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Cover Page Footnote

I am grateful to Mark O'Brien and Erika Tucker (UMMZ) and Gary Parsons (MSUC) for the privilege of studying the material under their care. I also thank three anonymous reviewers for their helpful comments which improved the manuscript.

New State Records for Some Flat Bugs (Heteroptera: Aradidae) of the United States

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Abstract

Twelve new state records are reported for eleven previously described species in six genera of Aradidae found in the United States.

Keywords: Hemiptera, true bugs, faunistics, distribution, Nearctic

As a companion piece to my Michigan Aradidae synopsis (i.e., Swanson 2020), I have re-examined and identified the Aradidae in the two major collections in southern Michigan in order to bring to light unreported state records. As a result, 12 new extra-Michigan state records, comprising material from the Michigan State University Albert J. Cook Arthropod Research Collection in East Lansing, the University of Michigan Museum of Zoology Insect Collection in Ann Arbor, and my personal collection, are herein reported.

Materials and Methods

Methodology largely follows my previous treatments (i.e., Swanson 2011, 2018, 2019):

After examining the determined aradid holdings and identifying much of the undetermined U.S. material in two Michigan university collections, the locality data of these specimens were compared with the most recent catalog for Heteroptera found north of Mexico (Henry and Froeschner 1988). Further records were culled after comparing with various post-1988 regional faunistic studies, as well as some pre-1988 references overlooked by the authors of the catalog (see annotations, plus Swanson 2011, 2018, 2019). The remaining specimen data are the subject of this treatment.

The identification of all specimens included in this study was rendered or confirmed by me, using my own keys (Swanson, unpublished) to the United States taxa syn-

thesized from various sources (e.g., Parshley 1921, Blatchley 1926, Torre-Bueno 1939, Matsuda 1977). In most cases, I have confirmed identifications previously rendered by R. F. Hussey.

Label data were not copied verbatim, although complete locality information is included. Any additions, changes, or interpretive elements I provide are shown in brackets. Multiple localities are included, where possible, to fortify new records. Distributional or taxonomic notes are offered where deemed necessary or useful.

As mentioned, the authority on which a state having a published record for a given aradid species is based belongs to Froeschner (1988). An updated distribution within the United States and Canada is included for each species treated herein. Records overlooked or reported subsequently are annotated in the distribution north of Mexico given at the end of each species account, whereas new records herein reported are presented in bold type; thus, this treatment also may be used as a partial compilation of references overlooked in Henry and Froeschner's (1988) catalog. The abbreviations used for each U.S. state and Canadian province or territory follow the United States Postal Service and the Canada Post Corporation, respectively.

Collections are designated as follows: Daniel R. Swanson, personal collection (DRS); Albert J. Cook Arthropod Research Collection, Michigan State University, East Lansing, Michigan (MSUC); and University of Michigan Museum of Zoology Insect Collection, Ann Arbor, Michigan (UMMZ).

Results

As a result of this investigation, 12 new state records for 11 previously described species in 6 genera have been compiled. The following 8 states have new records: IL, KY, LA, MO, TN, VA, WI, WY.

Subfamily ANEURINAE

Aneurus inconstans Uhler, 1871. – **TENNESSEE**: Carter Co., Roan Mountain, elevation 6300 ft., 6 August 1922, T. H. Hubbell, det. D. R. Swanson 2012 [1 ♂, 1 ♀] (UMMZ).

Distribution: USA: CT, DC, DE, IN, MA, MD, ME, MI (Swanson 2020), NC, NH, NJ, NY, OH (Osborn and Drake 1915), PA, RI, SD, TN, VA, VT; Canada: AB, BC, MB (Maw et al. 2000), NS, ON, QC, SK (Maw et al. 2000).

Iralunelus politus (Say, 1831). – **LOUISIANA**: Orleans Co. [sic], New Orleans, 24 February 1923, T. H. Hubbell, det. R. F. Hussey 1950 [4 ♀, 2 nymphs] (UMMZ).

Notes: Kormilev and Froeschner (1987) raised the subgenus *Iralunelus* Stys, 1974 to full generic rank, at the same time treating *Aneurus leptocerus* Hussey, 1957 and *Aneurus politus* Say, 1831 in combination with *Iralunelus*. It is unknown to me why these changes were not incorporated in the Henry and Froeschner's (1988) catalog. Stys (1974), in erecting *Iralunelus*, treated Say's species as *Aneurus (Iralunelus) politus*, but Froeschner (1988), despite co-authoring the new combinations, oddly noted for *Aneurus* Curtis, 1825: "Four subgenera have been placed within this genus...All species in the area north of Mexico appear to belong to the nominate subgenus."

Distribution: USA: AL, FL, GA, LA, MS, NY.

Subfamily ARADINAE

Aradus cincticornis Bergroth, 1906. – **ILLINOIS**: Will Co., Crete, 8 April 1906, H. Rumstadt, *Aradus proboscideus* Walker det. R. F. Hussey 1950, *Aradus cincticornis* Bergroth det. D. R. Swanson 2018 [1 ♀] (UMMZ).

Notes: Hussey originally identified this specimen as *Aradus proboscideus* Walker, 1873. However, in *A. proboscideus*, the disc of the pronotum is more or less flat, not being raised in front or behind the rather shallow transverse sulcus, whereas *A. cincticornis* (and the Illinoisan specimen) has the transverse sulcus deep and the disc distinctly raised in front and behind.

The single female on which this record is based has a body length of 8.6 mm. This "breaks" couplet #26 of Parshley's (1921) key (and Blatchley's [1926] key based on it), which purports that the body length of *A. cincticornis* is less than 6.8 mm.

Distribution: USA: AL, AR (Taylor and McPherson 1989), IL, MO.

Aradus crenatus Say, 1831. – **KENTUCKY**: Jackson Co., 5.4 air mi. NE. McKee, Turkey Foot Camp, 27 July 2010, 37.4708°N 83.9143°W, 880 ft., D. R. Swanson, #28, det. D. R. Swanson 2012 [1 ♀] (DRS).

Distribution: USA: AL, AR (Taylor and McPherson 1989), CT, DC, GA, IL, IN, KY, MD, MI, MO, NC, NY, OH, PA, TN (Blöte 1965), VA; Canada: ON, QC.

Aradus lugubris Fallén, 1807. – **WYOMING**: Johnson Co., Bighorn National Forest, Tie Hack Campground, T50N, R84W, Sec. 26, 11–12 July 1974, Thomas A. Bowling, det. D. R. Swanson 2012 [1 ♀] (MSUC).

Notes: The antennae of this specimen are entirely black, aligning it with *Aradus lugubris nigricornis* Reuter, 1900. However, Parshley (1921) treated *nigricornis* as an intergradational color variety with no geographic significance, and I follow the spirit of that treatment.

Distribution: USA: AK, AZ, CA, CO, DC, IA (Osborn 1892), ID, IL, MA, ME, MI, MN, MO, MT, NC, ND, NE, NH, NM, NV, NY, OR, PA, RI, UT, WA, WI, WY; Canada: AB, BC, MB, NF, NS, NT, ON, QC, SK, YT.

Subfamily MEZIRINAE

Aphleboderrhis pubescens (Walker, 1873). – **MISSOURI**: Oregon Co., McCormack Lake, Shawnee National Forest, 6 June 1968, E. J. Kochenderfer, det. D. R. Swanson 2012 [1 ♀] (MSUC).

Distribution: USA: MO, TX.

Mezira emarginata (Say, 1831). – **TENNESSEE**: Chester Co., 9 mi. W. Henderson, [illegible] September 1972, R. D. Ward, det. D. R. Swanson 2012 [1 ♀] (MSUC).

Distribution: USA: AR, AZ, CA, FL, MS, NC, NM, NV, TN, TX.

Mezira granulata (Say, 1831). – **VIRGINIA**: Fairfax Co., Herndon, August 1911, [no collector?], det. H. G. Barber 1919, det. D. R. Swanson 2013 [1 ♀] (UMMZ); Fairfax Co., Springfield, 5–9 April 1976, R. D. Ward, det. D. R. Swanson 2013 [1 ♂, 4 ♀] (MSUC).

Distribution: USA: AL, AR (Taylor and McPherson 1989, Davidová-Vilímová et al. 1996), AZ, DC, FL, GA, IL (Davidová-Vilímová et al. 1996), IN, MD, MO, NC, OK (Davidová-Vilímová et al. 1996), SC, TN (Lambdin et al. 2003, Vlach et al. 2010), TX, VA.

Mezira sayi Kormilev, 1982. – **TENNESSEE**: Chester Co., Chickasaw State Park, 9 July 1974, R. D. Ward, det. D. R. Swanson 2013 [1 ♂] (MSUC); [Fentress Co.], Allardt, 20 August 1922, T. H. Hubbell, det. D. R. Swanson 2013 [3 ♂, 4 ♀, 2 nymphs] (UMMZ); Hardeman Co., Bolivar, 19 March 1974 [add. dates: 24 December 1977, 27 December 1977], R. D. Ward, det. D. R. Swanson 2013 [4 ♂, 4 ♀] (MSUC); **VIRGINIA**: Fairfax Co., Herndon, August 1911, [no collector?], det. D. R. Swanson 2013 [1 ♀] (UMMZ); Fairfax Co., Springfield, 12–14 June 1976, R. D. Ward, det. D. R. Swanson 2013 [1 ♀] (MSUC).

Note: A single female from Washington with the following locality data could not be separated from *M. sayi*: **WASHINGTON**: Whitman Co., Pullman, 21 September 1919, Phillip Putnam, det. D. R. Swanson 2012 [1 ♀] (UMMZ). However, this represents a large range disjunction, as the nearest records of *M. sayi* are from Illinois and Texas (Davidová-Vilímová et al. 1996). Thus, it is possible that this female represents an undescribed species. A passive introduction of *M. sayi* into the Pacific Northwest also remains a possibility. Given the uncertainty, I simply note its existence here, without a formal identification.

Distribution: USA: AR (Taylor and McPherson 1989, Davidová-Vilímová et al. 1996), FL, GA, IL (Davidová-Vilímová et al. 1996), IN, LA (Davidová-Vilímová et al. 1996), MS (Davidová-Vilímová et al. 1996), NC (Davidová-Vilímová et al. 1996), SC, TN, TX (Davidová-Vilímová et al. 1996), VA.

Neuroctenus simplex (Uhler, 1876). – **WISCONSIN**: Shawano Co., [no further locality data], 6 September 1950, [no collector], det. D. R. Swanson 2012 [1 ♀] (MSUC).

Distribution: USA: AR (Taylor and McPherson 1989), CT, DC, FL, GA, IA (Osborn 1898), IL, IN (Blatchley 1895, 1926), KS, MA, MD, ME, MO, MT, NC, NJ, NY, OH, OK (Ortenburger 1926), PA, SC, TX, WI; Canada: ON (Paiero et al. 2003).

Neuroctenus unistellatus Vásárhelyi, 1994. – **MISSOURI**: Oregon Co., McCormack Lake, Shawnee National Forest, 6 June 1968, Roland L. Fischer, det. D. R. Swanson 2018 [1 ♂] (MSUC).

Note: Although they are figured, Vásárhelyi (1994) did not draw attention to the large eighth paratergites in the male of this species, despite the form of these structures being unique among congeners north of Mexico.

Distribution: USA: MO, TX.

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