AN EXPLORATION OF INDIANA SPIDERS COLLECTION FROM MIKE DRANEY

LAUREN COCHRAN

Abstract. In my progressing research, I verified 39 specimens comprised of Agelenidae, Anyphaenidae, Araneidae, Clubionidae, Corinnidae, Gnaphosidae, Hahniidae, Linyphiidae, Lycosidae, Pisauridae, Phrurolithidae, Salticidae, Theridiidae, and Thomisidae. These specimens came from Dr. Mike Draney and were all collected in various parts of Indiana in the United States. In my analyses, I will be analyzing families of spiders that have been prominent throughout my research of Indiana spiders thus far.

INTRODUCTION

This collection of spiders consists of a total of 139 spiders from Indiana. The exploration in this paper will be focused on prominent families of spiders from the collection that I identified in my research from January to March of 2020. These spiders were collected between May and October of 2002 and hail from either Wayne Co. or Delaware Co., Indiana. The spiders came in glass vials preserved with 95% ethanol, and all were accompanied with a label of when and where they were collected. Some spiders in the collection were already identified. I identified the spiders in this collection, when possible, to their species. If the spiders were immature, I was able to identify them to their genus or solely their family depending on the identification criteria.

MATERIAL AND METHODS

In the months of January, February, and March of 2020, I verified 39 specimens of spiders. These spiders were verified as belonging to Agelenidae (2 specimens), Anyphaenidae (1 specimen), Araneidae (2 specimens), Clubionidae (1 specimen), Corinnidae (3 specimens), Gnaphosidae (2 specimens), Hahniidae (1 specimen), Linyphiidae (2 specimens), Lycosidae (5 specimens), Pisauridae (1 specimen), Phrurolithidae (1 specimen), Salticidae (4 specimens), Theridiidae (7 specimens), and Thomisidae (7 specimens). Analyses of these families include: Agelenidae, Anyphaenidae, Araneidae, Clubionidae, Corinnidae, Linyphiidae, Lycosidae, Salticidae, Theridiidae, and Thomisidae, as these families of spiders have been the most numerous and prominent to be found in Indiana throughout my research thus far. The specimens were left in the original vials they came in. Spiders were first identified as male or female. I then used standard identification methods to determine family, genus, and species. Once all vials are relabeled with the appropriate identification, they will be sent back to Mike Draney.

Results

Agelenidae

Agelenopsis pennsylvanica
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 9.14.02

Wadotes saturnus
Male
Coll.place/date: Hayes Aboretum, Wayne Co., IN 5.30.02

Anyphaenidae

Anyphaena ?
Male (immature)
Coll.place/date: Ginn Woods, Delaware Co., IN 8.03.02

Araneidae

Neoscona arabesca
Male
Coll.place/date: Hayes Aboretum, Wayne Co., IN 9.13.02

Neoscona ?
Female (immature)
Coll.place/date: Ginn Woods, Delaware Co., IN 7.02.02

Clubionidae

Clubiona ?
Gender unknown (immature)
Coll.place/date: Hayes Aboretum, Wayne Co., IN 9.13.02

Corinnidae

Castianeira cingelata
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Castianeira longipalpus
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Castianeira longipalpus
Male
Coll.place/date: Hayes Aboretum, Wayne Co., IN 7.01.02

Gnaphosidae

Sergiolus capulatus
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Sergiolus ?
Female (immature)
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Hahniidae

Cicurina ?
Female (specimen damaged)
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Linyphiidae

Bathyphantes pallidus
Male
Coll.place/date: Hayes Aboretum, Wayne Co., IN 5.30.02

Linyphia waldea
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Lycosidae

Pirata alachuus
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Pirata alachuus
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Pirata alachuus
Male
Coll.place/date: Hayes Aboretum, Wayne Co., IN 6.06.02

Schizocosa ocreata
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Schizocosa stridulans
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Pisauridae

Pisaurina mira
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Phrurolithidae

Phrurotimpus borealis
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Salticidae

Naphrys xerophilum
Male (2x)
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Naphrys ?
Male (immature)
Coll.place/date: Hayes Aboretum, Wayne Co., IN 7.01.02

Zygoballus rufipes
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Theridiidae

Dipoena nigra
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 8.03.02

Dipoena nigra
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.26.02

Dipoena nigra
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 7.02.02

Dipoena nigra
Female
Coll.place/date: Hayes Aboretum, Wayne Co., IN 9.13.02

Theridion lyricum
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 9.07.02

Theridion ?
Female (damaged)
Coll.place/date: Ginn Woods, Delaware Co., IN 9.07.02

Theridion ?
Female (immature)
Coll.place/date: Ginn Woods, Delaware Co., IN 8.23.02

Thomisidae

Mecaphesa ?
Female (immature)
Coll.place/date: Ginn Woods, Delaware Co., IN 6.26.02

Tmarus angulatus
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 7.02.02

Xysticus ferox
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Xysticus ferox
Female (2x)
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Xysticus fraternus
Female
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

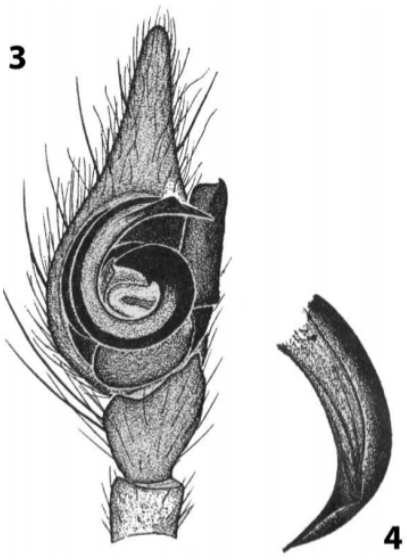
Xysticus sp.
Male
Coll.place/date: Ginn Woods, Delaware Co., IN 6.06.02

Family Agelenidae Analysis

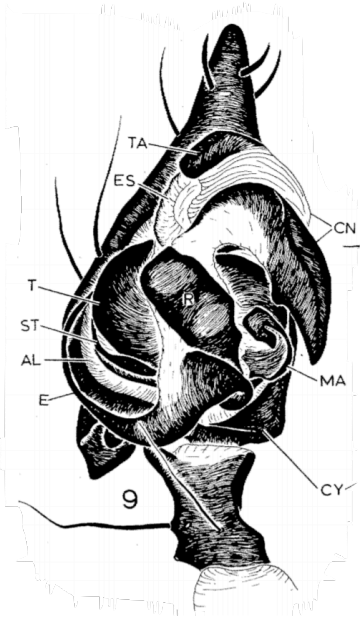
Agelenidae, more commonly known as funnel weavers, are a family of spiders spotted all over the United States and the midwest. These spiders like to make their webs inside of homes. Agelenidae are spotted most often in the months of April, May, and October. Agelenidae possess two horizontal rows of four eyes. The cephalothorax narrows towards the anterior side of the body, near the head. The abdomen is a slightly oval shape and is typically patterned with two rows of lines and spots. Some species of Agelenidae have longitudinal lines on the dorsal surface of the cephalothorax.

The two species of Agelenidae present in this collection were *Agelenopsis pennsylvanica* and *Wadotes saturnus*. *Agelenopsis pennsylvanica* can be distinguished from other Agelenids by two distinct features. The genus *Agelenopsis* possess posterior spinnerets approximately twice the length of the basal segment, while in most other Agelenids, these segments are approximately the same in length. The *Agelenopsis* males typically possess a large, openly coiled embolus that lies flat across the face of the palp that is distinct of that genus.[1]

The genus *Wadotes* is usually a pale yellowish-brown to dark reddish-brown in color. This genus can be distinguished from most other Agelenids by two retromarginal cheliceral fang furrow teeth. *Wadotes* males possess projecting processes on the prolateral and retrolateral margins of the palpal cymbium.[2] The specific palps of both *Agelenopsis pennsylvanica* and *Wadotes saturnus* are presented below.



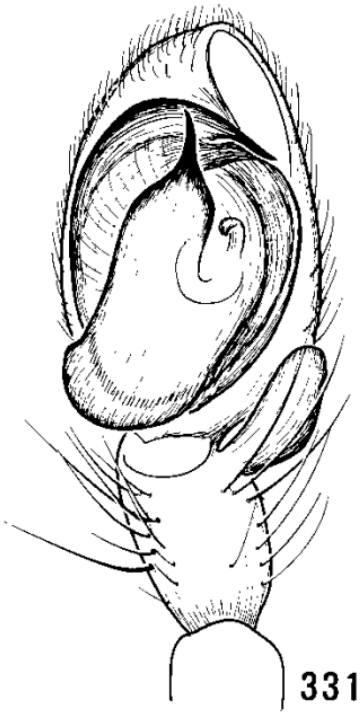
Agelenopsis pensylvannica



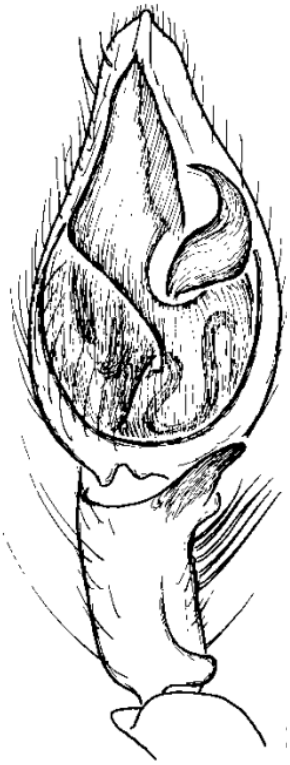
Wadotes saturnus

Family Anyphaenidae Analysis

Anyphaenidae, also known as ghost spiders or anyphaenid sac spiders, are a family of spiders commonly found in North and South America. Anyphaenids are closely associated with Clubionid, as both are known as sac spiders. The most common genera of Anyphaenidae found are *Anyphaena* and *Hibana.* Anyphaenids are be distinguished by a number of unique traits. The legs of Anyphaenids have very few flattened setae, and their tracheal spiracle is located midway between the genital groove and the spinnerets. Another distinguishing feature is the complexity and "ornateness" of the male genitalia.[3] The genus of anyphaenid found in this collection was *Anyphaena.* This male spider was immature, therefore a complete identification to species was not possible. Examples of male species in the genus *Anyphaena* are presented below.



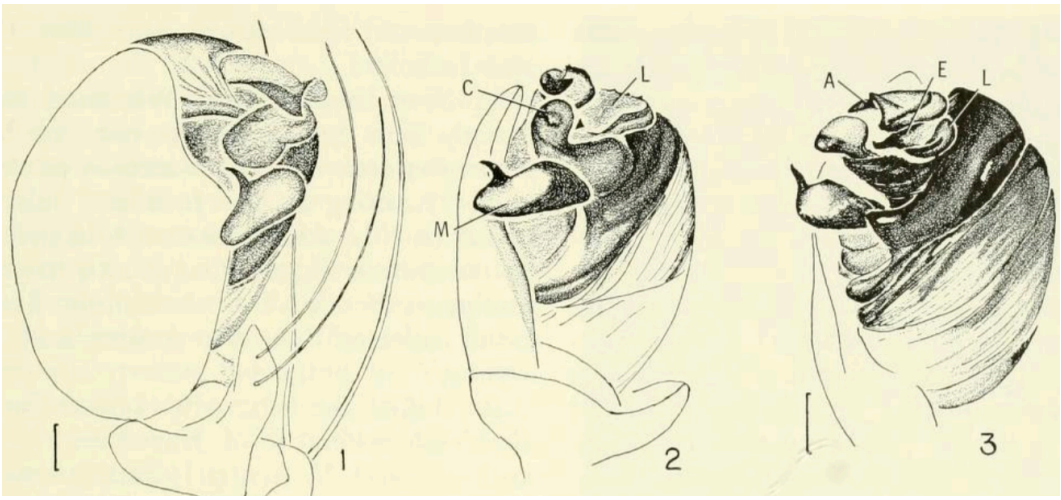
Anyphaena aperta



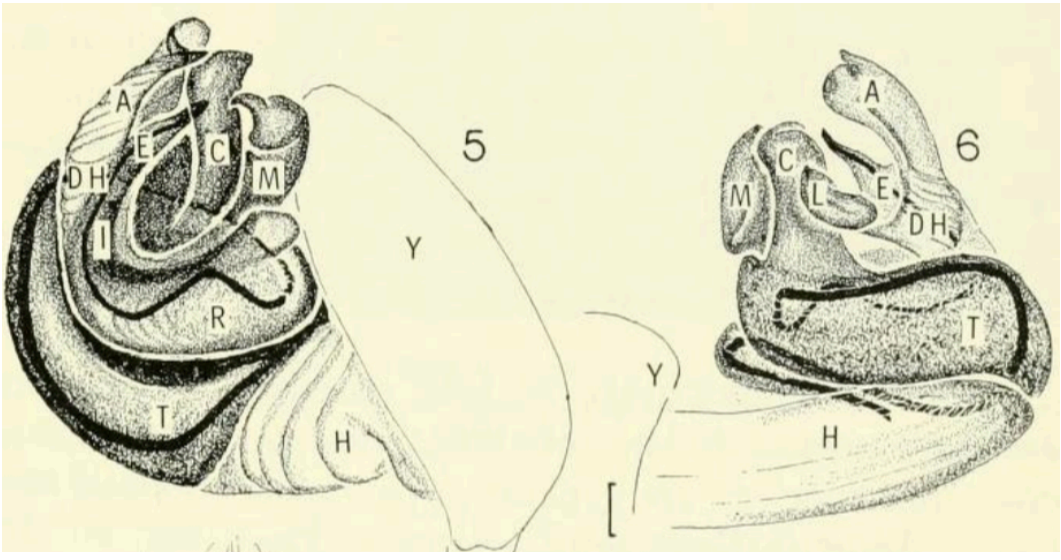
Anyphaena pacifica

Family Araneidae Analysis

Araneidae, also known as orb weavers, are amongst one of the largest families of spiders behind Salticidae and Linyphiidae. They are extremely diverse in their coloration, patterning, and sizes. As their common name suggests, they are well known for the types of webs they weave in a very circular fashion. The two Araneids found in this collection were both of the genus *Neoscona.* This genus is characterized by a specific ventral abdominal pattern that consists of an area of black bordered by white which forms a square where the furrow of the epigynum is.[4] As usual with any spiders, the genitalia of this genus is distinct from others in the Araneidae family and is key in identifying the genus and species. One of the *Neoscona* specimens is immature, so I was unable to ascertain a specific species identification. The other belongs to *Neoscona* arabesca. The left palpus of this species is presented below.

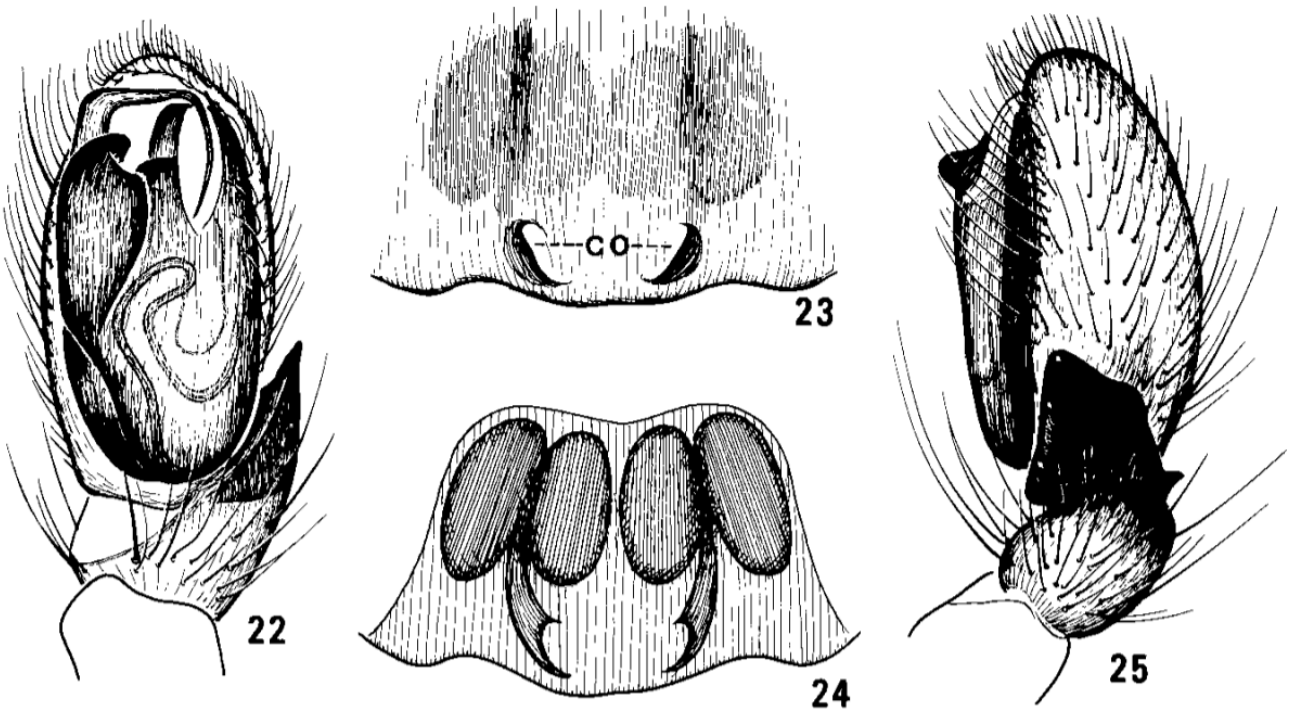


Neoscona arabesca



Family Clubionidae Analysis

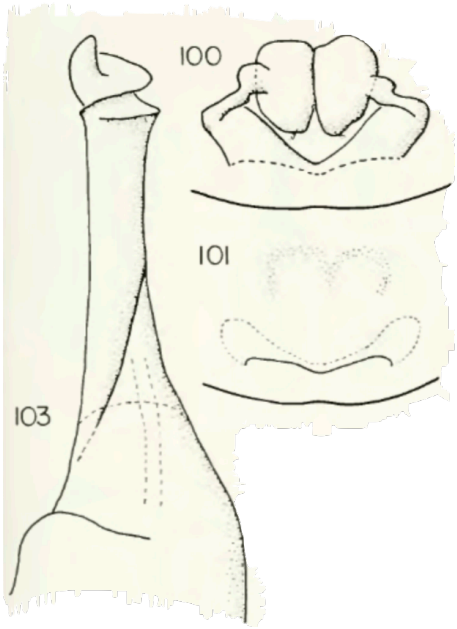
Clubionidae, also known as sac spiders, is a family of spiders characterized for possessing eight eyes in two rows of four across the face. Sac spiders have undergone a very complex and confusing taxonomical history, originally several now-existing families being lumped into one large family of sac spiders. The one Clubionid specimen found in this collection was identified to belong to the genus *Clubiona*. This spider was confirmed to be immature and therefore could not properly be assigned a species. The genus *Clubiona* usually present with a coloration of a variety of yellows and oranges. The chelicerae are usually hairy, being long and slender in males and bit more stout for females. The males can be distinguished by a blunt apophysis, and the females can be distinguished by an elongated, concave, or convex plate with many fine grooves and ridges.[3] Below are a few examples of what male and female genitalia of the genus *Clubiona* would look like.



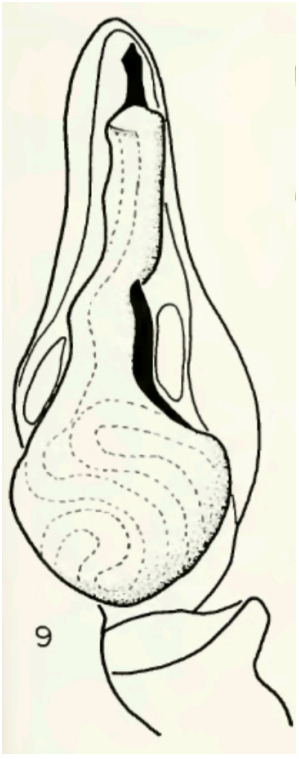
Clubiona moesta

Family Corinnidae Analysis

Corinnidae, also occasionally known as ground sac spiders or ant mimics, is a family of spiders that used to be classified as Clubionidae. Corinnids are commonly found in North and Central America. A key feature of Corinnids is their ant-like bodies, where the abdomen is noticeably separated from the carapace. The extremely prominent genus of Corinnidae found in this collect is *Castianeira,* which are the distinctively ant-like Corinnids. *Castianeira* males are distinguished by their relatively simple genitalia compared to most other spiders, along with a distinctive twist of the embolus.[5] *Castianeira* females are also distinguished by simple epigynums, but it is typically harder to compare female Corinnids. The two species found in this collect were *Castianeira cingulata* and *Castianeira longipalpus.* The genitalia of these species are shown below.



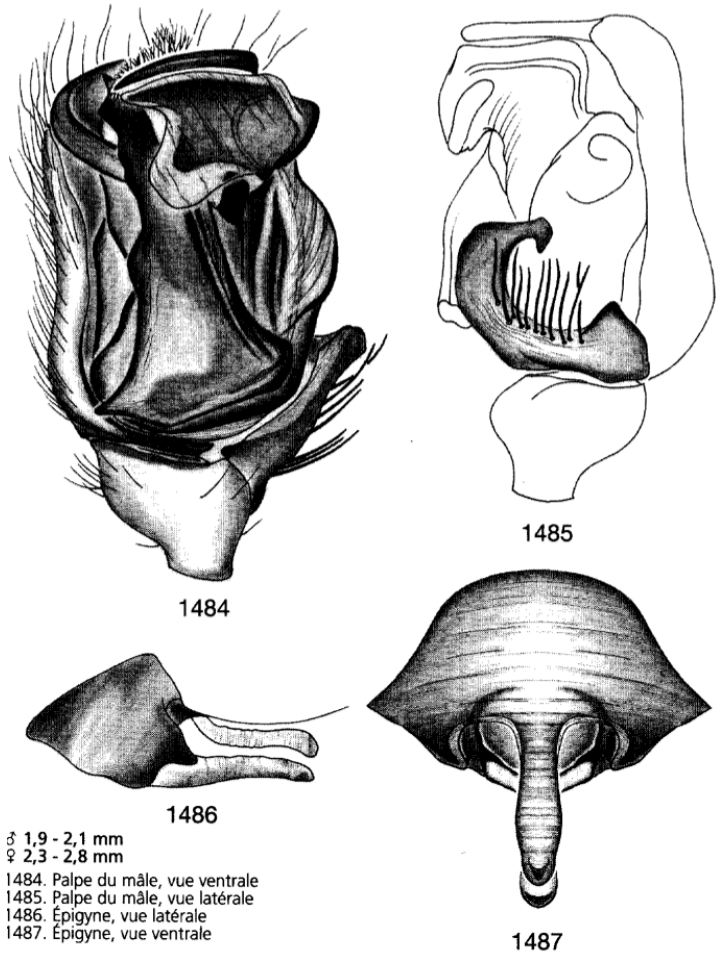
Castianeira cingulata



Castianeira longipalpus

Family Linyphiidae Analysis

Linyphiidae, also known as sheet weavers or money spiders, are an extremely large family of spiders; they are the second largest family next to Salticidae and are found nearly all over the world. Linyphiidae are typically very small spiders and have proven to be very difficult to identify for a variety of reasons. This family of spiders is easily recognizable by their rounded, nearly vertical protruding clypeus.[6] The female genitalia of Linyphiidae are typically simple and non-protruding, while the male genitalia are moderately small with a simply hooked paracymbium and a short, slender embolus.[6] The species of Linyphiidae found in this section of the collection were *Bathyphantes pallidus* and *Linyphia waldea.* The genitalia for *Bathyphantes pallidus* is presented below.

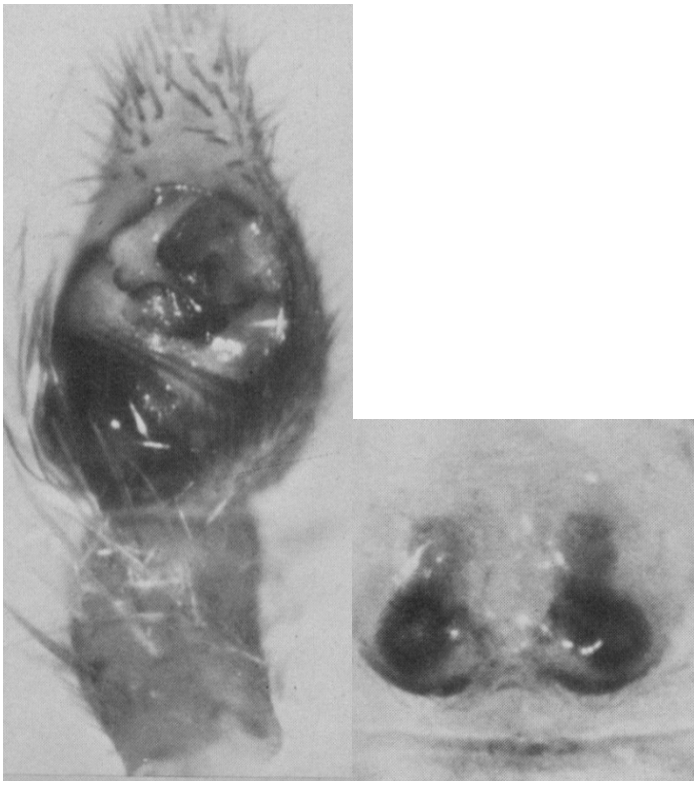


Bathyphantes pallidus[7]

Family Lycosidae Analysis

Lycosidae, also commonly known as wolf spiders, are another large family of spiders that can be found nearly all over the world and are common in midwestern areas such as Indiana. Lycosidae are excellent hunters and live on the ground rather than in webs. These spiders are easily identifiable by their eyes. Lycosidae possess three rows of eyes; the bottom row consists of four small eyes, the middle row have two distinctively large eyes, and the third row possesses two medium-sized eyes that appear to be almost on top of the head. These spiders are general dark brown, earthy colors because they live amongst the dirt and leaves.

The overwhelmingly prominent genera of Lycosidae found in this collection of spiders were *Schizocosa* and *Pirata,* more specifically the species of *Schizocosa ocreata* and *Pirate alachuus. Schizocosa* females can be distinguished from other Lycosidae by their well sclerotized median septum.[8] *Pirata* can be distinguished by a specific tuning fork pattern on its carapace, as well as unique genitalia.[9] Genitalia for both species are presented below.



Pirata alachuus

Schizocosa ocreata

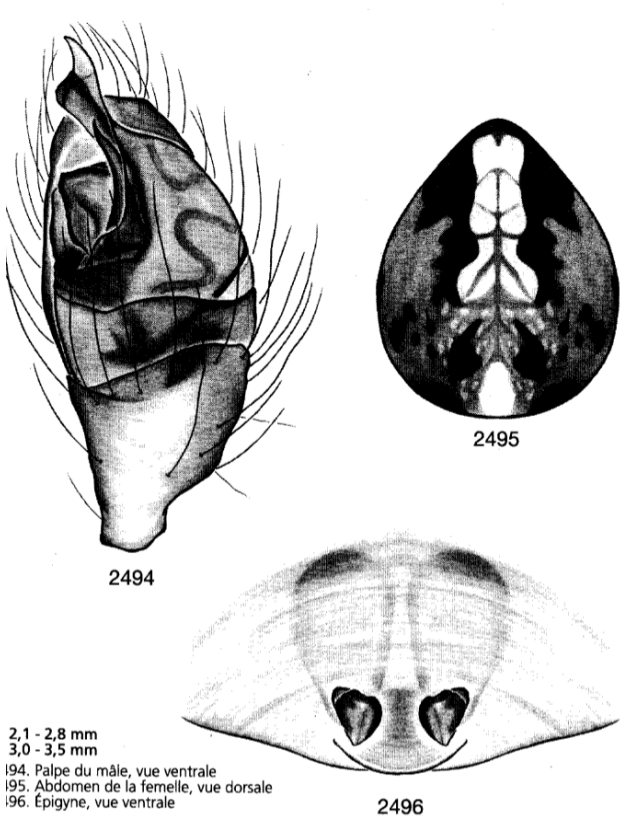
Family Salticidae Analysis

Salticidae, also commonly known as jumping spiders, are the largest family of spiders in the world. They consist of a multitude of different sizes, colors, and patterns and are sometimes referred to as the “cutest” spider family. Salticidae are among the easiest family to identify due to their uniquely characteristic eyes. These spiders possess two very large eyes that no other family of spider represents. Their faces are also distinctly rectangular to where their eyes appear to be on the front of their face pointing outward, somewhat like how a human’s eyes are oriented. The species found in this section of the collection were *Naphrys xerophilum* and *Zygoballus rufipes.*

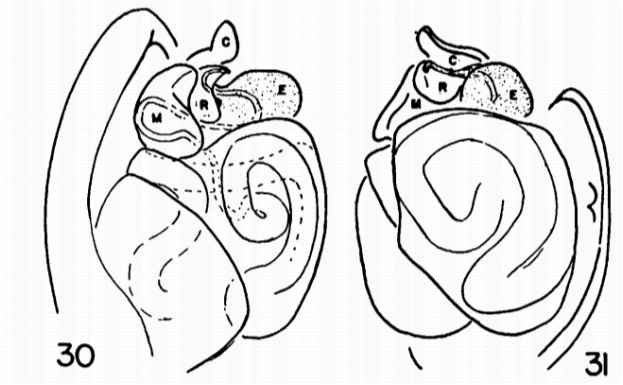
Naphrys xerophilum are distinguished firstly by their unique coloring. These spiders are black and seem to possess a reflective quality to them that gives off a greenish sheen in light. As with most other spiders, this species is also mainly distinguished by its genitalia in comparison to other species of Salticidae.

Family Theridiidae Analysis

Theridiidae, also known as tangle-web spiders and comb-footed spiders, are a rather large family of spider characterized by a specific comb they possess on their fourth tarsi. They also are distinguished by a protruding clypeus, but not nearly so much as Linyphiidae. The infamous black widow spider is part of this family. Theridiidae are also found nearly everywhere in the world and are common in the midwest and in Indiana. The largest genus of Theridiidae is *Theridion,* which is a common genus that was found in this collection. An interesting note to make is that all of the Theridiidae found in this collection were almost exclusively of the species *Theridion lyricum* and *Dipoena nigra.* These deductively must be the most common species located in Indiana. Both genera can be distinguished by their unique coloring/patterning and differences in genitalia. Female *Theridion lyricum* have a relatively simple epigynum with two small roughly triangular openings.[7]



Theridion lyricum

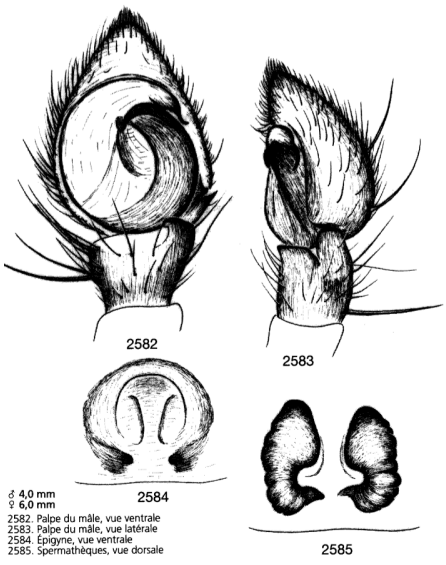


Dipoena nigra[10]

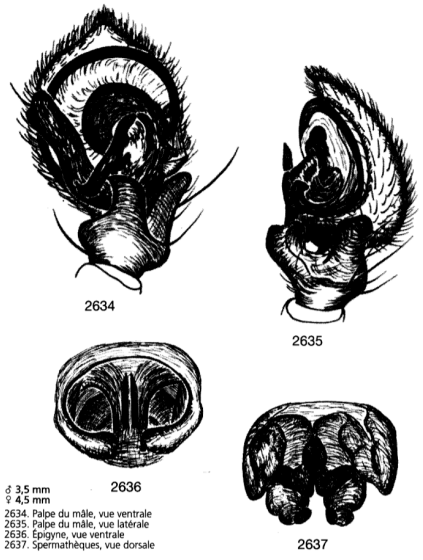
Family Thomisidae Analysis

Thomisidae, commonly known as crab spiders, are a family of spiders found all around the world. Thomisidae are a common spider found in Indiana and tend to reside in flowers or on fruit; they typically like to hunt their prey this way. They do not typically build webs to catch food. Instead, they are usually ambush predators. Thomisidae are called crab spiders because of their resemblance to a crab; their front legs are bent in a very angular way that is uniquely characteristic of crab spiders. They can also be identified by their eye size and arrangement.

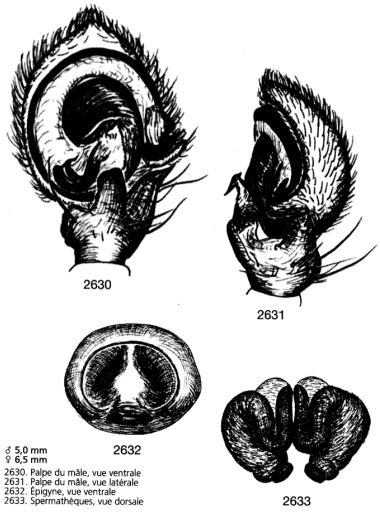
The extremely prominent genera found in this collection were *Xysticus* and *Tmarus.* The *Xysticus* genus can be distinguished by a rather intricately patterned abdomen, more so than the rest of the Thomisidae genera. *Xysticus* possess rather short and thick legs as well. *Tmarus* are distinguished by their angular abdomen which is uniquely quite long and narrow compared to other Thomisidae genera, and the legs are also longer and more slender, especially when compared to a genus such as *Xysticus.*[11] As usual, the genera and species of Thomisidae, along with most other spiders, can be distinguished by difference in genitalia. The specific specials found in this section of the collection were *Tmarus angulatus, Xysticus ferox,* and *Xysticus fraternus.* The genitalia for these species are presented below for comparison.



Tmarus angulatus



Xysticus fraternus



Xysticus ferox

DISCUSSIONS

In my analyses, I analyzed families of spiders that have been prominent throughout my research of Indiana spiders thus far. These prominent spider families include Agelenidae, Anyphaenidae, Araneidae, Clubionidae, Corinnidae, Linyphiidae, Lycosidae, Salticidae, Theridiidae, and Thomisidae. I was able to identify these spiders from January to March of 2020. These spiders were collected between May and October of 2002 and hail from either Wayne Co. or Delaware Co., Indiana.

After analyses of these various families, I have been able to identify both similarities and difference between these different groups of Indiana spiders. For example, both Theridiidae and Linyphiidae possess a protruding clypeus, but they each have very distinguishable characteristics that clearly separate the two families. Lycosidae and Salticidae are both agile spider families that possess rather large eyes, but they also are shaped and sized very differently from each other.

This diverse group of spiders all came from two locations in Indiana, Ginn Woods and Hayes Aboretum, both of which are forested areas. These areas possess very similar habitats and biomes, but several different families of spiders inhabit them together. This shows the biodiversity that Indiana contains. This proof of biodiversity, at least within the spider community, is good news. This means that spiders in Indiana are flourishing.

Literature Cited

[1]Whitman-Zai, J. et al. Revision and morphological phylogenetic analysis of the funnel web spider genus *Agelenopsis* (Araneae: Agelenidae). *The Journal of Arachnology* 43(1), 1-25, (1 April 2015). Retrieved April 2, 2020, from https://doi.org/10.1636/K14-35.1

[2]Bennett, R. (1987). Systematics and Natural History of Wadotes (Araneae, Agelenidae). *The Journal of Arachnology, 15*(1), 91-128. Retrieved April 13, 2020, from www.jstor.org/stable/3705512

[3]Dondale, D. And Redner, J. Araneae: Clubionidae and Anyphaenidae. *Biosystematics Research Institute* 1724, (1982). Retrieved April 17, 2020.

[4]Berman, J. And Levi, H. The Orb Weaver Genus *Neoscona* in North America (Araneae: Araneidae). *Museum of Comparative Zoology* 141(8), 465-500, (15 September 1971). Retrieved April 20, 2020.

[5]Reiskind, J. (1969). The spider subfamily Castianeirinae of North and Central America (Araneae, Clubionidae). *Bulletin of The Museum of Comparative Zoology*, *138*, 163–325. Retrieved April 17, 2020, from https://doi.org/10.5962/bhl.part.10359

[6]Chamberlain, R. V. and Ivie, W. New genera and species of North American linyphiid spiders. *Bulletin of the University of Utah* 33(10), 1-39, (1943). Retrieved April 18, 2020.

[7]Paquin, P. & N. Duperre. 2003. Guide d'identification des Araignees (Araneae) du Quebec. Fabreries, Supplement 11. 251 pages. Retrieved April 18, 2020.

[8]Dondale, C. D. and Redner, J. H. Revision of the Neartic Wolf Spider Genus *Schizocosa* (Araneida: Lycosidae). *Biosystematics Research Institute* 110, 143-181 (1978). Retrieved April 19, 2020.

[9]Wallace, H., & Exline, H. (1977). Spiders of the Genus Pirata in North America, Central America and the West Indies (Araneae: Lycosidae). *The Journal of Arachnology, 5*(1), 1-112. Retrieved April 22, 2020, from www.jstor.org/stable/3704981

[10]Levi, H. W. Spiders of the Genus *Dipoena* from America North of Mexico (Araneae, Theridiidae). *American Museum of Natural History* 1647, 1-39 (20 December 1953). Retrieved April 22, 2020.

[11]Dondale, C. D. and Redner, J. H. Araneae: Philodromidae and Thomisidae. *Biosystematics Research Institute* 1663, 1-255 (1978). Retrieved April 27, 2020.