a2					Trap destroyed/ missing
	a3					Trap destroyed/ missing
	a4					Trap destroyed/ missing
	a5	Gnaphosidae	Litopyllus	temporarius	M	
		Lycosidae	Hogna	sp. nr helluo	F	
		Lycosidae	Hogna	sp.	PF	22 spiderlings
		Lycosidae	Schizocosa	sp. ocreata group	F	
	a6	Clubionidae	Clubiona	sp. nr littoralis	F	
		Gnaphosidae	Talanites	exlineae	F	
		Lycosidae	Schizocosa	stridulans	M	
		Lycosidae	unidentified		I	
		Salticidae	unidentified		I	
	b1					Trap destroyed/ missing
	b2					Trap destroyed/ missing
	b3					Trap destroyed/ Missing
	b4					Trap destroyed/ missing
	b5					Trap destroyed/ missing
	b6	Tetragnathidae	Pachygnatha	tristriata	M	
	c1					Trap destroyed/ missing
	c2	Hahniidae	Neoantistea	agilis	M	
		Lycosidae	Schizocosa	sp. ocreata group	F	Eag sac attached
		Salticidae	Habronattus	sp. nr moratus	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Tetragnathidae	Pachygnatha	tristriata	F	
	c3					Trap destroyed/ missing
	c4	Lycosidae	Schizocosa	sp. ocreata group	F	2 spiderlings
	c5	Lycosidae	Hogna	sp. nr helluo	F	
		Lycosidae	Pirata	apalacheus	2 F	
		Lycosidae	Pirata	sedentarius	F	
		Lycosidae	Pirata	sp.	I	
		Lycosidae	Schizocosa	sp. ocreata group	F	10 spiderlings
	c6	Corinnidae	Falconina	gracilis	M	
		Salticidae	Habronattus	sp. nr moratus	M	
		Segestriidae	Ariadna	bicolor	M	
15-Jul-05	a1	Cyrtaucheniidae	unidentified		I	
		Gnaphosidae	Gnaphosa	sericata	M	
		Lycosidae	Hogna	sp. nr helluo	2 F	
		Lycosidae	Schizocosa	sp. ocreata group	2 F	
		Lycosidae	unidentified		3 (I)	
		Lycosidae	unidentified			Missing abdomen
		Salticidae	unidentified		I	
	a2	Corinnidae	Castianeira	sp. nr trilineata	F	
		Gnaphosidae	Gnaphosa	sericata	F	
		Lycosidae	Pirata	sp.	I	
	a3	Lycosidae	unidentified		I	
		Lycosidae	unidentified			Missing abdomen
		Salticidae	Anasaitis	canosa	F	
	a4	Lycosidae	Schizocosa	sp. ocreata group	F	1 spiderling
		Salticidae	unidentified			Missing abdomen
	a5	Lycosidae	Schizocosa	sp. ocreata group	F	
	a6	Lycosidae	Hogna	sp. nr helluo	F	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Lycosidae	Rabidosa	sp.		Missing abdomen
		Salticidae	unidentified		I	
		Sicariidae	Loxosceles	reclusa	M	
		Theridiidae	Latrodectus	sp.	PM	
	b1	Lycosidae	Rabidosa	punctulata	I	Eroded abdomen
	b2	Corinnidae	Phrurolithus	emertoni	F	
		Ctenizidae	Ummidia	sp.	M	
		Lycosidae	Pirata	apalacheus	F	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Mysmenidae	Calodipoena	incredula	F	
		Salticidae	unidentified		I	
	b3	Lycosidae	Pirata	sp.	I	
		Lycosidae	unidentified		2	
	b4					Trap destroyed/ missing
	b5					Trap destroyed/ missing
	b6	Clubionidae	unidentified			Missing abdomen
		Corinnidae	unidentified			Missing abdomen
		Gnaphosidae	Gnaphosa	sericata	M	Missing abdomen
		Lycosidae	unidentified			Missing abdomen
		Salticidae	Zygoballus	rufipes	F	
	c1	Corinnidae	Phrurotimpus	alarius	M	
		Gnaphosidae	Gnaphosa	sericata	M	
		Lycosidae	Schizocosa	stridulans	M	
		Salticidae	unidentified		I	
	c2	Araneidae	unidentified		I	
		Clubionidae	unidentified		I	
		Dictynidae	unidentified		I	
		Gnaphosidae	Drassyllus	sp. nr dixinus	F	
		Segestriidae	Ariadna	bicolor	M	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
	c3					Trap destroyed/ missing
	c4					Trap destroyed/ missing
	c5	Lycosidae	Hogna	sp. nr frondicola	F	
		Lycosidae	Hogna	sp. nr helluo	F	
		Lycosidae	unidentified		I	
	c6	Lycosidae	unidentified		I	
		Lycosidae	unidentified			Missing abdomen
		Salticidae	Habronattus	sp. nr moratus	M	
15-Aug-05	a1					Trap destroyed/ missing
	a2	Corinnidae	Falconina	gracilis	F	Damaged abdomen
		Corinnidae	unidentified			Missing abdomen
	a3	Araneidae	Mangora	maculata	F	
	a4	Lycosidae	unidentified		I	
	a5	Corinnidae	Phrurotimpus	certus	F	
		Corinnidae	unidentified			Missing abdomen
	a6	Corinnidae	Falconina	gracilis	F	
		Lycosidae	Schizocosa	sp. ocreata group	F	
		Salticidae	unidentified			Missing abdomen
	b1					Trap destroyed/ missing
	b2	Salticidae	unidentified		2 I	
		Lycosidae	unidentified		I	
	b3	Clubionidae	Clubiona	sp. nr littoralis	M	
		Salticidae	Anasaitis	canosa	M	
	b4	Clubionidae	unidentified		I	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Lycosidae	unidentified		2 (I)	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
	b5					Trap destroyed/ missing
	b6					Trap destroyed/ missing
	c1	Gnaphosidae	unidentified		I	
		Lycosidae	unidentified			Missing abdomen
	c2					Trap destroyed/ missing
	c3					Trap destroyed/ missing
	c4					Trap destroyed/ missing
	c5					Trap destroyed/ missing
	c6	Corinnidae	unidentified		I	
17-Sep-05	a1	Gnaphosidae	unidentified		2 PM	
		Linyphiidae	Erigone	autumnalis	2 M	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Lycosidae	Pirata	sp.	I	
		Lycosidae	unidentified		3 (I)	
		Theridiidae	Euryopis	spinigera	F	
	a2	Linyphiidae	unidentified		F	
		Linyphiidae	unidentified			Cannot determine
		Lycosidae	unidentified		I	
	a3					Trap destroyed/ missing
	a4	Gnaphosidae	unidentified		I	
		Mimetidae	unidentified		I	
		Salticidae	Anasaitis	canosa	PM	
	a5	Gnaphosidae	Zelotes	duplex	F	
		Lycosidae	unidentified		2 (I)	
		Salticidae	unidentified		I	
	a6	Corinnidae	Falconina	gracilis	F	
		Mimetidae	Ero	sp.	F	
	b1	Linyphiidae	Ceraticelus	sp. nr laticeps	M	
		Lycosidae	unidentified		PF	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Thomisidae	Misumenops	sp.	I	
	b2	Hahniidae	Neoantistea	oklahomensis	M	
		Lycosidae	Hogna	sp. nr annexa	F	1 spiderling
		Lycosidae	unidentified		PF	
	b3	Lycosidae	unidentified		I	
	b4	Lycosidae	unidentified		I	
	b5					Trap destroyed/ missing
	b6	Linyphiidae	unidentified			Missing abdomen
		Lycosidae	unidentified		PM	
	c1					Trap destroyed/ missing
	c2	Gnaphosidae	unidentified		I	
		Hahniidae	Neoantistea	agilis	M	
		Hahniidae	unidentified		I, PM	
		Lycosidae	Rabidosa	punctulata	PF	
		Lycosidae	unidentified		2 (I)	
		Salticidae	unidentified		I	
		Theridiidae	Euryopis	spinigera	F	
	c3					Trap destroyed/ missing
	c4					Trap destroyed/ missing
	c5					Trap destroyed/ missing
	c6	Gnaphosidae	unidentified		I	
		Philodromidae	unidentified		I	
		Salticidae	Habronattus	sp. nr moratus	M	
		Salticidae	Thiodina	sp.	PM	
		Salticidae	unidentified		I	
20-Oct-05	a1					Trap destroyed/ missing
	a2	Corinnidae	unidentified		I	
		Linyphiidae	Meioneta	sp. nr llanoensis	M	
		Lycosidae	unidentified		2 (I)	
		Salticidae	unidentified		I	
	a3	Clubionidae	unidentified		I	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Dictynidae	Lathys	sp. nr immaculata	M	
		Hahniidae	Neoantistea	oklahomensis	M	
	a4	Corinnidae	unidentified		I	
		Lycosidae	unidentified		PM	
	a5	Lycosidae	Rabidosa	punctulata	PF	
		Lycosidae	unidentified		I	
	a6	Lycosidae	unidentified		I	
		Oxyopidae	Oxyopes	sp.	I	
		Salticidae	unidentified		I	
	b1	Lycosidae	unidentified		I	
	b2					Trap destroyed/ missing
	b3	Hahniidae	Neoantistea	agilis	M	
		Linyphiidae	nr Eulaira	suspecta	F	
		Lycosidae	unidentified		3 (I)	
	b4					Nothing
	b5					Trap destroyed/ missing
	b6					Trap destroyed/ missing
	c1	Linyphiidae	Ceratinops	crenatus	F	
	c2	Clubionidae	unidentified		I	
		Hahniidae	Neoantistea	oklahomensis	3 M	
		Lycosidae	unidentified		I	
		Salticidae	unidentified		I	
		Salticidae	unidentified			Missing abdomen
		Theridiidae	Euryopis	spinigera	M	
	c3	Anyphaenidae	unidentified		I	
		Hahniidae	Neoantistea	agilis	M	
		Lycosidae	unidentified		I	
	c4					Trap destroyed/ missing
	c5	Dictynidae	Cicurina	minorata	2 F	
		Linyphiidae	unidentified		I	
		Lycosidae	unidentified		PF, 4 (I)	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Theridiidae	Euryopis	spinigera	2 F	
	c6	Corinnidae	unidentified			Missing abdomen
		Hahniidae	Neoantistea	agilis	3 M	
		Salticidae	unidentified		I	
15-Nov-05	a1	Salticidae	Habronattus	sp. nr moratus	M	
	a2	Corinnidae	Scotinella	nr.madisonia	M	
		Hahniidae	Neoantistea	agilis	M	
		Salticidae	Habronattus	sp. nr moratus	M	
	a3	Hahniidae	Neoantistea	agilis	2 M	
	a4	Corinnidae	unidentified		I	
		Dictynidae	Cicurina	sp. nr texana	M	
		Gnaphosidae	unidentified		PM	
		Lycosidae	unidentified		I	
	a5	Hahniidae	Neoantistea	agilis	2 M	
		Salticidae	unidentified		I	
	a6	Dictynidae	Cicurina	sp. nr varians	M	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
	b1	Dictynidae	Cicurina	sp. nr modesta	M	
		Hahniidae	unidentified		I	
		Linyphiidae	unidentified		F	
		Lycosidae	unidentified		I	
	b2	Agelenidae	unidentified		PM	
		Hahniidae	Neoantistea	agilis	2 M	
	b3	Hahniidae	Neoantistea	oklahomensis	F	
		Hahniidae	unidentified		I	
		Lycosidae	unidentified		I	
	b4	Linyphiidae	unidentified		F	
		Lycosidae	unidentified		I	
	b5	Hahniidae	Neoantistea	agilis	M	
		Thomisidae	Xysticus	sp.	4 (I)	
	b6	Hahniidae	Neoantistea	agilis	2 M	
		Hahniidae	Neoantistea	oklahomensis	1 M/1 F	
		Linyphiidae	unidentified		I	
		Lycosidae	unidentified		I	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Philodromidae	Thanatus	altimontis	M	
		Salticidae	Habronattus	sp. nr moratus	M	
		Salticidae	unidentified		PM	
	c1	Hahniidae	Neoantistea	agilis	M	
		Hahniidae	Neoantistea	sp.	I	
		Lycosidae	unidentified		I	
	c2					Trap destroyed/ missing
	c3	Clubionidae	unidentified		I	
		Hahniidae	Neoantistea	agilis	M	
		Lycosidae	unidentified		2 (I)	
		Thomisidae	Xysticus	sp.	PM	
	c4	Dictynidae	Cicurina	sp. nr varians	M	
		Hahniidae	Neoantistea	agilis	3 M	
		Lycosidae	Varacosa	avara	F	
		Lycosidae	unidentified		I	2 spiderlings
		Thomisidae	Xysticus	sp.	I	
	c5	Dictynidae	Cicurina	sp. nr texana	2 M	
		Gnaphosidae	unidentified		I	
		Lycosidae	unidentified		I	
	c6					Trap destroyed/ missing
21-Dec-05	a1	Dictynidae	Lathys	sp. nr immaculata	F	
		Linyphiidae	unidentified		F	
	a2					Trap destroyed/ missing
	a3	Hahniidae	Hahnia	flaviceps	F	
		Salticidae	Zygoballus	rufipes	F	
	a4	Cyrtaucheniidae	unidentified		I	
		Lycosidae	Pirata	sp.	I	
		Lycosidae	Varacosa	avara	M	
	a5	Hahniidae	Neoantistea	agilis	M	
		Hahniidae	Neoantistea	oklahomensis	F	
	b1	Corinnidae	unidentified		I	
		Hahniidae	Neoantistea	oklahomensis	1 M/1 F	
		Linyphiidae	unidentified		I	
		Lycosidae	unidentified		I	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Oxyopidae	Oxyopes	sp.	I	
	b2	Clubionidae	Clubiona	sp. nr littoralis	M	
		Clubionidae	unidentified		I	
	b3	Hahniidae	Neoantistea	agilis	M	
		Thomisidae	Misumenops	sp.	I	
	b4	Hahniidae	Neoantistea	agilis	M	
		Lycosidae	unidentified		I	
	b5					Trap destroyed/ missing
	b6					Trap destroyed/ missing
	c1	Lycosidae	Varacosa	avara	F	
	c2					Trap destroyed/ missing
	c3	Dictynidae	Cicurina	sp. nr varians	M	
		Lycosidae	unidentified		I	
		Thomisidae	Xysticus	sp.	I	
	c4					Trap destroyed/ missing
	c5	Lycosidae	unidentified		I	
		Theridiidae	Euryopis	spinigera	M	Detached abdomens
	c6					Trap destroyed/ missing
15-Jan-06	a1	Hahniidae	Neoantistea	agilis	M	
		Lycosidae	Varacosa	avara	M	
	a2	Hahniidae	Neoantistea	oklahomensis	M	
	a3	Corinnidae	unidentified		PM	
		Hahniidae	Neoantistea	agilis	2 M	
		Linyphiidae	nr Scyletria	sp.	M	
		Linyphiidae	unidentified		F	
		Lycosidae	Varacosa	avara	3 M	
	a4	Hahniidae	Neoantistea	agilis	2 M	
		Lycosidae	Pirata	sp.	I	
		Lycosidae	Varacosa	avara	2 M	
	a5	Hahniidae	Neoantistea	agilis	M	
	a6	Corinnidae	unidentified		I	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Hahniidae	Neoantistea	agilis	M	
		Lycosidae	Varacosa	avara	F	
		Lycosidae	unidentified			Missing legs
	b1	Linyphiidae	nr Floricomus	mulaiki	F	
		Linyphiidae	unidentified	sp 1	M	
		Lycosidae	Varacosa	avara	4 M	
	b2	Hahniidae	Neoantistea	agilis	M	
		Lycosidae	Pirata	sp.	I	
		Lycosidae	Varacosa	avara	2 M	
	b3	Clubionidae	Clubiona	sp. nr littoralis	M	
		Linyphiidae	unidentified		F	
		Lycosidae	Varacosa	avara	M	
		Thomisidae	Xysticus	sp.	I	
	b4					Trap destroyed/ missing
	b5					Trap destroyed/ missing
	b6	Amaurobiidae	Coras	sp.	M	
		Clubionidae	Clubiona	sp. nr littoralis	F	
		Hahniidae	Neoantistea	oklahomensis	F	
		Linyphiidae	nr Masoncus	sp.	M	
		Linyphiidae	unidentified		F	
		Lycosidae	Varacosa	avara	M	
		Lycosidae	unidentified		4 (I)	
		Theridiidae	Euryopis	spinigera	M	
	c1	Hahniidae	Neoantistea	agilis	M	
		Lycosidae	unidentified		2 (I)	
	c2	Gnaphosidae	unidentified		I	
		Hahniidae	Neoantistea	agilis	M	
	c3	Hahniidae	Neoantistea	agilis	M	
		Linyphiidae	nr Gonatium	sp.	F	
		Lycosidae	unidentified		I	
		Thomisidae	Xysticus	sp.	4 (I)	
	c4					Trap destroyed/ missing

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
	c5					Trap destroyed/ missing
	c6					Trap destroyed/ missing
15-Feb-06	a1					Trap destroyed/ missing
	a2					Trap destroyed/ missing
	a3	Cyrtaucheniidae	unidentified		I	
		Dictynidae	Cicurina	sp. nr idahoana	F	
		Linyphiidae	nr Islandiana	sp.	2 M	
		Lycosidae	Varacosa	avara	M	
	a4	Linyphiidae	Masoncus	sp. nr conspectus	M	
	a5	Thomisidae	Xysticus	sp.	I	
	a6	Dictynidae	unidentified		I	
		Linyphiidae	unidentified	sp. 2	M	
	b1					No spiders in trap
	b2	Hahniidae	Neoantistea	oklahomensis	F	
		Linyphiidae	unidentified	sp.2	M	
	b3					Trap destroyed/ missing
	b4					Trap destroyed/ missing
	b5	Clubionidae	unidentified		I	
		Linyphiidae	nr Meioneta	sp.	F	
	b6	Hahniidae	Neoantistea	oklahomensis	F	
	c1	Linyphiidae	unidentified		F	
	c2	Lycosidae	unidentified		I	
	c3	Cyrtaucheniidae	unidentified		I	
		Theridiidae	unidentified		PM	
	c4					No spiders in trap
	c5	Cyrtaucheniidae	unidentified		4 (I)	
	c6	Lycosidae	unidentified		I	
15-Mar-06	a1	Salticidae	Habronattus	sp. nr tuberculatus	F	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
	a2					Trap destroyed/ missing
	a3	Corinnidae	unidentified		PM	
		Linyphiidae	nr Eulaira	suspecta	F	
	a4	Corinnidae	unidentified		I	
		Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Lycosidae	Pirata		I	
		Lycosidae	unidentified		I	
	a5	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	3 M	
	a6					No spiders in trap
	b1	Lycosidae	unidentified		I	
	b2					No spiders in trap
	b3					contents evaporated
	b4					No spiders in trap
	b5	Clubionidae	Clubiona	sp. nr littoralis	M	
		Hahniidae	Neoantistea	agilis	M	
		Lycosidae	unidentified			
	b6	Lycosidae	unidentified		I	
	c1	Salticidae	Habronattus	sp. nr moratus	M	
	c2	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	2 M	
		Cyrtaucheniidae	unidentified		I	
		Linyphiidae	Mermessus	maculatus	M	
		Salticidae	Habronattus	sp. nr moratus	M	
	c3	Lycosidae	unidentified		I	
	c4	Lycosidae	unidentified		I	
	c5					No spiders in trap
	c6	Gnaphosidae	unidentified		I, PM	
		Lycosidae	Varacosa	avara	F	
15-Apr-06	a1					Trap destroyed/ missing
	a2	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
	a3	Corinnidae	Phrurotimpus	alarius	M	
	a4	Corinnidae	unidentified		I	

Table 2 (continued)

Date	Site	Family	Genera	Species	Sex	Comments
		Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
		Linyphiidae	Meioneta	sp. nr unimaculata	M	
		Salticidae	unidentified		I	
	a5					No spiders in trap
	a6	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	8 M	
		Linyphiidae	Ceraticelus	sp. nr laticeps	M	
		Lycosidae	unidentified		I	
	b1	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	3 M/ 1 PF	
		Lycosidae	Varacosa	avara	F	
	b2	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	3M	
		Thomisidae	Xysticus	fraternus	F	
	b3					Trap destroyed/ missing
	b4	Linyphiidae	nr Floricomus	mulaiki	F	
		Linyphiidae	unidentified		F	
	b5	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	M	
	b6					No spiders in trap
	c1					Trap destroyed/ missing
	c2					Trap destroyed/ missing
	c3	Cyrtaucheniidae	Myrmekiaphila	fluviatilis	2 M	
		Thomisidae	Xysticus	fraternus	M	
	c4					Trap destroyed/ missing
	c5					Trap destroyed/ missing
	c6	Theridiidae	Steatoda	americana	M	

M=male; F=female; I=immature; PM=penultimate male; PF=penultimate female; a= upland; b= disturbed; c= post oak; 1-6 are numbered traps.

Table 3. Sex ratios for each spider species.

Family	Total Family Ratio	Genera	Species	M:F:PM:PF:I
Agelenidae	2:1 RATIO	Agelenopsis	emertoni	1:0:0:0:0
Agelenidae		Agelenopsis	sp. nr oklahoma	1:0:0:0:0
Agelenidae		Agelenopsis	sp. nr pennsylvanica	0:1:0:0:0
Amaurobiidae	1:0:0:0:0	Coras	sp.	1:0:0:0:0
Araneidae		Mangora	maculata	0:1:0:0:0
Clubionidae	6:6:1:0:11	Clubiona	abboti	0:1:0:0:0
Clubionidae		Clubiona	sp. nr littoralis	6:4:0:0:0
Clubionidae		Clubiona	sp. nr pomoa	0:1:0:0:0
Clubionidae		unidentified	penultimate male	0:0:1:0:0
Clubionidae		unidentified	immatures	0:0:0:0:11
Corinnidae	14:11:3:0:12	Castianeira	trilineata	0:1:0:0:0
Corinnidae		Castianeira	sp. nr trilineata	0:1:0:0:0
Corinnidae		Falconina	gracilis	2:3:0:0:0
Corinnidae		Phrurolithus	emertoni	0:2:0:0:0
Corinnidae		Phrurotimpus	alarius	8:3:0:0:0
Corinnidae		Phrurotimpus	sp. nr alarius	3:0:0:0:0
Corinnidae		Phrurotimpus	certus	0:1:0:0:0
Corinnidae		Scotinella	sp. nr madisonia	1:0:0:0:0
Corinnidae		unidentified	immatures	0:0:0:0:12
Corinnidae		unidentified	penultimate males	0:0:3:0:0
Ctenizidae	1:0 RATIO	Ummidia	sp.	1:0:0:0:0
Cyrtaucheniidae	29:0:0:1:9	Myrmekiaphila	fluviatilis	29:0:0:1:0
Cyrtaucheniidae		Myrmekiaphila	immatures	0:0:0:0:9
Dictynidae	8:4:0:0:2	Cicurina	minorata	0:2:0:0:0
Dictynidae		Cicurina	sp. nr idahoana	0:1:0:0:0
Dictynidae		Cicurina	sp. nr modesta	1:0:0:0:0
Dictynidae		Cicurina	sp. nr texana	3:0:0:0:0
Dictynidae		Cicurina	sp. nr varians	3:0:0:0:0
Dictynidae		Lathys	sp. nr immaculata	1:1:0:0:0
Dictynidae		unidentified	immatures	0:0:0:0:2
Gnaphosidae	26:6:5:1:10	Drassyllus	aprilinus	2:0:0:0:0
Gnaphosidae		Drassyllus	sp. nr dixinus	0:1:0:0:0
Gnaphosidae		Gnaphosa	sericata	3:1:0:0:0
Gnaphosidae		Litopyllus	temporarius	2:0:0:0:0
Gnaphosidae		Talanites	exlineae	8:1:0:0:0
Gnaphosidae		Zelotes	duplex	11:2:0:0:0
Gnaphosidae		Zelotes	pseustes	0:1:0:1:0
Gnaphosidae		unidentified	immatures	0:0:0:0:10
Gnaphosidae		unidentified	penultimate males	0:0:5:0:0
Hahniidae	45:10:1:0:4	Hahnia	flaviceps	0:1:0:0:0
Hahniidae		Neoantistea	agilis	37:0:0:0:0
Hahniidae		Neoantistea	oklahomensis	8:9:0:0:0
Hahniidae		unidentified	immatures	0:0:0:0:4

Table 3 (continued)

Family	Total Family Ratio	Genera	Species	M:F:PM:PF:I
Hahniidae		unidentified	penultimate males	0:0:1:0:0
Linyphiidae	40:20:0:0:7	Ceraticelus	sp. nr laticeps	3:0:0:0:0
Linyphiidae		Ceratinops	crenatus	0:1:0:0:0
Linyphiidae		Mermessus	maculatus	5:0:0:0:0
Linyphiidae		Erigone	autumnalis	8:0:0:0:0
Linyphiidae		Masoncus	sp. nr conspectus	1:0:0:0:0
Linyphiidae		Meioneta	sp. nr llanoensis	5:0:0:0:0
Linyphiidae		Meioneta	sp. nr meridionalis	0:1:0:0:0
Linyphiidae		Meioneta	sp. nr unimaculata	10:1:0:0:0
Linyphiidae		Meioneta	sp.	0:1:0:0:0
Linyphiidae		nr Eulaira	suspecta	0:2:0:0:0
Linyphiidae		nr Gonatium	sp.	0:1:0:0:0
Linyphiidae		nr Islandiana	sp.	2:0:0:0:0
Linyphiidae		nr Masoncus	sp.	1:0:0:0:0
Linyphiidae		nr Scyletria	sp.	1:0:0:0:0
Linyphiidae		nr Floricomus	mulaiki	0:2:0:0:0
Linyphiidae		nr Meioneta	sp.	0:1:0:0:0
Linyphiidae		Walckenaeria	spiralis	1:0:0:0:0
Linyphiidae		unidentified	sp. 1	1:0:0:0:0
Linyphiidae		unidentified	sp. 2	2:0:0:0:0
Linyphiidae		unidentified	immatures	0:0:0:0:7
Linyphiidae		unidentified	females	0:10:0:0:0
Lycosidae	217:72:7:15:106	Allocosa	noctuabunda	1:2:0:0:0
Lycosidae		Allocosa	sp. nr georgicola	0:5:0:0:0
Lycosidae		Arctosa	littoralis	1:0:0:0:0
Lycosidae		Hogna	sp.	2:0:0:1:0
Lycosidae		Hogna	helluo	7:0:0:0:0
Lycosidae		Hogna	sp. nr annexa	0:1:0:0:0
Lycosidae		Hogna	sp. nr frondicola	0:3:0:0:0
Lycosidae		Hogna	sp. nr.helluo	0:9:0:0:0
Lycosidae		Hogna	sp. nr watsoni	0:1:0:0:0
Lycosidae		Pirata	sp.	0:0:0:0:7
Lycosidae		Pirata	alachuus	3:0:0:0:0
Lycosidae		Pirata	apalacheus	16:5:0:0:0
Lycosidae		Pirata	hiteorum	4:2:0:0:0
Lycosidae		Pirata	sedentarius	1:1:0:0:0
Lycosidae		Pirata	spiniger	1:0:0:0:0
Lycosidae		Rabidosa	punctulata	0:1:0:3:2
Lycosidae		Rabidosa	rabida	0:0:0:0:2
Lycosidae		Schizocosa	perplexa	1:0:0:0:0
Lycosidae		Schizocosa	rovneri	52:0:0:0:0
Lycosidae		Schizocosa	saltatrix	8:3:0:0:0
Lycosidae		Schizocosa	stridulans	37:0:0:0:0
Lycosidae		Schizocosa	uetzi	3:0:0:0:0
Lycosidae		Schizocosa	sp. ocreata group	9:22 :0:0:0

Table 3 (continued)

Family	Total Family Ratio	Genera	Species	M:F:PM:PF:I
Lycosidae		Trochosa	acompa	53:1:0:0:0
Lycosidae		Trochosa	sp. nr terricola	1:0:0:0:0
Lycosidae		Varacosa	avara	16:14:0:0:0
Lycosidae		unidentified	Adults/Immatures	1:2:7:15:95
Mimetidae	0:1:0:0:1	Ero	sp.	0:0:0:0:1
Mysmenidae	1:1:0:0:0	Calodipoena	incredula	1:1:0:0:0
Oxyopidae	2:0:0:0:3	Oxyopes	sp.	0:0:0:0:3
Oxyopidae		Oxyopes	acleistus	1:0:0:0:0
Oxyopidae		Oxyopes	salticus	1:0:0:0:0
Philodromidae	1:0:0:0:1	Thanatus	altimontis	1:0:0:0:0
Philodromidae		unidentified	immatures	0:0:0:0:1
Salticidae	25:8:5:0:23	Anasaitis	canosa	4:1:1:0:0
Salticidae		Eris	militaris	1:0:0:0:0
Salticidae		Habronattus	viridipes	0:1:0:0:0
Salticidae		Habronattus	sp. nr moratus	19:0:0:0:0
Salticidae		Habronattus	sp. nr tuberculatus	0:3:0:0:0
Salticidae		Marpissa	lineata	1:0:0:0:0
Salticidae		Phidippus	sp.	0:0:2:0:2
Salticidae		Synageles	noxiosus	0:1:0:0:0
Salticidae		Thiodina	sp.	0:0:1:0:0
Salticidae		Zygoballus	rufipes	0:2:0:0:0
Salticidae		unidentified	penultimate males	0:0:1:0:0
Salticidae		unidentified	immatures	0:0:0:0:21
Segestriidae	5:0:0:0:0	Ariadna	bicolor	5:0:0:0:0
Sicariidae	1:0:0:0:0	Loxosceles	reclusa	1:0:0:0:0
Tetragnathidae	1:3:0:0:0	Pachygnatha	tristriata	1:3:0:0:0
Theridiidae	5:4:2:0:0	Euryopis	spinigera	3:4:0:0:0
Theridiidae		Latrodectus	sp.	0:0:1:0:0
Theridiidae		Steatoda	americana	2:0:0:0:0
Theridiidae		unidentified	penultimate males	0:0:1:0:0
Thomisidae	9:1:2:0:16	Misumenops	sp.	0:0:0:0:2
Thomisidae		Tmarus	sp.	0:0:0:0:2
Thomisidae		Xysticus	sp.	0:0:2:0:12
Thomisidae		Xysticus	ferox	2:0:0:0:0
Thomisidae		Xysticus	fraternus	7:1:0:0:0
Titanoecidae	1:0:0:0:0	Titanoeca	americana	1:0:0:0:0

M=male; F=female; I=immature; PM=penultimate male; PF=penultimate female.
Total included: 438 Males, 148 Females, 26 Penultimate Males, 17 Penultimate Females, and 202 Immatures.

Table 4. Habitat occurrence index for each ground spider species*.

Family	Genera	Species	Occurrence Index Upland	Disturbed	Post Oak	Total
Agelenidae	Agelenopsis	emertoni		1		1
Agelenidae	Agelenopsis	sp. nr oklahoma	1			1
Agelenidae	Agelenopsis	sp. nr pennsylvanica	1			1
Amaurobiidae	Coras	sp.		1		1
Araneidae	Mangora	maculata	1			1
Clubionidae	Clubiona	abboti			1	1
Clubionidae	Clubiona	sp. nr littoralis	1	6	3	10
Clubionidae	Clubiona	sp. nr pomoa		1		1
Corinnidae	Castianeira	trilineata		1		1
Corinnidae	Castianeira	sp. nr trilineata	1			1
Corinnidae	Falconina	gracilis	3		2	5
Corinnidae	Phrurolithus	emertoni		2		2
Corinnidae	Phrurotimpus	alarius	9		2	11
Corinnidae	Phrurotimpus	certus	1			1
Corinnidae	Phrurotimpus	sp. nr alarius	3			3
Corinnidae	Scotinella	sp. nr madisonia	1			1
Ctenizidae	Ummidia	sp.		1		1
Cyrtaucheniidae	Myrmekiaphila	fluviatilis	16	7	7	30
Dictynidae	Cicurina	minorata			2	2
Dictynidae	Cicurina	sp. nr idahoana	1			1
Dictynidae	Cicurina	sp. nr modesta		1		1
Dictynidae	Cicurina	sp. nr texana	1		2	3
Dictynidae	Cicurina	sp. nr varians	1		2	3
Dictynidae	Lathys	sp. nr immaculata	2			2
Gnaphosidae	Drassyllus	aprilinus	1	1		2
Gnaphosidae	Drassyllus	sp. nr dixinus			1	1
Gnaphosidae	Gnaphosa	sericata	2	1	1	4
Gnaphosidae	Litopyllus	temporarius	1	1		2
Gnaphosidae	Talanites	exlineae	4	1	4	9
Gnaphosidae	Zelotes	duplex	3	7	3	13
Gnaphosidae	Zelotes	pseustes	1			1
Gnaphosidae	Zelotes	sp.	1	1		2
Hahniidae	Hahnia	flaviceps	1			1
Hahniidae	Neoantistea	agilis	13	10	14	37
Hahniidae	Neoantistea	oklahomensis	3	10	4	17
Hahniidae	Neoantistea	sp.			1	1
Linyphiidae	Ceraticelus	sp. nr laticeps	2	1		3
Linyphiidae	Ceratinops	crenatus			1	1
Linyphiidae	Mermessus	maculatus	3		2	5
Linyphiidae	Erigone	autumnalis	6		2	8
Linyphiidae	Masoncus	sp. nr conspectus	1			1

Table 4 (continued)

Family	Genera	Species	Upland	Disturbed	Post Oak	Total
Linyphiidae	Meioneta	sp.		1	1	2
Linyphiidae	Meioneta	sp. nr llanoensis	1	3	1	5
Linyphiidae	Meioneta	sp. nr meridionalis		1		1
Linyphiidae	Meioneta	sp. nr unimaculata	5	2	4	11
Linyphiidae	nr Eulaira	suspecta	1	1		2
Linyphiidae	nr Floricomus	mulaiki		2		2
Linyphiidae	nr Gonatium	sp.			1	1
Linyphiidae	nr Islandiana	sp.	2			2
Linyphiidae	nr Masoncus	sp.		1		1
Linyphiidae	nr Scyletria	sp.	3			3
Linyphiidae	unidentified	sp. 1		1		1
Linyphiidae	unidentified	sp. 2	1	1		2
Linyphiidae	Walckenaeria	spiralis			1	1
Lycosidae	Allocosa	noctuabunda		4		4
Lycosidae	Allocosa	sp. nr georgicola	2		3	5
Lycosidae	Arctosa	littoralis			1	1
Lycosidae	Hogna	sp. nr annexa		1		1
Lycosidae	Hogna	sp. nr frondicola	2		1	3
Lycosidae	Hogna	helluo	2	2	3	7
Lycosidae	Hogna	sp. nr helluo	6		4	10
Lycosidae	Hogna	sp. nr watsoni		1		1
Lycosidae	Hogna	sp.	1	1		2
Lycosidae	Pirata	alachuus			3	3
Lycosidae	Pirata	apalacheus		10	11	21
Lycosidae	Pirata	hiteorum	1		5	6
Lycosidae	Pirata	sedentarius	1		1	2
Lycosidae	Pirata	spiniger	1			2
Lycosidae	Pirata	sp.	5	2	1	8
Lycosidae	Rabidosa	punctulata	3	1	2	6
Lycosidae	Rabidosa	rabida	1			1
Lycosidae	Rabidosa	sp.	1			1
Lycosidae	Schizocosa	perplexa		3		3
Lycosidae	Schizocosa	rovneri	21	8	20	49
Lycosidae	Schizocosa	saltatrix	6	1	4	11
Lycosidae	Schizocosa	stridulans	18	7	12	37
Lycosidae	Schizocosa	uetzi	1	1	1	3
Lycosidae	Schizocosa	sp. ocreata group	9	3	17	29
Lycosidae	Schizocosa	sp.		1		1
Lycosidae	Trochosa	acompa	24	9	20	53
Lycosidae	Trochosa	sp. nr terricola		1		1
Lycosidae	Varacosa	avara	15	5	6	26
Mimetidae	Ero	sp.	1			1
Mysmenidae	Calodipoena	incredula		2		2
Oxyopidae	Oxyopes	acleistus		1		1

Table 4 (continued)

Family	Genera	Species	Upland	Disturbed	Post Oak	Total
Oxyopidae	Oxyopes	salticus			1	1
Oxyopidae	Oxyopes	sp.	2	1		3
Philodromidae	Thanatus	altimontis		1		1
Salticidae	Anasaitis	canosa	2	2	2	6
Salticidae	Eris	militaris	1			1
Salticidae	Habronattus	sp. nr moratus	6	2	11	19
Salticidae	Habronattus	sp. nr tuberculatus	3			3
Salticidae	Habronattus	viridipes			1	1
Salticidae	Marpissa	lineata	1			1
Salticidae	Phidippus	sp.			4	4
Salticidae	Synageles	noxiosus	1			1
Salticidae	Zygoballus	rufipes	1	1		2
Salticidae	Thiodina	sp.			1	1
Segestriidae	Ariadna	bicolor			5	5
Sicariidae	Loxosceles	reclusa	1			1
Tetragnathidae	Pachygnatha	tristriata	1	1	2	4
Theridiidae	Euryopis	spinigera	1	1	5	7
Theridiidae	Latrodectus	sp.	1			1
Theridiidae	Steatoda	americana			2	2
Thomisidae	Misumenops	sp.		2		2
Thomisidae	Tmarus	sp.	1	1		2
Thomisidae	Xysticus	ferox	1	1		2
Thomisidae	Xysticus	fraternus	2	3	3	8
Thomisidae	Xysticus	sp.	1	7	7	15
Titanoecidae	Titanoeca	americana			1	1

*Shaded species were found in every habitat.

List of Species

Agelenidae

Agelenopsis emertoni Chamberlin & Ivie, 1935
Agelenopsis sp. nr *oklahoma* (Gertsch, 1936)
Agelenopsis sp. nr *pennsylvanica* (C. L. Koch, 1843)

Amaurobiidae

Coras sp.

Anyphaenidae

unidentified Anyphaenidae

Araneidae

Mangora maculata (Keyserling, 1865)

Clubionidae

Clubiona abboti L. Koch, 1866
Clubiona sp. nr *littoralis* Banks, 1895
Clubiona sp. nr *pomoa* Gertsch, 1941

Corinnidae

Castianeira trilineata (Hentz, 1847)
Castianeira sp. nr *trilineata* (Hentz, 1847)
Falconina gracilis (Keyserling, 1891)
Phrurolithus emertoni Gertsch, 1935
Phrurotimpus alarius (Hentz, 1847)
Phrurotimpus certus Gertsch, 1941
Phrurotimpus sp. nr *alarius* (Hentz, 1847)
Scotinella sp. nr *madisonia* Levi, 1951

Ctenizidae

Ummidia sp.

Cyrtaucheniidae

Myrmekiaphila fluviatilis (Hentz, 1850)

Dictynidae

Cicurina minorata (Gertsch & Davis, 1936)
Cicurina sp. nr *idahoana* Chamberlin, 1919
Cicurina sp. nr *modesta* Gertsch, 1992
Cicurina sp. nr *texana* (Gertsch, 1935)
Cicurina sp. nr *varians* Gertsch & Mulaik, 1940
Lathys sp. nr *immaculata* (Chamberlin & Ivie, 1944)

Gnaphosidae

Drassyllus aprilinus (Banks, 1904)
Drassyllus sp. nr *dixinus* Chamberlin, 1922
Gnaphosa sericata (L. Koch, 1866)
Litopyllus temporarius Chamberlin, 1922
Talanites exlineae (Platnick & Shadab, 1976)
Zelotes duplex Chamberlin, 1922
Zelotes pseustes Chamberlin, 1922

Hahniidae

Hahnia flaviceps Emerton, 1913
Neoantistea agilis (Keyserling, 1887)
Neoantistea oklahomensis Opell & Beatty, 1976

Linyphiidae

Ceraticelus sp. nr *laticeps* (Emerton, 1894)
Ceratinops crenatus (Emerton, 1882)
Erigone autumnalis Emerton, 1882
Masoncus sp. nr *conspectus* (Gertsch & Davis, 1936)
Meioneta sp. nr *llanoensis* (Gertsch & Davis, 1936)
Meioneta sp. nr *meridionalis* (Crosby & Bishop, 1936)
Meioneta sp. nr *unimaculata* (Banks, 1892)
Meioneta sp.
Mermessus maculatus (Banks, 1892)
nr *Eulaira suspecta* Gertsch & Mulaik, 1936
nr *Floricomus mulaiki* Gertsch & Davis, 1936
nr *Gonatium sp.*
nr *Islandiana sp.*
nr *Masoncus sp.*
nr *Scyletria sp.*
Walckenaeria spiralis (Emerton, 1882)
unidentified Linyphiidae sp. 1
unidentified Linyphiidae sp. 2

Lycosidae

Allocosa noctuabunda (Montgomery, 1904)
Allocosa sp. nr *georgicola* (Walckenaer, 1837)
Arctosa littoralis (Hentz, 1844)
Hogna helluo (Walckenaer, 1837)
Hogna sp. nr *annexa* (Chamberlin & Ivie, 1944)
Hogna sp. nr *frondicola* (Emerton, 1885)
Hogna sp. nr *helluo* (Walckenaer, 1837)
Hogna sp. nr *watsoni* (Gertsch, 1934)
Pirata alachuus Gertsch & Wallace, 1935

Pirata apalacheus Gertsch, 1940
Pirata hiteorum Wallace & Exline, 1978
Pirata sedentarius Montgomery, 1904
Pirata spiniger (Simon, 1898)
Rabidosa punctulata (Hentz, 1844)
Rabidosa rabida (Walckenaer, 1837)
Schizocosa perplexa Bryant, 1936
Schizocosa rovneri Uetz & Dondale, 1979
Schizocosa saltatrix (Hentz, 1844)
Schizocosa stridulans Stratton, 1984
Schizocosa uetzi Stratton, 1997
Schizocosa sp. *ocreata* group
Trochosa acompa (Chamberlin, 1924)
Trochosa sp. nr *terricola* Thorell, 1856
Varacosa avara (Keyserling, 1877)

Mimetidae
Ero sp.

Mysmenidae
Calodipoena incredula Gertsch & Davis, 1936

Oxyopidae
Oxyopes acleistus Chamberlin, 1929
Oxyopes salticus Hentz, 1845

Philodromidae
Thanatus altimontis Gertsch, 1933

Salticidae
Anasaitis canosa (Walckenaer, 1837)
Eris militaris (Hentz, 1845)
Habronattus viridipes (Hentz, 1846)
Habronattus sp. nr *moratus* (Gertsch & Mulaik, 1936)
Habronattus sp. nr *tuberculatus* (Gertsch & Mulaik, 1936)
Marpissa lineata (C. L. Koch, 1846)
Phidippus sp.
Synageles noxiosus (Hentz, 1850)
Thiodina sp.
Zygoballus rufipes Peckham & Peckham, 1885

Segestriidae
Ariadna bicolor (Hentz, 1842)

<u>Sicariidae</u>

Loxosceles reclusa Gertsch & Mulaik, 1940

<u>Tetragnathidae</u>

Pachygnatha tristriata C. L. Koch, 1845

<u>Theridiidae</u>

Euryopis spinigera O. P.-Cambridge, 1895
Latrodectus sp.
Steatoda americana (Emerton, 1882)

<u>Thomisidae</u>

Misumenops sp.
Tmarus sp.
Xysticus ferox (Hentz, 1847)
Xysticus fraternus Banks, 1895

<u>Titanoecidae</u>

Titanoeca americana Emerton, 1888

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