Seven Novel Hemiptera (Miridae; Pentatomidae; Reduviidae; Rhyparochromidae) Records from Southeastern Oklahoma

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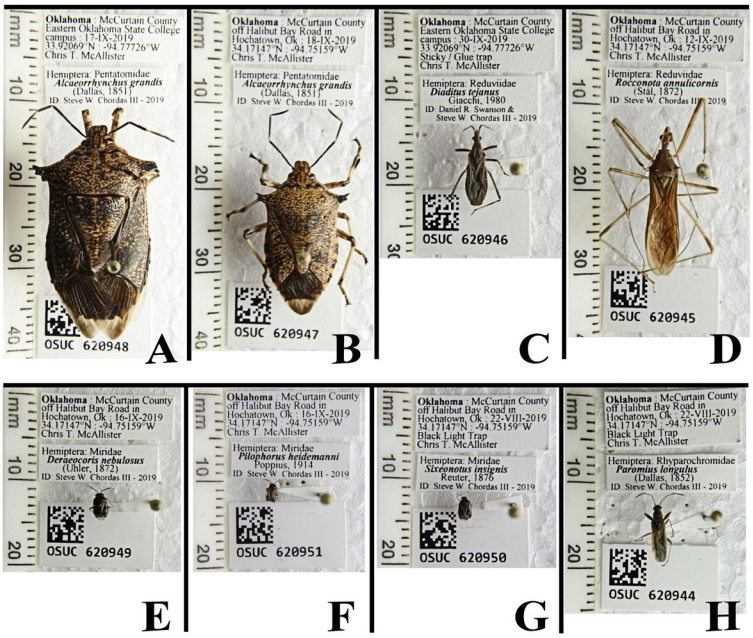
Abstract: Our knowledge of the true bugs (Hemiptera) of Oklahoma has grown over the last decade. Several reports from our lab have provided new records of hemipterans in the state for the first time. Here, we continue our efforts by providing seven new state records for species of hemipterans within the families Miridae, Pentatomidae, Reduviidae, and Rhyparochromidae from McCurtain County.

Introduction

Over the last decade, several new true bug (Hemiptera) records have been reported for Oklahoma; including six species reported by the authors for the first time (see refs in Chordas and McAllister 2018). Further, over the same period, Henry et al. (2010) reported *Corixidea major* from Latimer County, Swanson (2011) documented the assassin bug, *Empicoris orthoneuron* from Marshall County, and Henry and Sweet (2015) provided a description of a new species of chinch bug, *Wheelerodemus muhlenbergiae*, from the Arbuckle Mountains of Oklahoma. Here, we continue to provide new distributional records for seven true bugs within four families in the state.

Methods

Between May and September 2019, various true bugs were collected at two localities in McCurtain County with an insect aspirator under a porch light or from black light pan traps at a residence in Hochatown (34° 10' 17.0286"N, 94° 45' 5.7414"W) and with Trapper® Max glue traps (Bell Laboratories, Inc., Madison, WI) at the Eastern Oklahoma State College Campus (EOSC), Idabel (33° 55' 16.3272''N, 94° 46' 41.43''W). Habitat of the area consisted of various hardwoods (*Carya* and *Quercus* spp.) and pines (*Pinus* spp.) in Ouachita uplands. Specimens were placed in individual vials containing 70% (v/v) ethanol and forwarded to the senior author for laboratory identification. Blatchley (1926), Knight (1941), Schuh and Schwartz (1988), and Blinn (2009) were consulted for species identifications. Henry and Wheeler (1988), Schuh and Schwartz (1988), Snodgrass (1991), Maw et al. (2000), Boyd et al. (2002), Henry et al. (2005), Chordas et al. (2011), Swanson (2011), Packauskas (2012), and Sites et al. (2012) were used as literature distributional references. Voucher specimens (Figs. 1A–H) were deposited in the C. A. Triplehorn Collection at The Ohio State University, Columbus, Ohio. Image H (Fig. 2) was created via stacking digital photographs (using CombineZP) of the curated voucher specimen captured with a Cannon EOS DLSR through an Olympus SZ60 dissecting microscope processed with Corel PaintShopPro 2020 (Corel Corporation 2019a). Maps of literature records (Figs. 2 A–G) were created with CorelDraw 2019 (Corel Corporation 2019b) and all other images (Fig. 1) were captured using a10× close-



Figures 1A–H. Museum vouchers of new Oklahoma Hemiptera state records. Contents of each image top to bottom: location label, identification label, voucher specimen, unique museum number and code: (A) *Alcaeorrhynchus grandis* female; (B) *Alcaeorrhynchus grandis* male; (C) *Diaditus tejanus*; (D) *Rocconota annulicornis*; (E) *Deraeocoris nebulosus*; (F) *Pilophorus heidemanni*; (G) *Sixeonotus insignis*; (H) *Paromius longulus*. Scale in millimeters (mm) on left side of each image.

up lens attachment on a Cannon EOS DLSR.

Results and Discussion

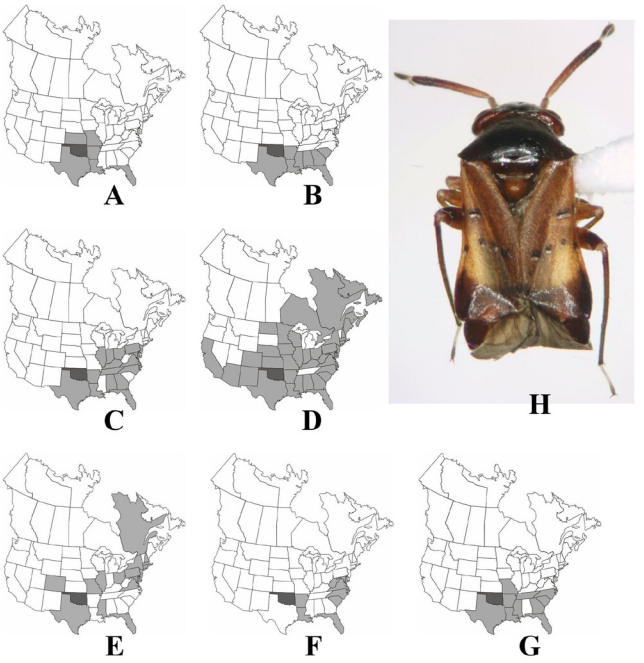
The following seven species, all collected in a four month period in 2019, representing new Oklahoma records, were identified. Species are listed alphabetically by family then by subfamily within family below in an annotated format.

Hemiptera: Miridae: Bryocorinae

***Sixeonotus insignis* Reuter, 1876.** – Several *Sixeonotus* specimens were encountered; however, most had missing parts or were damaged hindering an accurate identification. However, one specimen taken in a black light trap on 22-VIII-2019 was intact and we report it here (see data label, Fig. 1G; unique museum code = OSUC 620950). We suspect the other *Sixeonotus* specimens were also this species. It has been recorded from the middle and eastern portions of North America (Fig. 2E). However, this mirid had not been previously documented from Oklahoma.

Deraeocorinae

***Deraeocoris nebulosus* (Uhler, 1872).** – A single specimen was taken on 16-IX-2019 (see data label, Figure 1E: unique museum code = OSUC 620949). It is found in southern and eastern Canada and is widespread in the United States (Henry and Wheeler 1988) (Fig. 2D). This plant bug is also common in the eastern states (Knight 1941), and has been reported in every state surrounding Oklahoma (Fig. 2D). However, it had not previously been documented in the refereed literature for Oklahoma; thus, it our record fills a distributional gap. Adults of *D. nebulosus* are about 3.5 to 4.0 mm long and 1.8 to 2.0 mm wide and possess an ovate, shiny, dark, olive body with pale markings. Wheeler et al. (1975) provided a critical review of the literature of *D. nebulosus* and summarized the various host (many common pests) and habitat associations (more than 75 species of ornamental trees and shrubs) of this well-known predator on plant-



Figures 2A–H. Species distribution maps (A–G; north of México) of new Oklahoma Hemiptera state records: (A) *Alcaeorrhynchus grandis*; (B) *Diaditus tejanus*; (C) *Rocconota annulicornis*; (D) *Deraeocoris nebulosus*; (E) *Sixeonotus insignis*; (F) *Pilophorus heidemanni*; (G) *Paromius longulus*. Light shade = prior literature record, dark shade = new Oklahoma record. (H) Dorsal view of *Pilophorus heidemanni* voucher specimen (unique museum code = OSUC 620951); specimen is ca. 2 mm long.

feeding insects; whiteflies (Aleyrodidae) and other sessile hemipterans (aphids, scale insects) were prominently mentioned. In addition to those insects, it is a generalist predator of mites (Wheeler et al. 1975; Jones and Snodgrass 1998). In Mississippi, *D. nebulosus* has been observed in commercial cotton (*Gossypium*) fields in association with aphids, even when fields were sprayed with heavy insecticide use (Westigard 1973; Snodgrass 1991) and, more recently, has been associated with whitefly infestations in cotton. Boyd et al. (2002) studied digestive enzymes and stylet morphology from a South Carolina population.

Phylinae

***Pilophorus heidemanni* Poppius, 1914. –** A single specimen was encountered on 16-IX-2019 (see data label, Fig. 1F: unique museum code= OSUC 620951). We include an image of the curated museum specimen of this stunning little uncommon species (Fig. 2H). Previously recorded for neighboring Arkansas (Schuh and Schwartz 1988), a record Chordas (2017) overlooked in the recent Arkansas list, this Oklahoma record constitutes a slight western range extension (Fig. 2F). The species is dark-colored and about 3.0 mm long with a slightly constricted mid-body; its middle region is often brightly colored orange with an anterior small black stripe and four posterior black disconnected and disjointed dots topped with white markings on each wing (Schuh and Schwartz 1988) (Fig. 2H). Schuh and Schwartz (1988, see p. 119) provided an excellent illustration of this species and a superb image of it from Virginia that was posted on iNaturalist (https://www.inaturalist.org/) by pbedell.

Pentatomidae: Asopinae

***Alcaeorrhynchus grandis* (Dallas, 1851). –** At two separate locations, only a single day apart (17 and 18-IX-2019), a male and a female of this species were encountered (see data label, Fig. 1A = female and Fig. 1B = male; unique

museum codes = OSUC 620947 [male] and OSUC 620948 [female]). This is one of the larger stink bug species and both sexes have unique bifid humeral projections (Figs. 1A–B). Having been reported for all states to the north, south and east of Oklahoma, this new record fills a gap in the species' distribution (Fig. 2A). It has been previously reported from Arkansas, Florida, Kansas, Louisiana, Missouri and Texas (Barton and Lee 1981; Packauskas 2012; Sites et al. 2012). The giant strong-nosed stink bug is a very large (females up to 25 mm, males up to 21 mm) predator which occurs in several row crops and preys on other insects, especially lepidopteran caterpillars.

Reduviidae: Stenopodainae

***Diaditus tejanus* Giacchi, 1980.** – A single specimen of this assassin bug was taken in a glue trap on the campus of EOSC on 30-IX-2019 (see data label, Fig. 1D; unique museum code = OSUC 620946). This species was previously thought to be limited to the coastal plain of the southeastern United States, but Swanson (2011) showed this was not the case with many inland records of the bug. It is distributed mainly in the south and southeast, but also occurs north to Arkansas and now in Oklahoma (Fig. 2B).

Harpactorinae

***Rocconota annulicornis* (Stål, 1872).** – A single specimen of this assassin bug was taken on 12 IX 2019 in Hochatown (see data label, Fig. 1D; unique museum code= OSUC 620945). Widespread throughout the eastern portion of the United States and the bordering states of Arkansas and Texas (Fig. 2C), this Oklahoma record was not unexpected and helps fill a gap in the western portion of the species' distribution. The ringed-horn assassin bug is a relatively small (16–20 mm) stout, elongate-oval, reddish to yellowish, member of the family with four prominent spines on pronotum (Fig. 1D).

Rhyparochromidae: Rhyparochrominae

***Paromius longulus* (Dallas, 1852).** – This dirt-colored seed bug is distributed mainly in the mid, south and southeastern United States (Fig. 2G). Having been previously reported from both Texas and Arkansas (Chordas et al. 2011), it was not unexpected that this hemipteran would be found in Oklahoma (Fig. 2G). We encountered a single specimen in a black light trap on 22-VIII-2019 (see data label, Fig. 1H; unique museum code= OSUC 620944).

During the same four-month period, 15 other hemipterans within seven families were collected and all have been reported previously from Oklahoma including the following taxa (descriptor's omitted): **Alydidae:** *Megalotomus quinquespinosus*; **Berytidae:** *Jalysus spinosus*; *Metacanthus multispinus*; **Cydnidae:** *Pangaeus bilineatus*; **Miridae:** *Lygus lineolaris*; *Pilphorus crassipes*; **Reduviidae:** *Repipta taurus*; *Zelus luridus*; *Zelus tetracanthus*; **Rhopalidae:** *Arhyssus lateralis*; *Harmostes reflexulus*; **Rhyparochromidae:** *Antillocoris pilosulus*; *Pseudopachybrachius basalis*; *Pseudopachybrachius vinctus*; *Ptochiomera nodosa*.

Additional collections of hemipterans in the state should be conducted including the search for several uncommon reduviids (assassin bugs) recently reported from adjacent Arkansas (Chordas and Tumlison 2016) that would eventually become new distributional records for Oklahoma as well as other families of hemipterans that could lead to additional novel records. More surveys of aquatic taxa should be conducted as several that occur in surrounding states should also be found in watersheds of Oklahoma.

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