

April 2010

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Recommended Citation

Swanson, Daniel R. 2010. "On the Mygalomorphae (Araneae) of Michigan," *The Great Lakes Entomologist*, vol 43 (1)

Available at: <https://scholar.valpo.edu/tgle/vol43/iss1/9>

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On the Mygalomorphae (Araneae) of Michigan

Daniel R. Swanson¹

Abstract

The discovery of a population of *Antrodiaetus unicolor* (Hentz) in Michigan is reported, resulting in the first state record for the mygalomorph family Antrodiaetidae. New county records for another mygalomorph spider, *Sphodros niger* (Hentz) (Atypidae), including one which represents a significant Michigan range extension, are presented and the occurrence of the genus in Michigan is clarified.

The Mygalomorphae are often large, conspicuous spiders comprising the taxon sister to the much larger clade of true spiders, the Araneomorphae. Members of the group possess parallel fangs and two pairs of book lungs, in contrast to the diaxial chelicerae and single pair or absence of book lungs found in most araneomorph spiders. The infraorder encompasses 15 families with the greatest diversity found, as is the usual case, in the tropics. Eight of these families are known to occur in the United States and basic information on identification, natural history and taxonomy for each of these families may be found in Ubick et al. (2005). Of the Mygalomorphae, only two atypids have previously been reported in Michigan (one erroneously). Herein, a new mygalomorph family is added to the list of spiders occurring in Michigan with the discovery of a population of *Antrodiaetus unicolor* (Hentz, 1842) in Ann Arbor. Additional records are presented for the black purseweb spider *Sphodros niger* (Hentz, 1842) and the presence of the red-legged purseweb spider *Sphodros rufipes* (Latreille, 1829) is discussed.

Antrodiaetidae. The trapdoor spiders in the family Antrodiaetidae are arranged into 2 genera and 32 species worldwide (Platnick 2009). Both genera are restricted to but widely distributed across the United States and portions of southwestern Canada with the exception of two species of *Antrodiaetus* found in Japan (Coyle 2005). The family was revised and information on natural history was presented in a series of studies by Coyle (1968, 1971, 1975) and additional natural history information was given by Coyle and Icenogle (1994). *Atypoides* was later synonymized with *Antrodiaetus* based on molecular studies (Hendrixson and Bond 2007). Species of *Aliatypus* are found in the southwestern United States (Coyle 2005). *Antrodiaetus* is widespread across the United States though previous records report *A. unicolor* from only as far north as southern Illinois, Indiana and Ohio and *A. robustus* (Simon, 1891) from Pennsylvania and eastern Ohio (Coyle 1971, Sierwald et al. 2005).

The trapdoor spiders in the genus *Antrodiaetus* are commonly known as folding-door or collar-door spiders. The name seems fitting as the silken folds or "curtains" that line each side of the burrow mouth render spiders of this genus instantly recognizable. These distinctive trapdoor spider burrows as well as their occupants were observed on the night of 21 May 2009 in Nichols Arboretum located in the northeastern portion of the University of Michigan Central campus in Ann Arbor. One adult female was taken. Upon returning on several later dates, the burrows were counted, spiders and burrows were photographed (Figs. 1-3) and more specimens were collected.

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The site of collection is a mesic oak-maple forest, typical of lower Michigan, in a glacial outwash. The soil consists of Miami loam, 25-30% slope as characterized by Engel (1977). Invasive species including buckthorn and honeysuckle are common and hints of extirpation efforts are noticed occasionally. The particular portion of the Arboretum in which the spiders reside comprises the periphery along the lower northern Arboretum road from the Washington Heights entrance (Intersection 1) to the trail junctions east of the Oak Openings (Intersection 2) and the trail leading from this road to the beginning of the wooden staircase near the River Landing on the Huron River (Intersection 7). The distances from Intersection 1 to Intersection 2 (hereafter Lower Road) and from Intersection 2 to Intersection 7 (hereafter Ridge Trail) are 0.24 and 0.32 km, respectively. Place names and distances are taken from the trail maps posted throughout the Arboretum. The periphery of the Lower Road was densely covered in leaf litter nearly in its entirety; very little bare soil was visible. The Ridge Trail periphery, on the other hand, had much less leaf litter and closer to 50% of the soil was bare. Areas beyond the periphery of the trail were not searched as the spiders were common enough around the trail. Additional investigation was further deterred since the sloping hillsides were posted as protected areas.

On one evening in late May of 2009, 237 burrows were counted from the Arboretum entrance to the wooden staircase. In most cases, the spider occupants could be seen at the entrance of the burrow but this was not required for count



Figure 1. *Antrodiaetus unicolor*, adult female, at burrow entrance.



Figure 2. Same burrow as Fig. 1, entrance concealed.



Figure 3. *Antrodiaetus unicolor*, adult female, grappling with "lure".

inclusion. Of these burrows, 43 burrows were counted along the Lower Road while 194 burrows were counted along the Ridge Trail. The sheer number of individuals seems to indicate that this population has been living in the Arboretum for some time and has simply remained unnoticed. Burrow diameter ranged from about 5-18 mm. In each situation, more burrows were counted on the higher side of the path and burrows were situated so the spider was facing downhill. Burrows were commonly found under the large surfaced tree roots or under the occasional log set out to line the path on the Ridge Trail. In a few instances, burrows were found on the lateral portion of the pathway itself. Some burrows were carved through fallen leaf litter but it was more common to see them in bare soil. The difference in leaf litter coverage mentioned previously may account for the discrepancy in burrow density between the Lower Road and the Ridge Trail.

It was fairly easily to induce a quick pounce from the burrow using a small twig or blade of grass but the spiders seemed fairly cautious as well as incredibly fast. It is likely that the presence of numerous flashlights made them more wary. Discovery of a superior lure afforded a better chance to study the spiders. A stem with a large bud or unopened flower was particularly attractive as an imitation food source; in many cases, individuals would come completely out of the burrow in pursuit of it. Presumably, the fleshy, somewhat moist feeling of the plant bud better simulated a living organism than a stick or grass blade. Despite this trickery, one large female, when continuously presented with the same bud, grappled with it for a full 2.5 minutes.

Specimens were identified using the key to females constructed by Coyle (1971). The spider's identity could easily be limited to *A. robustus* or *A. unicolor*. The length: width ratio of the sternum fit within the range described for *A. unicolor*. Additionally, the short thickened black setae characteristic of *A. unicolor* was observed immediately posterior to the pedicel, contrasting the long, thin setae expected for *A. robustus*. The author also found no anterior lateral spinneret vestiges, this absence being another feature attributable to *A. unicolor*. As a result, the specimens were identified as *A. unicolor*. Photographs of some of these characters were sent to Dr. Brent Hendrixson for confirmation; he agreed with the author's determination. However, two notes regarding the taxonomic status of this species should be considered. First, Coyle (1971) notes *A. robustus* may be nothing more than a northern genetic variant of *A. unicolor*. Second, Hendrixson and Bond (2005) suggest and Coyle (2005) agrees that *A. unicolor* is probably made up of a complex of species.

As a direct result of this discovery, two large adult females (20-22 mm.) were vouchered in the University of Michigan Museum of Zoology (UMMZ) bearing the following locality information: MICHIGAN, Washtenaw Co., Ann Arbor, Nichols Arboretum, Ridge Trail from Oak Openings to Huron River, 30 May 2009, 42.2823 -83.7220, DRS#2009-052, 240 m., D. R. Swanson, *Antrodiaetus unicolor* (Hentz), det. D. R. Swanson 2009, NEW STATE RECORD - Michigan. Several adult females, including the first specimen obtained from the locality on May 21, reside in the author's personal collection (DRS). Aside from the date on the first female, these specimens have locality information identical to the museum vouchers.

The new record reported above constitutes a northward extension of the species current range as set out by Coyle (1971). The new locality is approximately 330 air km north-northwest of the Hocking Hills State Park area in Hocking County, Ohio; this is listed in the reference as Ash Cave State Park and Cantwell Cliffs State Park. It is also approximately 370 and 380 air km northwest of Pittsburgh and Penn Hills, Allegheny County, Pennsylvania, respectively, an area in which both *A. unicolor* and *A. robustus* are found. It is also worth noting here the nearest locality for *A. robustus*: approximately 255 air km to the southeast in Canton, Stark County, Ohio.

Atypidae. The Atypidae, whose members are commonly known as purseweb spiders, contains 3 genera and 43 species worldwide (Platnick 2009). In the Nearctic region, the 7 species belonging in the genus *Sphodros* Walckenaer and the single species belonging in *Atypus* Latreille are restricted to the eastern half of the continent (Coyle, 2005a). The family was revised by Gertsch and Platnick (1980) while some aspects of natural history were reported by Coyle and Shear (1981), Beatty (1986) and Edwards and Edwards (1990).

Previously, the black purseweb spider, *Sphodros niger* (Hentz 1842), has been taken in Ingham and Clinton County, Michigan (Gertsch and Platnick, 1980). Both were single males caught in pitfall traps. This species was later reported as having been collected in the Edwin S. George Reserve in Livingston County (Cameron, 1993; pers. comm.). Additionally, the author has seen images that clearly represent *S. niger* reportedly photographed in Ada, Kent County, Michigan (<http://bugguide.net/node/view/220129/bgimage>).

The only specimen of Atypidae, a single male *S. niger*, already residing in the UMMZ bears the following label: MICHIGAN, Lenawee Co., Adrian Coll. Arb. @ SE Round Lk., 3 June 1992, field, R. W. Husband, det. M. O'Brien '93 (1♂). The recent sorting of old pitfall material stored in the UMMZ has yielded additional records for the species, including one that represents a significant northward range expansion in Michigan. Two males bear the locality information: MICHIGAN, Washtenaw Co., Matthaei Botanical Garden nr. Dix Pond, small pitfall, 15-19 June 1996, G. Hammond, det. D. R. Swanson 2009 (2♂). Two more males bear the following locality information: MICHIGAN, Crawford Co., T25N-R4W-Sec. 32, 23-30 June 1997, Stand 8, Plot 3, C. Sculley, pitfalls, det. D. R. Swanson 2009 (2♂). One of these males is missing the abdomen but the form of the chelicerae and endites, in addition to the similarity to the other complete specimen, make identification indisputable. Additionally, Prof. H. D. Cameron has kindly donated another specimen to the UMMZ. It represents the only female in the Michigan collections and bears the following locality information: MICHIGAN, Washtenaw Co., Pittsfield, Twp., S. of US12 on Moon Rd., Sec. 32, 33, digging in thick woods, 13 April 1998, Ryan F. Neice, det. H. D. Cameron 1998 (1♀). All of the above specimens are now deposited in the UMMZ collection.

A confusing and overlooked point in the literature is the presence of another atypid, the red-legged purseweb spider *S. rufipes* in Michigan. The binomial *Sphodros milberti* Walckenaer, 1837 was officially synonymized under this species by Gertsch and Platnick (1980). *S. rufipes* is known from Maryland, New York and Rhode Island to southern Illinois and eastern Kansas (Gertsch and Platnick 1980, Morrow 1986) and Snider (1991) reported *Atypus milberti* (Walckenaer) as occurring in Berrien, Clinton, Ingham and Jackson counties in Michigan. Snider also noted the latter three counties as having vouchered specimens in the Michigan State University Arthropod Research Collection (MSU). Sierwald et al. (2005) then based inclusion of *Sphodros rufipes* (Latreille) in their list for Michigan on Snider's records. The author has seen the specimens residing in MSU: five males from four different collecting events in Ingham County, one male from a single collecting event in Clinton County and one male from a single collecting event in Lake County. As the latter may constitute an unreported record, the locality data is provided here: MICHIGAN, Lake Co., Big Star Lake, 6-June-1973, W. Walker, ex. leaf litter (1♂). One of the males from Ingham County could be the one mentioned in Gertsch and Platnick (1980) but the Clinton County record represents another individual. The Berrien and Jackson County specimens of Snider (1991) remain unknown to the author.

All of the MSU specimens clearly represent *S. niger*. The piceous color of the legs and the palpal morphology leave no question regarding the identity of the spiders. The confusion was a result of the specimens being misidentified

as *A. milberti*, an understandable error as this particular misidentification was not at all uncommon in the past (Gertsch and Platnick 1980). Furthermore, Sierwald et al. (2005) designated *S. niger* as having a “predicted” occurrence in Michigan; obviously the set of Michigan records provided by Gertsch and Platnick (1980) were overlooked. Ultimately, *S. niger* remains the only atypid known to occur in Michigan.

Acknowledgements

I thank Mark O’Brien, Insect Division, UMMZ, for his insight and guidance in preparing the manuscript, his beautiful photographs which supplement this text and his general support in all my entomological endeavors. I owe thanks to Gary Parsons, Arthropod Research Collection, MSU, for the hospitable visits to the collection under his care and his helpful correspondence regarding its specimens. I am also grateful to Prof. H. D. Cameron, University of Michigan, and Dr. Brent Hendrixson, Millsaps College, each for their arachnological expertise pertaining to the identification of the spider. I would also be remiss if I did not offer thanks to my field assistants, A. Heldt and C. Silliman, for the hours spent in the dead of night fishing large spiders out of their burrows.

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