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A Synopsis of the Coreoidea (Heteroptera) of Michigan

D. R. Swanson¹

Abstract

An overview of the species of Coreoidea (Alydidae, Coreidae, and Rhopalidae) found in Michigan is presented, along with identification keys, distribution maps, and relevant literature. New state records for *Alydus pilosulus* Herrich-Schaeffer (Alydidae: Alydinae), *Merocoris distinctus* Dallas (Coreidae: Meropachyinae), *Leptoglossus corculus* (Say) (Coreidae: Coreinae), *Leptoglossus oppositus* (Say) (Coreidae: Coreinae), and *Liorhyssus hyalinus* (Fabricius) (Rhopalidae: Rhopalinae) are included.

Although many of the species are regarded as economically important and several conspicuous species are oft-encountered near human habitations, no treatment exists for the families of the Coreoidea in the state of Michigan. Furthermore, the literature containing pertinent information for this group begets a rather short list. O'Brien (1983, 1988) enumerated the publications dealing with the terrestrial arthropods of Michigan, and from these works, only two contribute to the knowledge of the Coreoidea. These short regional faunal lists provided by Townsend (1890) and Hussey (1922) recorded Heteroptera collected from the vicinity of Constantine in Saint Joseph County and Berrien County, respectively.

To augment the knowledge of the Michigan Heteroptera, the author herein presents the findings from his study of the Coreoidea housed in the two major university collections in southern Michigan. County records were compiled, identification keys were modified, and the existing natural history information was summarized. Given the scarcity of literature regarding this group in the Great Lakes region, the author has provided references based on extralimital specimens where applicable.

Materials and Methods

The identification of all specimens included in this study was rendered or confirmed by the author, and all specimens reside in one of the collections listed below unless otherwise noted. Collection dates indicate the earliest and latest adults examined and refer specifically to specimens collected in Michigan. Location of counties from which specimens were collected in Michigan are depicted in Figure 1. In the few instances where it is provided, label data are not transcribed verbatim, but locality information is included in its entirety.

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

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Results and Discussion

Superfamily COREOIDEA

The superfamily Coreoidea comprises three families in the Nearctic region: Alydidae, Coreidae, and Rhopalidae. The Alydidae and Rhopalidae have been treated as subfamilies of the Coreidae, but their familial rank has been secured (Schaefer 1964, 1965). The characters diagnosing the Coreoidea include some of the abdominal trichobothria present in triplets, a small scutellum not reaching apex of clavus, 4-segmented antennae, hemelytral membrane with 11 or more veins, and presence of ocelli (Henry 1997). All are phytophagous as a general rule with some species attacking commercially cultivated plants; data on food plants of the superfamily were summarized by Schaefer and Mitchell (1983). Extra-phytophagous sources have been summarized by Adler and Wheeler, Jr. (1984). The economic importance of the Alydidae, Coreidae, and Rhopalidae was discussed by Panizzi et al. (2000), Mitchell (2000), and Schaefer and Kotulski (2000), respectively; several species found in Michigan are discussed in more detail by these authors, and each specific account is noted under the appropriate heading below. Each of the three coreoid families is represented in Michigan, and 25 species in 18 genera are found in the state (Table 1).



Figure 1. The counties of the State of Michigan.

Table 1. Species of Alydidae, Coreoidea, and Rhopalidae found in Michigan.

Alydidae	Coreoidea	Rhopalidae
<i>Alydus conspersus</i> Montandon, 1893	<i>Acanthocephala terminalis</i> (Dallas), 1852	<i>Arhyssus lateralis</i> (Say), 1825
<i>Alydus eurinus</i> (Say), 1825	<i>Anasa armigera</i> (Say), 1825	<i>Arhyssus nigristernum</i> (Signoret), 1859
<i>Alydus pilosulus</i> Herrich-Schaeffer, 1847	<i>Anasa tristis</i> (DeGeer), 1775	<i>Boisea trivittata</i> (Say), 1825
<i>Megalotomus quinquespinosus</i> (Say), 1825	<i>Catorhintha mendica</i> Stål, 1870	<i>Brachycarenum tigrinus</i> (Schilling), 1829
<i>Protenor belfragei</i> Haglund, 1868	<i>Chariesterus antennator</i> (Fabricius), 1803	<i>Harmostes reflexulus</i> (Say), 1832
	<i>Coriomeris humilis</i> (Uhler), 1872	<i>Liorhyssus hyalinus</i> (Fabricius), 1794
	<i>Euthochtha galeator</i> (Fabricius), 1803	<i>Stictopleurus knighti</i> Harris, 1942
	<i>Leptoglossus corculus</i> (Say), 1832	<i>Stictopleurus punctiventris</i> (Dallas), 1852
	<i>Leptoglossus occidentalis</i> Heidemann, 1910	
	<i>Leptoglossus oppositus</i> (Say), 1832	
	<i>Merocoris distinctus</i> Dallas, 1852	
	<i>Piezogaster alternatus</i> (Say), 1825	

Most of these species are treated by Blatchley (1926) and Torre-Bueno (1941) although these works are outdated and do not focus specifically on the superfamily. Hoffman (1975) also treated the Coreoidea of Virginia and all Michigan species excepting *Coriomeris humilis*, *Alydus conspersus*, *Brachycarenum tigrinus*, and *Stictopleurus knighti* are found there. The following key is modified from Schaefer's (1965) treatment.

Key to the North American families of Coreoidea

- 1 Opening of scent glands absent or inconspicuous; usually less than 10 mm in length (except *B. trivittata*)
.....Rhopalidae
- 1' Opening of scent glands present, auricles located between meso- and metacoxa; usually greater than 10 mm in length.....2

- 2 (1') Head narrower and shorter than pronotum; bucculae extending posteriorly beyond base of antennae in lateral view Coreidae
 2' Head nearly as wide and as long as pronotum; bucculae shorter, not extending posteriorly beyond base of antennae in lateral view.....Alydidae

Family ALYDIDAE Amyot and Serville, 1843

The Alydidae are represented in Michigan by 5 species in 3 genera, and its members are commonly known as the broad-headed bugs. Fracker (1918) revised the family (as subfamily Alydinae of the Coreidae) although Schaefer (2004) more recently keyed the New World genera; the following key is modified principally from these works. The Mirelytrinae are thought to feed on grasses and sedges, while those in the Alydinae are well-documented feeders on various legumes, although they occasionally feed opportunistically on carrion and fecal matter (Payne et al. 1968, Schaefer 1980, Schaefer and Mitchell 1983). Adults peak from late summer to early fall, and the eggs probably overwinter (Fracker 1918). Nymphs of the alydine genera found in Michigan are ant-mimetic.

Key to the Alydidae of Michigan

- 1 Metafemur unarmed ventrally (Mirelytrinae); second rostral segment much longer than third and fourth combined (Mirelytrini); juga split at apex, much longer than tylus *Protenor belfragei*
 1' Metafemur armed ventrally with one or two rows of spines (Alydinae); second rostral segment subequal or shorter than third and fourth combined; juga not split at apex, not conspicuously longer than tylus2
 2 (1') First antennomere longer than second (*Megalotomus*); fourth antennomere with basal portion contrastingly pale; metafemur usually distinctly bicolorous, basal half pale, apical half red-brown
*Megalotomus quinquespinosus*
 2' First antennomere shorter than second (*Alydus*); fourth antennomere essentially unicolorous, fuscous; metafemur usually unicolorous, fuscous 3
 3 (2') Membrane of hemelytra with scattered fuscous spots; [humeral angles rounded] *Alydus conspersus*
 3' Membrane without spots, uniformly infuscate4
 4 (3') Humeral angles sharply angulate; lateral margins of pronotum usually pale *Alydus pilosulus*
 4' Humeral angles rounded; lateral pronotal margins not conspicuously pale*Alydus eurinus*

Subfamily ALYDINAE Amyot and Serville, 1843

Genus ALYDUS Fabricius, 1803

Alydus conspersus Montandon, 1893. (Fig. 2). – This species was reported from Constantine, Michigan in the original description (Montandon 1893). Hussey (1922) also reported this species (as *Coriscus conspersus*) from Berrien County where he noted it as “abundant in the fields and meadows about Warren Woods during June and July.” Label information indicates this species has been collected nocturnally at lights in Otsego County, and this species also has been collected from Isle Royale, Keweenaw County. The biology of *A. conspersus* was studied in Wisconsin by Yonke and Medler (1968). 169 specimens examined. Collection dates from 5 June to 9 October.

Alydus eurinus (Say), 1825. (Fig. 3). – This species was reported from Michigan by Townsend (1890) and Hussey (1922), but the records seem to have been overlooked by Froeschner (1988a). Townsend (1890) reported adults on the wing from July to September while Hussey (1922) noted “from the same

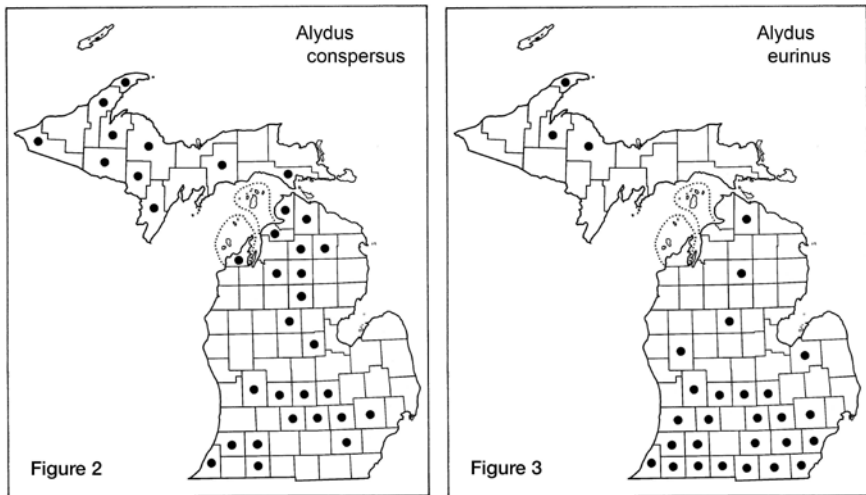


Figure 2. Distribution of *Alydus conspersus* in Michigan.

Figure 3. Distribution of *Alydus eurinus* in Michigan.

localities as [*Alydus conspersus*], but much less numerous...[also] from a clump of beach grass on the fore-dune near Sawyer.” In Livingston County, it has been taken on flowering spurge (*Euphorbia corollata* L.) and wild bergamot (*Monarda fistulosa* L.), and in Kent County, it was taken on wild indigo (*Baptisia* sp.) and swamp milkweed (*A. incarnata* L.) in a suburban garden. This species also has been collected from Isle Royale, Keweenaw County. The biology of *A. eurinus* was studied in Wisconsin by Yonke and Medler (1968). 291 specimens examined. Collection dates from 26 May to 24 October.

Alydus pilosulus Herrich-Schaeffer, 1847. (Fig. 4). – (NEW STATE RECORD). It appears that this species has not previously been reported from Michigan (Froeschner 1988a). It is not surprising that this alydine occurs in the state; the few specimens examined might explain its having been unreported. It remains to be seen whether *A. pilosulus* is restricted to the southern part of Michigan. In Kent County, it was taken on wild indigo (*Baptisia* sp.) and swamp milkweed (*A. incarnata* L.) in a suburban garden. The biology of this species was studied in Wisconsin by Yonke and Medler (1968). This species is treated briefly under the less economically-important species by Panizzi et al. (2000). 22 specimens examined. Collection dates from 23 June to 16 October.

Genus MEGALOTOMUS Fieber, 1860

Megalotomus quinquespinosus (Say), 1825. (Fig. 5). – Sometimes referred to as the lupine bug, this species was reported from Michigan by Townsend (1890) as *Alydus quinque-spinosus*. Hussey (1922) also reported this alydine from Berrien County where it was taken “from roadside grasses in the Warren Woods.” Specimen labels indicate *M. quinquespinosus* has been taken on Queen Anne’s lace (*Daucus carota* L.) in Jackson County, on pods of wild indigo (*Baptisia* sp.) in Washtenaw County, and from a garter snake (*Thamnophis* sp.) carcass in Livingston County. The biology of this species was studied in Wisconsin by Yonke and Medler (1965); they additionally noted it has been taken on smooth sumac (*Rhus glabra* L.) at Douglas Lake, Cheboygan County, Michigan. This species also is briefly mentioned under the less economically important species by Panizzi et al. (2000). 197 specimens examined. Collection dates from 17 June to 6 October.

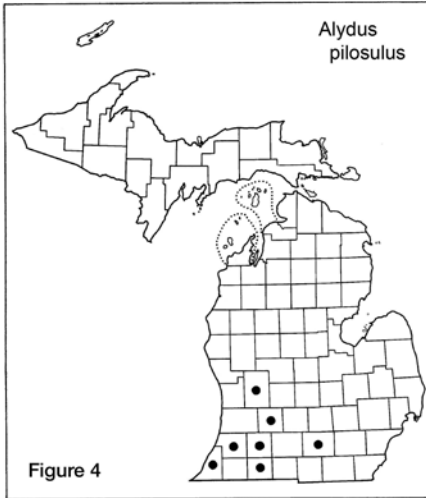


Figure 4. Distribution of *Alydus pilosulus* in Michigan.



Figure 5. Distribution of *Megalotomus quinquespinosus* in Michigan.

Subfamily MICRELYTRINAE Stål, 1867

Genus PROTENOR Stål, 1867

Protenor belfragei Haglund, 1868. (Fig. 6). – This species was reported from Michigan by Townsend (1890) and Hussey (1922); the latter indicated it was “taken from grasses in a marshy locality behind the Sawyer Dunes; others were taken at Stevensville and at Klute’s Lake.” Fracker (1918) indicated this species feeds on members of the Cyperaceae. 318 specimens examined. Collection dates from 30 May to 18 October.

Family COREIDAE Leach, 1815

Commonly known as the leaf-footed bugs, the family Coreidae is the largest and most diverse in the Coreoidea. In Michigan, the Coreidae are represented by 12 species in 9 genera although a note is provided for a potentially adventive southern species, *Leptoglossus phyllopus* (Linnaeus), 1767. Baranowski and Slater (1986) treat the Coreidae of Florida and the vast majority of the Nearctic species are found in that state; *Leptoglossus occidentalis* and *Catorhintha mendica* are the only Michigan species not discussed in that work. Packauskas (1994) keyed the New World taxa to tribe and provided references for further identification; he also provided the most recent catalog for the New World species of this family (Packauskas 2010). The following key was synthesized from several of these works (Blatchley 1926, Baranowski and Slater 1986, Packauskas 1994).

Key to the Coreidae of Michigan

- 1 Apex of metatibia ending in short projecting spine (Meropachyinae); metafemur strongly arcuate and clavate (Merocorini) *Merocoris distinctus*
- 1' Apex of metatibia without projecting spine; metafemur not strongly arcuate and clavate, although may be incrassate.....2
- 2 (1') Anteocular region lacking median sulcus; tibiae not sulcate on outer surface (Pseudophloeinae); antennae, head and pronotum beset with small seta-bearing granules..... *Coriomeris humilis*

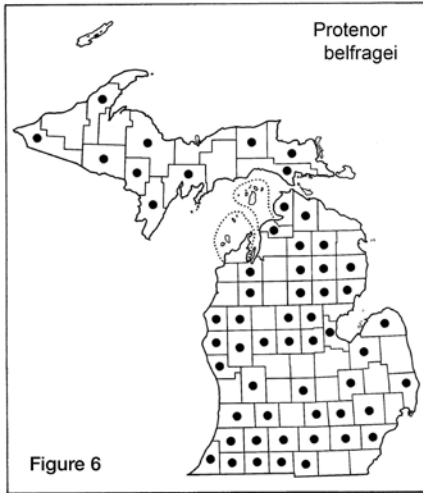


Figure 6. Distribution of *Protenor belfragei* in Michigan.

- 2' Anteocular region with median sulcus; tibiae usually sulcate on outer surface (Coreinae); not beset with small seta-bearing granules.....3
- 3 (2') Metatibiae of both sexes dilated on one or both sides to form a thin foliaceous flange.....4
- 3' Metatibiae of both sexes simple, terete7
- 4 (3) Head deflexed, only slightly prolonged beyond antennal bases; tylus compressed and projected upward between antenniferous tubercles as a triangular spine; first antennomere at least 1.5 times longer than head (Acanthocephalini)..... *Acanthocephala terminalis*
- 4' Head porrect, much prolonged beyond antennal bases; tylus compressed but deflexed between antenniferous tubercles; first antennomere subequal to length of head (Anisoscelini: *Leptoglossus*).....5
- 5 (4') Outer dilation of metatibia distinctly scalloped; [corial fascia reduced to one or two small spots on vein]..... *Leptoglossus oppositus*
- 5' Outer dilation of metatibia entire, smoothly convex6
- 6 (5') Outer dilation of metatibia distinctly longer than inner dilation; abdominal tergites entirely dark or nearly so; corial fascia present, confined to veins; posterior margin of male genital capsule usually with median roundly V-shaped notch *Leptoglossus corculus*
- 6' Outer dilation of metatibia subequal to inner dilation; fourth and fifth abdominal tergites with striking orange-yellow markings, each interrupted medially by a black spindle or diamond-shaped mark; corial fascia present though sometimes faint or absent; posterior margin of male genital capsule usually with median subrectangular notch *Leptoglossus occidentalis*
- 7 (3') Metafemur armed beneath with many teeth, strongly swollen in males8
- 7' Metafemur unarmed beneath or armed with only 2-3 small teeth, not swollen in either sex9
- 8 (7) Ocellar tubercles large; metathoracic scent gland auricle with single disc; antenniferous tubercles armed laterally (Acanthocerini); male with metatibia more or less straight *Euthochtha galeator*

- 8' Ocellar tubercles small; metathoracic scent gland auricle with pair of divergent discs; antenniferous tubercles unarmed (Nematopini); male with metatibia strongly bent *Piezogaster alternatus*
- 9 (7') Third antennomere dilated and compressed on both sides, others terete; antenniferous tubercles very prominent; tylus strongly and abruptly deflexed, the space between the tubercles unfilled (Chariesterini)
..... *Chariesterus antennator*
- 9' All antennomeres terete; antenniferous tubercles not prominent; tylus not strongly deflexed, the space between the tubercles filled (Coreini)10
- 10 (9') Eyes distinctly projecting beyond apical angle of pronotum; ocelli separated by nearly twice the distance between them and eyes; abdominal spiracles closer to lateral margins than to anterior or posterior margins.....
..... *Catorhintha mendica*
- 10' Eyes not or slightly projecting to apical angle of pronotum; ocelli separated by distance equal to distance between them and eyes; spiracles equidistant from lateral, anterior, and posterior margins of ventrite (*Anasa*) 11
- 11 (10') Head with long spines near the antennal bases *Anasa armigera*
- 11' Head unarmed *Anasa tristis*

Subfamily COREINAE Leach, 1815

Tribe ACANTHOCEPHALINI Stål, 1870

Genus ACANTHOCEPHALA Laporte, 1833

Acanthocephala terminalis (Dallas), 1852. (Fig. 7). – This species was reported from Michigan by Hussey (1922), although this record seems to have been overlooked by Froeschner (1988b) but included by McPherson et al. (2011). Hussey noted “adults were taken occasionally from dense tangles of herbage in damp localities...and some were also found on the white ash (*Fraxinus americana*). Nymphs were beaten from a number of different trees, but were found in numbers only on the ash.” Hussey continued with descriptions of all instars (except the fourth) in some detail. Yonke and Medler (1969a, 1969c) provided information about the immature stages and biology of this species in Wisconsin. McPherson et al. (2011) reviewed *Acanthocephala* and keyed the species north of Mexico. 132 specimens examined. Collection dates from 3 May to 10 November.

Tribe ACANTHOCERINI Bergroth, 1913

Genus EUTHOCHTHA Mayr, 1865

Euthochthya galeator (Fabricius), 1803. (Fig. 8). – Occasionally referred to as the helmeted squash bug, this species was reported from Michigan by Townsend (1890) and Hussey (1922). The former noted “on various weeds in May and June,” and the latter stated “taken from ragweed in a pear orchard near the Warren Woods...and one was taken in flight at Harbert.” Yonke and Medler (1969a, 1969b) provided information about the immature stages and biology of this species in Wisconsin where it occurs on a wide range of host plants. This coreid occasionally injures citrus, rose, and other cultivated fruits and ornamentals (Mead 1981). 65 specimens examined. Collection dates from 3 May to 10 November.

Tribe ANISOSCELINI Amyot and Serville, 1843

Genus LEPTOGLOSSUS Guérin-Méneville, 1831

Leptoglossus corculus (Say), 1832. (Fig. 9). – (**NEW STATE RECORD**). Label data as follows: MICHIGAN: Allegan Co., 18 May 1959, R. & K. Dreisbach, det. J. C. Lutz [1 male] (MSU). As this species is known from Illinois and

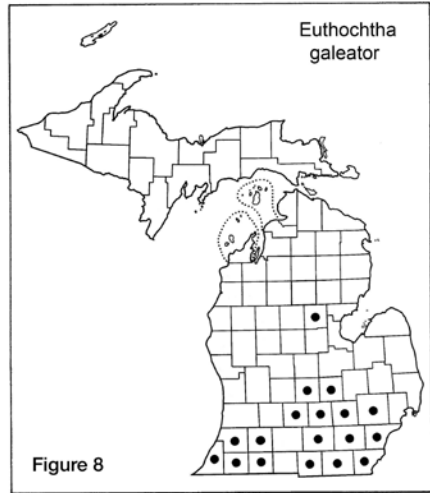
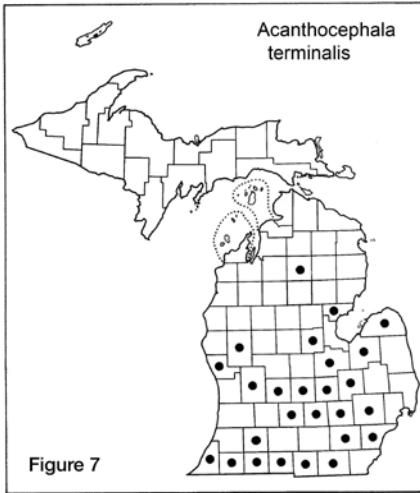


Figure 7. Distribution of *Acanthocephala terminalis* in Michigan.

Figure 8. Distribution of *Euthochtha galeator* in Michigan.

Wisconsin (Katovich and Kulman 1987), it is not surprising to find *L. corculus* in Michigan. Katovich and Kulman (1987) noted this species attacking red pine (*Pinus resinosa* Solander) in Wisconsin; adults were first collected in late June. This species is commonly known as the leaf-footed pine seed bug. Mitchell (2000) discussed the economic significance of this species, and Elbel et al. (1981) described the nymphs. The genus was revised by Allen (1969). The key by McPherson et al. (1990) was modified slightly by Gall (1992) for the species of *Leptoglossus* found in the United States. 1 specimen examined. Collection date is 18 May.

Leptoglossus occidentalis Heidemann, 1910. (Fig. 10). – The western conifer seed bug was first reported from Michigan by McPherson et al. (1990); the distribution and biology of *L. occidentalis* in Michigan are covered in that work and only a few details are reproduced here. This species feeds on several species of pine (Pinaceae) (Katovich and Kulman 1987, McPherson et al. 1990, Gall 1992). *L. occidentalis* is univoltine and overwinters as an adult (McPherson et al. 1990). Collection dates reflect the bug's tendency to enter human habitations, where the overwintering adults often are considered a nuisance. Overwintering individuals have been shown to cause some structural damage to plumbing materials (Bates 2005). The author believes the number of specimens in university collections may be negatively influenced by this synanthropic overwintering; species perceived as extremely common or easily obtainable are rarely collected or completely ignored (see also *Boisea trivittata* (Rhopalidae) below). While the eastward expansion of this species into the Great Lakes region has been fairly recent, it seems likely that *L. occidentalis* occurs widely in the state, at least throughout the Lower Peninsula. The economic significance of this species was discussed by Mitchell (2000). The genus was revised by Allen (1969). McPherson et al. (1990) provided a key to the U.S. species of the genus; Gall (1992) modified the couplet pertaining to two of the species found in Michigan. 68 specimens examined. Collection dates from 27 January to 16 December.

Leptoglossus oppositus (Say), 1832. (Fig. 11). – **(NEW STATE RECORD)**. Label data as follows: MICHIGAN: [Wayne Co.], Ecorse, 8 November 1933, Rec'd Ralph Beebe, det. H. G. Barber, det. R. Packauskas 1995 [1 male] (UMMZ). The locality label indicates the specimen was "on [a] brick wall numbered with

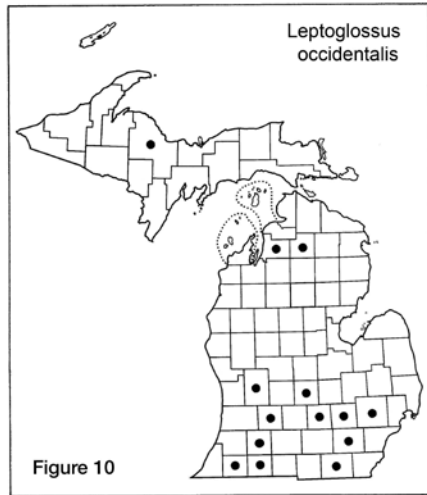
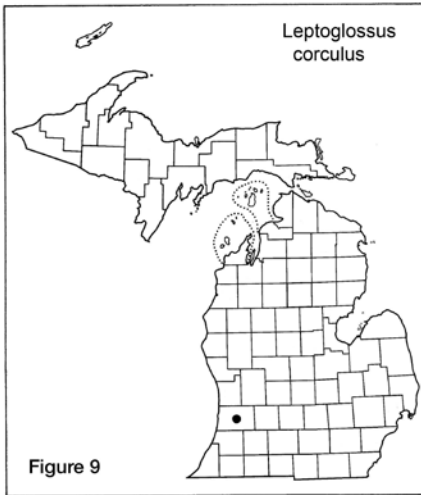


Figure 9. Distribution of *Leptoglossus corculus* in Michigan.

Figure 10. Distribution of *Leptoglossus occidentalis* in Michigan.

cold.” There is no apparent reason to doubt the validity of this record; in fact, the author was surprised to find only a single specimen among material examined, given that *L. oppositus* is recorded from Illinois, Indiana, Minnesota, New York, Ohio, and Wisconsin. Yonke and Medler (1968a) noted, however, that this species is rare in Wisconsin. Chittenden (1925) provided brief notes about the biology of this species in Virginia. *L. oppositus* feeds on a variety of host plants including many cultivated crops although, compared to other members of the genus found in Michigan, this species is considerably less injurious to conifers (Blatchley 1926, Baranowski and Slater 1986). The economic significance of this species was discussed by Mitchell (2000). Allen (1969) revised the genus and McPherson et al. (1990) keyed the species occurring in the United States. 1 specimen examined. Collection date is 8 November.

Leptoglossus phyllopus (Linnaeus), 1767 – One individual of this species from Michigan was found in the material examined. Label data as follows: MICHIGAN: Ingham Co., T4N R210, Sec. 7, home, 20 February 1976, M. C. Nielsen (MSU). The following information written on the underside of the label was nearly missed by the author: “from ‘romaine’ lettuce package.” This specimen clearly represents an unnatural introduction, and unless a breeding population is confirmed, *L. phyllopus* should be regarded as an adventive species in Michigan. This coreid is known from New York and Iowa but no records exist for any other Midwestern states. *L. phyllopus* is readily separated from all species of *Leptoglossus* native to Michigan by the conspicuous straight transverse fascia of the hemelytra and from *L. corculus* and *L. occidentalis* by the scalloped outer margin of the metatibial dilation.

Tribe CHARIESTERINI Stål, 1867

Genus CHARIESTERUS Laporte, 1832

Chariesterus antennator (Fabricius), 1803. (Fig. 12). – Often known as the euphorbia bug, this species was reported from Michigan by Hussey (1922). He commented “this is the most characteristic bug of the fore-dunes, where it appears to be restricted to a single food-plant, the flowering spurge (*Euphorbia corollata*). Nymphs and adults are abundant here through the summer.” Wheeler, Jr. (1981) noted association of *C. antennator* with several *Euphorbia* spp., and Blatchley (1926)

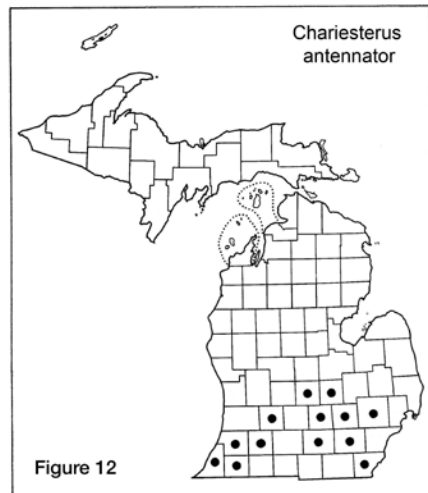


Figure 11. Distribution of *Leptoglossus oppositus* in Michigan.

Figure 12. Distribution of *Chariesterus antennator* in Michigan.

listed other presumed host plants in various eastern states. Ruckes (1955) revised the genus. 70 specimens examined. Collection dates from 5 June to 19 September.

Tribe COREINI Leach, 1815

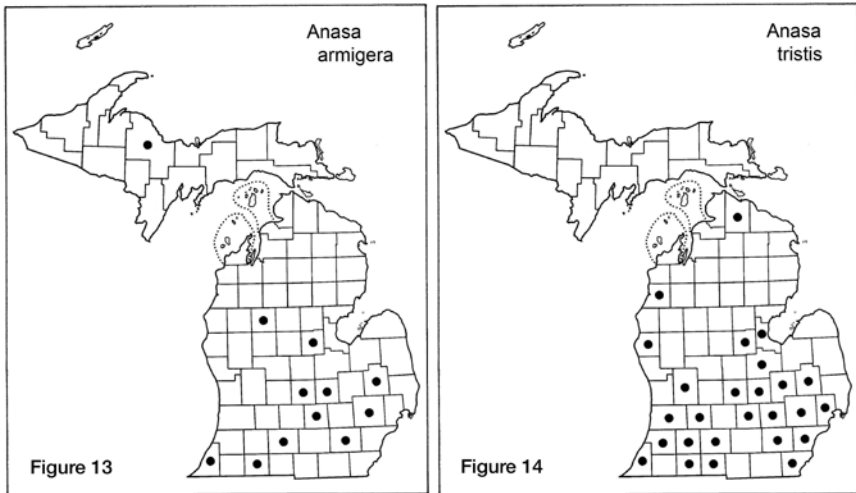
Genus ANASA Amyot and Serville, 1843

Anasa armigera (Say), 1825. (Fig. 13). – Commonly known as the horned squash bug, this species was reported from Michigan by Hussey (1922) from “grasses in an alder-buttonbush swamp at new Buffalo.” The species of this genus are well-known pests of cucurbits, and Parshley (1918) reported this species feeding on both cultivated and star-cucumber in New England. This economic impact of this species was treated briefly by Mitchell (2000). Beard (1937) described and illustrated the nymphs. Brailovsky (1985) revised and keyed the genus. 33 specimens examined. Collection dates from 30 April to 8 September.

Anasa tristis (DeGeer), 1775. (Fig. 14). – The infamous squash bug was reported from Michigan by Townsend (1890) and Hussey (1922). The former noted “the matured insects become active in sunny weather about the last of August.” Hussey (1922) provided the following details:

“Mr. Hubbell took one individual of this common species at Klute’s Lake, near Three Oaks...and a number of specimens were collected at light in our camp on the lake shore early in July. A winter-killed individual of the preceding year was found under the bark of a dead pine on the fore-dune.”

Several individuals examined by the author were taken from a wood cellar in Washtenaw County. This insect may seek overwintering sites in human habitations, and this predilection probably accounts for the earliest and latest collection dates. Yonke and Medler (1969a) provided notes on the immature stages and biology of this species in Wisconsin as a supplement to the extensive study of these species by Beard (1940). As with other species of this genus, *A. tristis* is a pest of cultivated cucurbits and star-cucumber (Parshley 1918, Beard 1940); Mitchell (2000) discussed the economic importance of this species. Brailovsky (1985) revised and keyed the genus. 145 specimens examined. Collection dates from 25 February to 12 December.

Figure 13. Distribution of *Anasa armigera* in Michigan.Figure 14. Distribution of *Anasa tristis* in Michigan.

Genus CATORHINTHA Stål, 1859

Catorhinta mendica Stål, 1870. (Fig. 15). – This species was reported from Michigan by Hoebeke and Wheeler, Jr. (1982b), who also provided information on biology and dispersal. Yonke and Medler (1969a) provided biological notes on this species in Wisconsin, and Slater (1943) described the instars. This coreid is associated with *Mirabilis* spp. (Balduf 1942, 1957, Hoebeke and Wheeler, Jr. 1982b). Brailovsky and Garcia (1987) revised and keyed the genus. 16 specimens examined. Collection dates from 21 June to 7 October.

Tribe NEMATOPINI Amyot and Serville, 1843

Genus PIEZOGASTER Amyot and Serville, 1843

Piezogaster alternatus (Say), 1825. (Fig. 16). – This species was reported from Michigan by Van Duzee (1917) under the binomial *Archimerus alternatus*. The author has not been able to locate an earlier literature record; neither Townsend (1890) nor Hussey (1922) mentioned this species. The Michigan specimen found in material examined bears the following label data: MICHIGAN: Cass Co., Dr. Lawless Co. Park, T6S, R13W, Sec. 32, UV, 16 September 1995, M. C. Nielsen [1 male] (MSU). O'Shea (1980) incorrectly synonymized *P. alternatus* with *P. calcarator* (Fabricius), 1803 (Packauskas, pers. comm.). The latter species is restricted to the southeastern states, and Blatchley (1926) correctly keyed the two species. Yonke and Medler (1969a, 1969d) provided much information about the immature stages and biology of this species in Wisconsin; it commonly occurs on *Desmodium* spp. (Leguminosae). 1 specimen examined. Collection date is 16 September.

Subfamily MEROPACHYINAE Stål, 1867

Genus MEROCORIS Perty, 1833

Merocoris distinctus Dallas, 1852. (Fig. 17). – (NEW STATE RECORD). To the author's knowledge, no species of *Merocoris* have been reported from Michigan even though this species is known from surrounding regions and a considerable number of specimens have been examined. Label data indicate this species has been taken "on *Solidago*" in Dickinson County and "sweeping fallow roadsides.

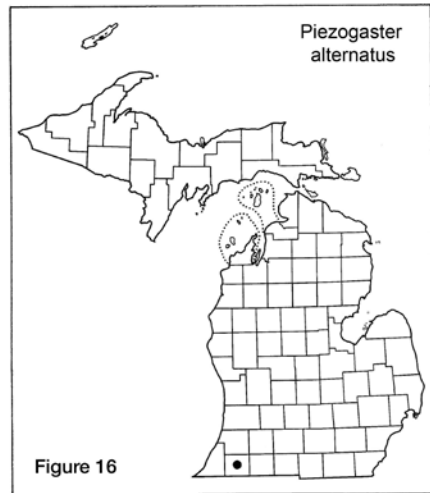


Figure 15. Distribution of *Catorhintha mendica* in Michigan.
Figure 16. Distribution of *Piezogaster alternatus* in Michigan.

Solidago dominant. Some shrubs." in Isabella County. This species has been collected from Isle Royale, Keweenaw County. There has been much confusion about how to treat the three taxa occurring in the United States; Baranowski and Slater's (1986) interpretation of *Merocoris typhaeus* (Fabricius), 1798 as an essentially Floridian species is followed here. Species of the genus probably feed on *Polygala* spp., but they have been observed on *Baccharis* spp. and *Solidago* spp. (Schaefer and Mitchell 1983). It has also been recorded feeding on a tortoise carcass in New York (Engelhardt 1912). Yonke and Medler (1969a) provided notes on the biology of this species in Wisconsin, including another incidence of its association with carrion. A key to the tribe containing the Nearctic species was given by Brailovsky and Barrera (2009). 88 specimens examined. Collection dates from 4 May to 27 September.

Subfamily PSEUDOPHLOEINAE Stål, 1867

Genus CORIOMERIS Westwood, 1842

Coriomeris humilis (Uhler), 1872. (Fig. 18). – This species was reported from Michigan by Hussey (1922) "beaten from willow in a gravel pit at Harbert." The records for Eaton, Kent, and Wayne counties were approximated from Dolling and Yonke (1976); no specimens were examined by the author from these localities. Label data on specimens from Isabella County indicate "Sweeping fallow roadside. *Solidago* dominant. Some shrubs." The genus was revised and the Nearctic species keyed by Dolling and Yonke (1976); they also suggested *C. humilis* is univoltine, peaks from June to July, and overwinters as an adult. Feeding is not known to occur outside the Leguminosae (Dolling and Yonke 1976, Schaefer and Mitchell 1983). The presence of this species in the eastern United States, along with some of the Michigan records housed in the UMMZ, is briefly discussed by Slater and Schaefer (1963). 21 specimens examined. Collection dates from 3 March to 17 September.

Family RHOPALIDAE Amyot and Serville, 1843

Members of this family are commonly known as the scentless plant bugs. Most are small and inconspicuous although one (the boxelder bug, *Boisea trivittata*)

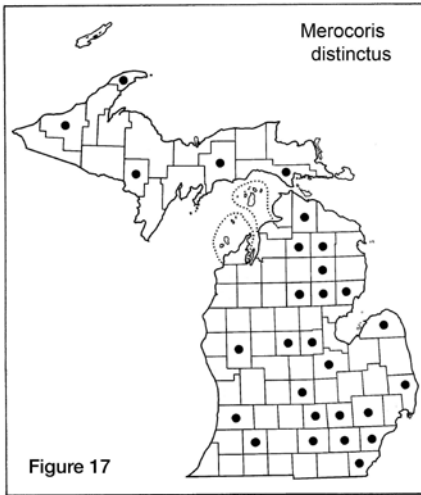


Figure 17. Distribution of *Merocoris distinctus* in Michigan.

Figure 18. Distribution of *Coriomeris humilis* in Michigan.

is well known and frequently encountered in large aggregations around homes. In Michigan, the Rhopalidae are represented by 8 species in 6 genera. Schaefer and Chopra (1982) provided a list of food plants. Hambleton (1908) revised the genus *Corizus* which then included four of the Michigan taxa treated below (*punctiventris*, *hyalinus*, *lateralis*, and *nigristernum*). More recently, Hoebeke and Wheeler, Jr. (1982a) treated the species of this family found east of the Mississippi; all of the species presently known from Michigan are included and the following key is modified from that reference.

Key to the Rhopalidae of Michigan

- 1 Lateral pronotal margins distinctly notched behind anterior margin (*Serinetinae*); conspicuously colored, black and red; length 11 mm or more
Boisea trivittata
- 1' Lateral pronotal margins straight or slightly sinuate, without distinct notch behind anterior margin (*Rhopalinae*); generally inconspicuously colored; length usually a little more than 9 mm 2
- 2 (1') Metafemur incrassate, bearing a series of prominent spines (*Harmostini*) *Harmostes reflexulus*
- 2' Metafemur not incrassate, lacking prominent spines 3
- 3 (2') Metapleuron not or only indistinctly divided into episternum and epimeron; metathoracic scent gland openings indistinct or absent; pronotal cicatrices generally ending in a closed loop (*Stictopleurus*) 4
- 3' Metapleuron distinctly divided into episternum and epimeron; metathoracic scent gland openings more conspicuous; pronotal cicatrices not ending in a closed loop 5
- 4 (3) Projection of apical margin of male genital capsule with apex rounded; paramere without subbasal enlargement, flat and tapering; female conspicuously reddish *Stictopleurus knighti*

- 4' Projection of apical margin of male genital capsule with apex emarginated; paramere with pronounced globose enlargement basally, strongly tapering distally, recurved so that posterior face is concave; female fuscotestaceous, not conspicuously reddish..... *Stictopleurus punctiventris*
- 5 (3') Pronotum with distinct, but narrow collar anteriorly; pronotum between collar and cicatrices forming a distinct ridge which is polished and impunctate, or at most with a few punctures; abdomen truncate, broadly rounded apically *Liorhyssus hyalinus*
- 5' Pronotum without collar anteriorly; pronotum anterior to cicatrices not smooth or polished, always with numerous coarse punctures; abdomen triangulate apically 6
- 6 (5') Head quite short, more than 1.5 times as broad as long; rostrum short, not or barely extending to metasternum; posterolateral margin of metapleuron strongly angulate, with prominent and pointed projection laterally *Brachycarenum tigrinus*
- 6' Head longer, less than 1.5 times as broad as long; rostrum extending beyond metasternum; posterolateral margin of metapleuron usually straight or slightly sinuate (Niesthrini: *Arhyssus*)..... 7
- 7 (6') Apical margin of male genital capsule somewhat emarginated; female with ultimate tergite broadly triangular; coloration lighter, pale dull yellow to reddish..... *Arhyssus lateralis*
- 7' Apical margin of male genital capsule more or less straight; female with ultimate tergite acutely triangular; coloration darker, dark gray-white to red-brown or fuscous-black *Arhyssus nigristernum*

Subfamily RHOPALINAE Amyot and Serville, 1843

Tribe HARMOSTINI Stål, 1873

Genus HARMOSTES Burmeister, 1835

Harmostes reflexulus (Say), 1832. (Fig. 19). – This species was reported by Hussey (1922), who noted: “taken in the fields about the Warren Woods... and one swept from roadside grasses at Lakeside.” It has been collected from cultivated strawberry in Berrien County. Members of the tribe Harmostini feed on Asteraceae (Compositae) (Schaefer and Mitchell 1983). Yonke and Medler (1967) and Yonke and Walker (1970a, 1970b) provided biological notes. Göllner-Scheiding (1978a) revised the genus. 164 specimens examined. Collection dates from 11 February to 17 October.

Tribe NIESTHRINI Chopra, 1967

Genus ARHYSSUS Stål, 1870

Arhyssus lateralis (Say), 1825. (Fig. 20). – Townsend (1890) probably was the first to report this species from Michigan (as *Corizus lateralis*), but he mistakenly included it within the Berytidae. Hussey (1922) also listed this species from Michigan (as *Corizus lateralis*), noting it “very abundant in the grassy fields around the Warren Woods from late June to September, and in similar localities in the dune region during July.” Hambleton (1909) and Readio (1928) provided biological information for the species in Ohio and Kansas, respectively. Paskewitz and McPherson (1983) provided information on life history of the species in southern Illinois as well as laboratory rearing techniques. Chopra (1968) revised and keyed the genus. 211 specimens examined. Collection dates from 9 March to 13 November.

Arhyssus nigristernum (Signoret), 1859. (Fig. 21). – This species was reported by Hussey (1922) as *Corizus bohemannii* [sic]. In Isabella County, it was taken by “sweeping brackensweet fern fallow field”, and in Jackson County, it was

taken on Queen Anne's lace (*Daucus carota* L.). This species also has been collected from Isle Royale, Keweenaw County. Chopra (1968) revised and keyed the genus. 78 specimens examined. Collection dates from 27 April to 19 September.

Tribe RHOPALINI Amyot and Serville, 1843

Genus BRACHYCARENUS Fieber, 1860

Brachycarenum tigrinus (Schilling), 1829. (Fig. 22). – This adventive Old World species was reported from Michigan by Wheeler, Jr. (1992), who collected a single specimen in a cemetery in Dansville, Ingham County, on hoary alyssum (*Berteroa incana* (L.)). The author visited the locality and collected another individual,

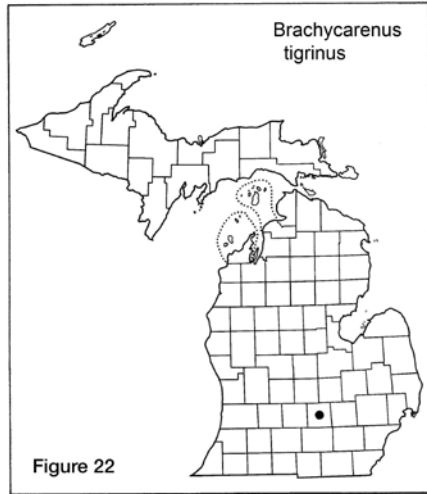
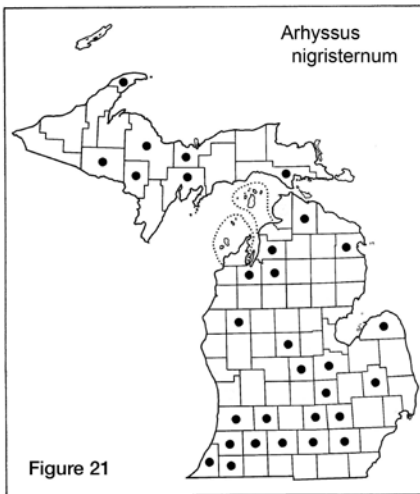
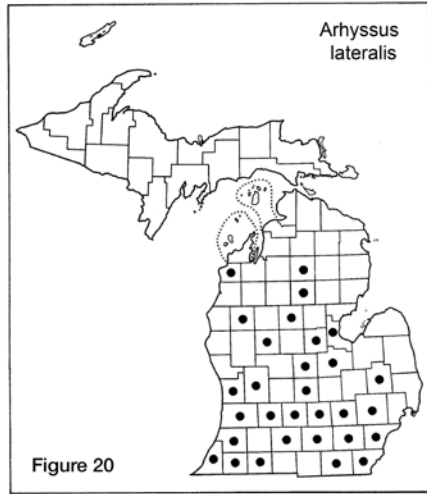
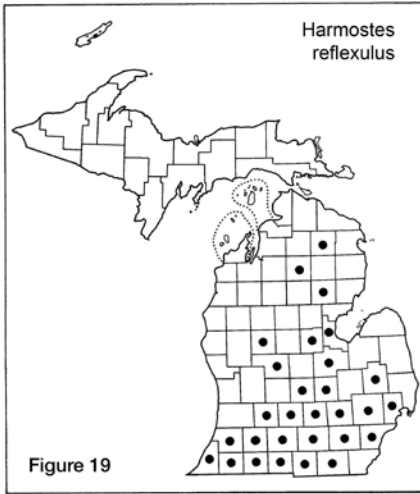


Figure 19. Distribution of *Harmostes reflexulus* in Michigan.

Figure 20. Distribution of *Arhyssus lateralis* in Michigan.

Figure 21. Distribution of *Arhyssus nigristernum* in Michigan.

Figure 22. Distribution of *Brachycarenum tigrinus* in Michigan.

demonstrating the presence of an established population in Michigan. The specimen bears the following label data: MICHIGAN: Ingham Co., Dansville, Fairview Cemetery, SW. corner, 2 September 2011, 42.5539°N 84.2964°W, #46, 950 ft., D. R. Swanson [1 male] (DRS). The specimen was taken simultaneously with *Stictopleurus punctiventris*, and *Harmostes reflexulus* was taken in the surrounding area. The generic placement of this species has varied, with many earlier references relegating *Brachycarenum* to a subgenus of *Rhopalus* Schilling, 1827; however, Dolling's (2006) treatment is followed here. In the United States, *B. tigrinus* is associated with crucifers (Brassicaceae) (Wheeler, Jr. and Hoebeke 1988). The presence and subsequent spread of *B. tigrinus* in the United States has been well-documented (Hoebeke 1977, Hoebeke and Wheeler, Jr. 1982, Wheeler, Jr. and Hoebeke 1988, 1999, Wheeler, Jr. 2004), and Scudder (2007) reported the first record from Canada. Wheeler, Jr. and Hoebeke (1988) provided biological information. Göllner-Scheiding (1978b) reviewed and keyed *Rhopalus*, including the two species in *Brachycarenum*. 1 specimen examined. Collection dates from 15 July to 2 September.

Genus LIORHYSSUS Stål, 1870

Liorhyssus hyalinus (Fabricius), 1794. (Fig. 23). – (NEW STATE RECORD). Label data as follows: MICHIGAN: Jackson Co., Jackson, 27 August 1963, R. & J. Matthews [1 female] (MSU). It is assumed that this is not an adventitious individual because several other coreoids examined by the author (*Catorhintha mendica*, *Chariesterus antennator*, *Harmostes reflexulus*, and *Stictopleurus punctiventris*) bear identical locality data; it would not be unexpected to find these species syntopically. Furthermore, *L. hyalinus* is known from Indiana, Ohio, and Ontario (Henry 1988) which supports the presence of this species in Michigan. This rhopalid sometimes is referred to as the hyaline grass bug. Readio (1928) provided information on the life history of this species in Kansas. Carlson (1959) studied economic effects of this insect in California; it is also discussed by Schaefer and Kotulski (2000). Göllner-Scheiding (1976) revised and keyed the genus. 1 specimen examined. Collection date is 27 August.

Genus STICTOPLEURUS Stål, 1872

Stictopleurus knighti Harris, 1942. (Fig. 24). – This species was reported from Thompson, Michigan by Harris (1944); however, the Agricultural College record is excluded because labels of this type typically denote ownership rather than a collecting locality (O'Brien 1998). This species can be difficult to separate from the following species, and *S. knighti* may occur more widely in the state than is evidenced by the distribution map. Göllner-Scheiding (1975) revised the genus and included a key to species. 6 specimens examined. Collection dates from 3 June to 22 August.

Stictopleurus punctiventris (Dallas), 1852. (Fig. 25). – This species was reported from Michigan by Harris (1944), although he included no specific localities. In Livingston County, *S. punctiventris* has been taken on flowers of prairie fleabane (*Erigeron strigosus* Muhl. ex Willd.). It also has been collected from Isle Royale, Keweenaw County. Yonke and Medler (1967) provided life history information for this species (as *S. crassicornis*). Göllner-Scheiding (1975) revised the genus and included a key to species. 198 specimens examined. Collection dates from 25 March to 27 September.

Subfamily SERINETHINAE Stål, 1873

Genus BOISEA Kirkaldy, 1910

Boisea trivittata (Say), 1825. (Fig. 26). – The presence of the boxelder bug in Michigan was first referenced by McDaniel (1933), although no specific locality was given and the record was understandably overlooked (Schaefer 1975, Henry 1988). The collection dates reflect the tendency of this species to enter human habitations

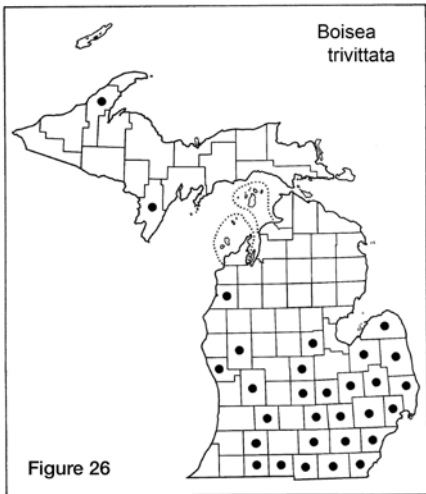
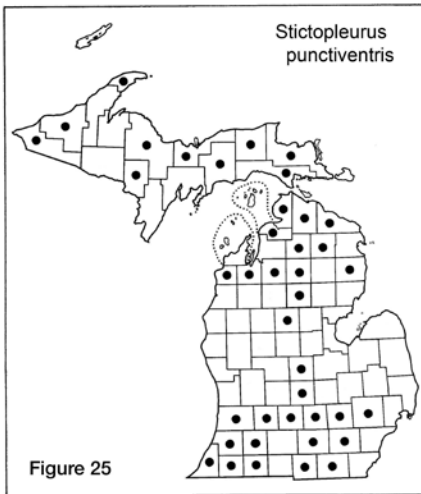
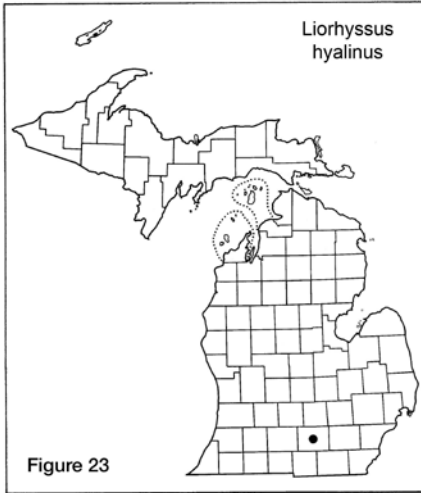


Figure 23. Distribution of *Liorhyssus hyalinus* in Michigan.
 Figure 24. Distribution of *Stictopleurus knighti* in Michigan.
 Figure 25. Distribution of *Stictopleurus punctiventris* in Michigan.
 Figure 26. Distribution of *Boisea trivittata* in Michigan.

in search of overwintering sites. This behavior, coupled with the massive vernal and autumnal aggregations witnessed on man-made structures, make *B. trivittata* the most encountered and, perhaps, the best known coreoid in Michigan. As previously noted (see *Leptoglossus occidentalis* (Coreidae) above), the high frequency of encounter between humans and insects doubtlessly accounts for the low county representation among material in collections, and *B. trivittata* probably occurs state-wide in Michigan. This species is closely tied to boxelder (*Acer negundo* L.), although feeding is not restricted to this plant (Schaefer and Kotulski 2000,

Slater and Schaefer 1963). This species has been studied in Michigan (Bouldrey and Grimnes 1995, Grimnes et al. 2003), and its life history has been documented (Smith and Shepard 1937, Tinker 1952). Yoder and Robinson (1990) presented information on behavior in an urban setting. Wheeler, Jr. (1982) provided information on its economic importance and life history. Slater and Schaefer (1963) reported aspects of distribution and eastward dispersal. Schaefer (1975) treated the two species of *Boisea* found in the Nearctic region; Göllner-Scheiding (1980) revised the genus. 192 specimens examined. Collection dates from 27 February to 3 December.

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