

The Great Lakes Entomologist

Volume 45
Numbers 3 & 4 - Fall/Winter 2012 *Numbers 3 &
4 - Fall/Winter 2012*

Article 4

October 2012

The Stink Bugs (Hemiptera: Heteroptera: Pentatomidae) of Missouri

Robert W. Sites
University of Missouri

Kristin B. Simpson
University of Missouri

Diane L. Wood
Southeast Missouri State University

Follow this and additional works at: <https://scholar.valpo.edu/tgle>

 Part of the [Entomology Commons](#)

Recommended Citation

Sites, Robert W.; Simpson, Kristin B.; and Wood, Diane L. 2012. "The Stink Bugs (Hemiptera: Heteroptera: Pentatomidae) of Missouri," *The Great Lakes Entomologist*, vol 45 (2)
Available at: <https://scholar.valpo.edu/tgle/vol45/iss2/4>

This Peer-Review Article is brought to you for free and open access by the Department of Biology at ValpoScholar. It has been accepted for inclusion in *The Great Lakes Entomologist* by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

The Stink Bugs (Hemiptera: Heteroptera: Pentatomidae) of Missouri

Robert W. Sites^{1,2}, Kristin B. Simpson², and Diane L. Wood³

Abstract

The stink bug (Hemiptera: Pentatomidae) fauna of Missouri was last treated more than 70 years ago. Since then, many more specimens have become available for study, substantial papers on regional faunas have been published, and many revisions and other taxonomic changes have taken place. As a consequence, 40% of the names from the previous Missouri state list have changed or the taxa have been removed. The fauna of stink bugs known from Missouri based on specimens from museums, other collections, and the literature is presented. Included for each species is a general overview of biological and ecological information, overall distribution, and local distribution among Missouri Natural Divisions. Also presented for Missouri specimens are biological label data and extreme dates of adult collection. All totaled, 57 species are now known from the state, eight of which represent new state records: Asopinae: *Alcaeorrhynchus grandis* (Dallas), *Tylospilus acutissimus* (Stål); Pentatominae: *Banasa calva* (Say), *Banasa euchlora* Stål, *Cosmopepla intergressa* (Uhler), *Halyomorpha halys* (Stål), *Neottiglossa undata* (Say); Podopinae: *Amaurochrous brevitylus* Barber and Sailer.

As a family of true bugs, the stink bugs (Heteroptera: Pentatomidae) have received a great deal of notoriety by scientists and non-scientists in part because their common name engenders curiosity; they are large, apparent and sometimes brightly colored; some are crop pests and others are predators of crop pests. This is one of the largest families of Heteroptera and includes species exhibiting a wide variety of biological and ecological attributes. Although most of the literature on stink bugs focuses on questions related to controlling populations of destructive species (see McPherson and McPherson 2000), a sizable body of literature exists on the taxonomy and systematics of stink bugs at various taxonomic levels, including superfamily, family, and genus.

On a broad taxonomic and geographic scale, the Pentatomoidea of northeastern North America was presented by McPherson (1982) with keys, distributions, and exhaustive reviews of biology. The stink bug fauna of many individual states with a similar species composition to that of Missouri have been presented over the past century, including for Arkansas (Barton and Lee 1981), Illinois (Hart 1919, McPherson 1979b), Iowa (Stoner 1920), Kansas (Gates and Peters 1962), Michigan (McPherson 1970, 1979a), Nebraska (Zimmer 1911), Ohio (Furth 1974), and Virginia (Hoffman 1971). The fauna of Pentatomoidea of Missouri was presented by Froeschner (1941) with an annotated list and taxonomic key to species. However, that paper is more than 70 years old and since then, many additional specimens have become available for study in

¹Corresponding author (email: sitesr@missouri.edu).

²Enns Entomology Museum, Division of Plant Sciences, University of Missouri, Columbia, Missouri 65211, U.S.A.

³Department of Biology, Southeast Missouri State University, Cape Girardeau, Missouri 63701, U.S.A. (email: dwood@semo.edu).

museum and other collections, other papers addressing regional faunas have been published, and many revisions and other taxonomic changes have taken place. As a consequence, 40% of the names from the 1941 Missouri state list have changed and various taxa have been removed from or added to the list. Thus, presented here is an annotated list of the stink bugs currently known from Missouri based on museum and other collection records, and the literature.

Materials and Methods

Data were gathered from the Enns Entomology Museum - University of Missouri, other collections, a state agency, and the literature. In the Distribution sections, we provide an overall distribution of each species followed by distribution in Missouri as associated with six Natural Divisions (Thom and Wilson 1980). The Natural Divisions are the result of a hybridized regionalization scheme based on an integration of physical (geologic history, soils, bedrock geology, topography), biological (known plant and animal distributions, presettlement vegetation), and other natural factors (Fig. 1).

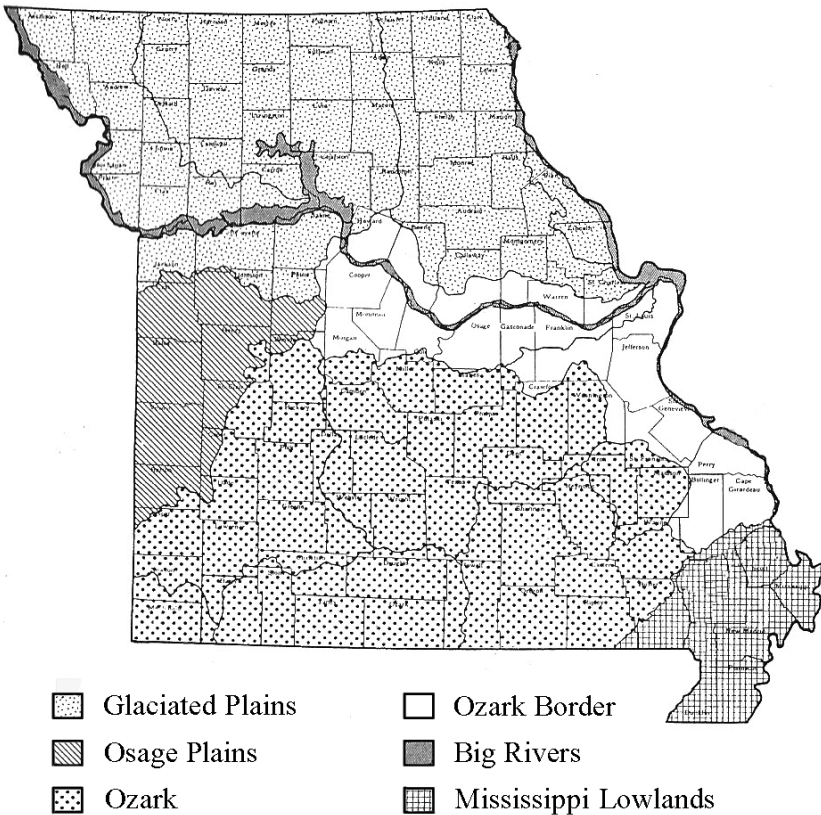


Figure 1. Natural Divisions of Missouri, modified from Thom and Wilson (1980). Reproduced with permission by Richard Thom and James Wilson.

A project is in progress to digitize the Enns Entomology Museum which is expected to make available high resolution images of the specimen holdings and legible label data, including the pentatomids referenced here. Unless otherwise indicated, records presented here are from the Enns Entomology Museum (MU). Data from the Missouri Department of Agriculture are indicated as "MDA," Southeast Missouri State University as "SEMO," and the University of Missouri Delta Center at Portageville as "UMDC." Because many county records referenced by Froeschner (1941) are represented by specimens in the Enns Entomology Museum, his county records are included with those of the Museum. Occurrence in St. Louis is noted separately because the city is its own geopolitical entity and has no county association. The date extremes given for each species represent the earliest and latest dates of collection of adults.

Pentatomidae Known from Missouri

Biology overview. In general, species of the subfamily Asopinae are predators as adults, whereas those of Pentatominae and Podopinae are phytophagous, although exceptions exist. In Missouri, species are univoltine or bivoltine (Oetting and Yonke 1971c) and adults of most species overwinter in association with some type of protection on the ground. Immature stages pass through five nymphal instars and development from egg to adult generally requires 6–8 weeks (Oetting and Yonke 1971c).

Taxonomic overview. All totaled, 57 species are known from Missouri from the following three subfamilies: Asopinae (12), Pentatominae (43), and Podopinae (2). Eight of the species, representing all three subfamilies, are newly reported for the state of Missouri.

SUBFAMILY – ASOPINAE

Alcaeorrhynchus grandis (Dallas)

Canthecona grandis Dallas, 1851: List Hem. Brit. Mus. 1: 91.

Alcaeorrhynchus grandis: Bergroth, 1891, Rev. Ent. 10: 235.

Distribution. Missouri south to Florida, Texas, and Argentina. Missouri records are from 5 counties in Ozark and Mississippi Lowlands Natural Divisions (UMDC).

Label data. Biological: alfalfa, nest of malacocana, light, light trap (UMDC). Date extremes in Missouri: 14 April–29 July (UMDC).

Discussion. This species is sometimes commonly known as the giant strong-nosed stink bug (Richman and Mead 2011) and is the largest of the Asopinae in Missouri. It was reared in the laboratory by Richman and Whitcomb (1978) and has been reported as a predator of butterfly larvae (Araujo e Silva 1933). This is the first record of this species from Missouri.

Apoecilus cynicus (Say)

Pentatoma cynica Say, 1831b: Descrip. Het. Hem. N. Am., p. 3.

Apoecilus cynicus: Thomas, 1992, Thom. Say Found. Mon. 16: 27.

Distribution. Arizona to "Dakota" east to Florida and New York (Froeschner 1988), and Canada (Thomas 1992). Missouri records are from the City of St. Louis and 17 counties in Ozark, Glaciated Plains, and Ozark Border Natural Divisions.

Label data. Biological: eggs under bark black oak (13 March), in firewood logs, under bark, lights. Date extremes in Missouri: 5 May–19 October, 3rd instars 11 May.

Discussion. The biology of this species (as *Apateticus cynicus*) was reviewed by Jones and Coppel (1963) and McPherson and Mohlenbrock (1976), and biology and distribution by McPherson (1982). This large species usually is found under bark and although it was described from Missouri, it is uncommon in the state (Froeschner 1941).

Euthyrhynchus floridanus (Linnaeus)

Cimex floridanus Linnaeus, 1767: Syst. Nat. Ed. 12, 1, pt. 2: 719.

Euthyrhynchus floridanus: Dallas, 1851, List Hem. Brit. Mus. 1: 104.

Distribution. Pennsylvania to Missouri south to Brazil (Froeschner 1988). Missouri records are from 3 counties in Ozark and Mississippi Lowlands Natural Divisions.

Label data. Biological: aggregated on bee hive, honeysuckle. Date extremes in Missouri: 10 September–28 September, 3rd instars on 6 June.

Discussion. This species was reported from Missouri by Oetting and Yonke (1975). It was reared in the laboratory by Richman and Whitcomb (1978). Information on biology and immature stages was provided by Oetting and Yonke (1975), and biology and distribution were reviewed by McPherson (1982).

Perillus bioculatus (Fabricius)

Cimex bioculatus Fabricius, 1775: Syst. Ent., p. 715.

Perillus bioculatus: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 129.

Distribution. Alberta to Quebec south to Arizona, Florida, and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 7 counties in Glaciated Plains, Ozark Border, and Big Rivers Natural Divisions.

Label data. Date extremes in Missouri: 11 May–12 December (MU, Froeschner 1941).

Discussion. *Perillus bioculatus* is known commonly as the twospotted stink bug. This predaceous species was introduced to Europe for control of the Colorado potato beetle (Thomas 1992) and was mass-reared for use against this pest (Franz 1961). A technique to rear this species on artificial diet was presented by Coudron and Kim (2004). The biology and distribution of *P. bioculatus* were reviewed by McPherson (1982). Adults of this species exhibit color dimorphism in which one form is red or orange and black, and the other form is white or yellow and black. The latter is the 'clanda' form and was described by Say (1825) from Missouri. This species was considered by Froeschner (1941) to be scarce in Missouri.

Perillus circumcinctus Stål

Perillus circumcinctus, Stål 1862: Stet. Ent. Zeit. 23(1): 89.

Distribution. Saskatchewan to New Hampshire south to Nebraska, Missouri, and Ohio (Froeschner 1988).

Discussion. This predaceous stink bug specializes on Chrysomelidae as prey (Evans 1982, and citations therein). The biology and distribution were reviewed by McPherson (1982). Although *P. circumcinctus* was listed from Missouri by Van Duzee (1917) and Froeschner (1988), we have seen no specimens from the state and know of no specific locality data. Because this species is northern in its overall distribution and is known from only the northern half of Illinois (McPherson 1982), it should be expected in the Glaciated Plains Natural Division of Missouri.

***Perillus exaptus* (Say)**

Pentatoma exapta Say, 1825: J. Acad. Nat. Sci. Phila. 4: 313.

Perillus exaptus: Stål, 1870, K. Svens. Vet.-Akad. Handl. 9(1): 32.

Distribution. British Columbia to California east to Nova Scotia and New Jersey (Froeschner 1988). The sole Missouri record is from St. Louis (Froeschner 1941).

Label data. Biological: weedy field. Date of collection: 2 July 1935.

Discussion. The biology and distribution of this species were reviewed by McPherson (1982). This species was described based on specimens from Missouri. We have not seen specimens of this species from Missouri, although the record of a single specimen swept from a weedy field in St. Louis was presented by Froeschner (1941) and the species was listed from Missouri by Uhler (1861), Van Duzee (1917), and Blatchley (1926).

***Perillus strigipes* (Herrich-Schäffer)**

Podisus strigipes Herrich-Schäffer, 1853: Wanz. Ins. 9: 338.

Perillus strigipes: Hoffman, 1971, Va. Polyt. Inst. Res. Div. Bull. 4: 55.

Distribution. Massachusetts to Florida west to Colorado and Arizona (Froeschner 1988). Missouri records are from 6 counties in Osage Plains, Glaciated Plains, Ozark, and Ozark Border Natural Divisions.

Label data. Biological: *Asclepias*, Japanese beetle trap (Froeschner 1941). Date extremes in Missouri: 3 May–3 September.

Discussion. This species was reported from Missouri by Froeschner (1941). The biology and distribution (as *Mineus strigipes*) were reviewed by McPherson (1982).

***Podisus maculiventris* (Say)**

Pentatoma maculiventris Say, 1831a: Descrip. N. Am. Ins. La., p. 11.

Podisus spinosus: Stål, 1867, Öfv. K. Svens. Vet.-Akad. Förh. 24(7): 497.

Podisus maculiventris: Torre-Bueno, 1903, J. N. Y. Ent. Soc. 11: 128.

Distribution. British Columbia to Quebec south to California, Texas, and Florida (Froeschner 1988). Missouri records are from the City of St. Louis and 81 counties in all six Natural Divisions (MU, MDA).

Label data. Biological: sucking *Catocala* larva, *Phlox divarticula*, *Rhus canadensis*, *Salix*, alfalfa, alsike, feeding on adult bibionid, corn, fescue, Laidino clover, partridge pea, pre-tassel corn, rank grass, red clover, white clover, cheat, fumigation collection soybeans, roadside sweeps, sticky board, sweeping garden, sweeping weeds, blacklight, light trap, lights, malaise, mercury vapor light (MU); sugarbeet, bollworm trap (UMDC). Date extremes in Missouri: 14 April–26 November (MU), nymphs in July–August (Froeschner 1941).

Discussion. This species is known commonly as the spined soldier bug. The biology was discussed by McPherson and Mohlenbrock (1976), a list of prey species was given by McPherson (1980a), laboratory rearing data were presented by Richman and Whitcomb (1978), rearing on artificial diet by Witmeyer and Coudron (2001), and biology and distribution were reviewed by McPherson (1982). In Missouri, adults have been observed preying on larvae of Lepidoptera and *Lema trilineata* (Olivier) (Coleoptera: Chrysomelidae) (Froeschner 1941).

***Podisus placidus* Uhler**

Podisus placidus Uhler, 1870: Am. Ent. 2: 203.

Distribution. British Columbia to Quebec south to Utah, Arkansas, and New Jersey (Froeschner 1988). Missouri records are from 7 counties in Ozark and Ozark Border Natural Divisions.

Label data. Biological: feeding on *Hyphantria cunea* (Drury), hickory. Date extremes in Missouri: 20 April–12 September.

Discussion. The biology and immature stages were described by Oetting and Yonke (1971a). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) considered this species to be rare in Missouri.

***Podisus serieventris* Uhler**

Podisus serieventris Uhler, 1871: Proc. Bost. Soc. Nat. Hist. 14: 94.

Distribution. British Columbia to Newfoundland south to New Mexico and North Carolina (Froeschner 1988). Missouri records are from 4 counties in Ozark, Ozark Border, and Glaciated Plains Natural Divisions.

Label data. Biological: blacklight, mercury vapor light. Date extremes in Missouri: 22 July–10 October.

Discussion. This species was first reported from Missouri by Froeschner (1941) based on a specimen from St. Louis County. Information on the biology of this species was given by Prebble (1933) and biology and distribution were reviewed by McPherson (1982).

***Stiretrus anchorago* (Fabricius)**

Cimex anchorago Fabricius, 1775: Syst. Ent., p. 699.

Stiretrus anchorago: Dallas, 1851, List Hem. Brit. Mus. 1: 80.

Distribution. Alberta to New York south to New Mexico, Florida, and Panama (Froeschner 1988). Missouri records are from the City of St. Louis and 30 counties in Ozark, Ozark Border, Glaciated Plains, Mississippi Lowlands, and Big Rivers Natural Divisions (MU, UMDC).

Label data. Biological: *Asclepias* attacking larva, alfalfa, beans, preying on e. tent caterpillar, hibiscus, potato plant, red clover, sweeping in abandoned field, weed, malaise trap (MU); JB [Japanese] beetle] trap (MDA). Date extremes in Missouri: 14 April–15 October (UMDC, MU); nymphs in August (Froeschner 1941).

Discussion. This species is variable in its expression of color for which many forms have been named (Thomas 1992). Immature stages were described by Oetting and Yonke (1971a) and laboratory rearing data were presented by Richman and Whitcomb (1978). Various aspects of biology of this species were presented by Waddill and Shepard (1974) and McPherson and Mohlenbrock (1976), and a review of the literature by McPherson (1982). This species was considered to be relatively scarce in Missouri (Froeschner 1941).

***Tylospilus acutissimus* (Stål)**

Podisus acutissimus Stål, 1870: K. Svens. Vet.-Akad. Handl. 9(1): 53.

Tylospilus acutissimus: Uhler, 1876, Bull. U.S. Geol. Geogr. Surv. Terr. 1: 283.

Distribution. Colorado and Arizona south through Texas to Guatemala

(Froeschner 1988). The sole Missouri record is from Columbia, Boone County in the Ozark Border Natural Division.

Label data. Date collected: 1 November 1975.

Discussion. Information concerning the biology of *T. acutissimus* was presented by Stoner (1920). The specimen for this apparently extralimital record was determined by K. A. Phillips and confirmed by D. A. Rider. This is the first record of this species from Missouri.

SUBFAMILY – PENTATOMINAE

Aelia americana Dallas

Aelia americana Dallas 1851: List Hem. Brit. Mus. 1: 223.

Distribution. British Columbia to Michigan south to Arizona and Alabama (Froeschner 1988). Missouri records are from 18 counties in Ozark, Ozark Border, Glaciated Plains, Mississippi Lowlands, and Big Rivers Natural Divisions.

Label data. Biological: *Andropogon*. Date extremes in Missouri: 5 February–17 December.

Discussion. Although this species has been considered rare (Froeschner 1941, McPherson and Mohlenbrock 1976), it has been collected commonly from apple trees in orchards and has been reported to overwinter in grass clumps and under mullein leaves (Froeschner 1941).

Banasa calva (Say)

Pentatoma calva Say, 1831b: Descrip. Het. Hem. N. Am., p. 7.

Banasa calva: Uhler, 1876, Bull. U. S. Geol. Geogr. Surv. Terr. 1: 291.

Distribution. Maine to British Columbia south to Georgia, Mexico, and Guatemala (Froeschner 1988). Missouri records are from 4 counties in Mississippi Lowlands, Glaciated Plains, and Ozark Border Natural Divisions.

Label data. Biological: blacklight, light trap. Date extremes in Missouri: 21 May–3 September.

Discussion. Thomas and Yonke (1981) reviewed the genus. The life history of *B. calva* was reported by DeCoursey (1963), and the biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This is the first record of this species from Missouri.

Banasa dimidiata (Say)

Pentatoma dimidiata Say, 1831b: Descrip. Het. Hem. N. Am., p. 7.

Pentatoma dimidiata: LeConte, 1859, Comp. Writ. T. Say, 1: 318.

Banasa dimidiata: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 43.

Distribution. British Columbia to Nova Scotia south to New Mexico and Florida (Froeschner 1988). Missouri records are from 10 counties in Ozark, Ozark Border, Osage Plains, Glaciated Plains, and Mississippi Lowlands Natural Divisions (MU, UMD).C).

Label data. Biological: *Spirea* flower, blacklight, light, mercury vapor light (MU); light trap (UMDC); Japanese beetle trap (Froeschner 1941). Date extremes in Missouri: 1 May–19 September.

Discussion. Thomas and Yonke (1981) reviewed the genus and reported this species on blueberry in Missouri. Say (1831b) named this species *dimidiata*;

however, LeConte (1859) emended the specific epithet to *dimidiata*, which is what he thought Say had intended. Although this was an unjustified emendation, most authors have followed LeConte, and the usage of *dimidiata* for over 150 years, albeit inconsistent, has created some stability and justifies its continued use (see explanation in Hoffman 2005). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982).

***Banasa euchlora* Stål**

Banasa euchlora Stål, 1872: K. Svens. Vet.-Akad. Handl. 10(4): 44.

Distribution. New York to Florida west to Arizona and Utah (Froeschner 1988), Canada (Paiero et al. 2003), and northern Mexico (Thomas and Yonke 1981). Missouri records are from 3 counties in Ozark, Ozark Border, and Osage Plains Natural Divisions.

Label data. Biological: house basement, blacklight trap, mercury vapor light. Date extremes in Missouri: 4 May–31 December.

Discussion. Thomas and Yonke (1981) reviewed the genus. This species is associated with cedar (McPherson 1982, and citations therein). The biology and distribution of *B. euchlora* were reviewed by McPherson (1982). This is the first record of this species from Missouri.

***Banasa sordida* (Uhler)**

Atomosira sordida Uhler, 1871: Proc. Bost. Soc. Nat. Hist. 14: 98.

Banasa sordida: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 44.

Distribution. Southern Canada, the contiguous U. S., and northern Mexico (Thomas and Yonke 1981). Missouri records are from 3 counties in Ozark Border, Glaciated Plains, and Mississippi Lowlands Natural Divisions (MU, UMDC).

Label data. Biological: cow peas, blacklight, light trap, mercury vapor light (MU); cow peas (UMDC). Date extremes in Missouri: 6 June–18 September.

Discussion. Thomas and Yonke (1981) reviewed the genus and reported this species in Missouri to use *J. (Juniperus) virginiana* as a host plant. The biology and distribution of *B. sordida* were reviewed by McPherson (1982).

***Brochymena cariosa* Stål**

Brochymena cariosa Stål, 1872: K. Svens. Vet.-Akad. Handl. 10(4): 17.

Distribution. North Carolina to Florida west to Nebraska and Louisiana (Froeschner 1988). Missouri records are from the City of St. Louis and 19 counties in Ozark, Ozark Border, Osage Plains, Mississippi Lowlands, and Big Rivers Natural Divisions (MU, SEMO, UMDC).

Label data. Date extremes in Missouri: 1 February–15 December (MDA, MU).

Discussion. The biology and distribution of this species were reviewed by McPherson (1982). This species overwinters under bark and in logs and is known to congregate in large numbers (Froeschner 1941).

***Brochymena carolinensis* (Westwood)**

Cimex annulata Fabricius, 1775: Syst. Ent., p. 704. (preoccupied)

Halys carolinensis Westwood, 1837: Hope. Cat. 1: 22.

Brochymena carolinensis: Dallas, 1851, List Hem. Brit. Mus. 1: 189.

Distribution. New York to Florida west to Alberta and Texas (Froeschner 1988). Missouri records are from 2 counties in Ozark Natural Division (MU, McPherson 1980b).

Label data. Biological: at a nursery. Date extremes in Missouri: 26 August–3 September.

Discussion. This species was first reported from Missouri by McPherson (1980b). Biology and distribution were reviewed by McPherson (1980b, 1982).

Brochymena punctata punctata Van Duzee

Brochymena punctata Van Duzee, 1909: Can. Ent. 41: 369.

Distribution. Virginia to Florida (Froeschner 1988) west to Oklahoma and Missouri (Larivière 1992).

Discussion. We have not seen specimens of this species from Missouri, although Larivière (1992) indicated that a specimen with a Missouri label is in the U.S. National Museum. The species has been collected on black walnut (McPherson 1976c) and oaks (Ruckes 1946b). The biology and distribution of *B. p. punctata* were reviewed by McPherson (1982). Larivière (1992) considered this species to be rare.

Brochymena quadripustulata (Fabricius)

Cimex 4.pustulatus Fabricius, 1775: Syst. Ent., p. 704.

Brochymena serrata: Amyot and Serville, 1843, Hist. Nat. Ins. Hem., 107.

Brochymena quadripustulata: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 16.

Distribution. British Columbia to Quebec south to Arizona and Florida (Froeschner 1988). Missouri records are from the City of St. Louis and 49 counties in all six Natural Divisions (MU, MDA, UMDC).

Label data. Biological: *Cirsium* sp., *Fraxinus penasylvanica* [sic] Marsh trunk, *Helianthus*, *Populus deltoides* Bartr. foliage, *Quercus palustris* trunk, elm, green ash twig, jack pine, oak & poplar, pin oak leaf, pin oak, soybeans, willow, herbage, prairie, under bark of dead oak [18 Jan.], under bark [11 Jan. and 20 Apr.], under bark of stump [10 Nov.], under stone near woods [16 Dec.] (MU); *Arundinaria gigantea* (SEMO). Date extremes in Missouri: 1 January–16 December.

Discussion. Specimens were reared in the laboratory and immature stages described by Cuda and McPherson (1976). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). In Missouri, this common species feeds on *Quercus*, *Salix*, and *Ulmus* and overwinters under bark (Froeschner 1941).

Chinavia hilaris (Say)

Pentatoma hilaris Say, 1831a: Descrip. N. Am. Ins. La., p. 9.

Chinavia hilaris: Schwertner and Grazia, 2006, Iher. Ser. Zool. Por. Aleg. 96.

Distribution. California and Montana east to Florida and Quebec (Froeschner 1988). Missouri records are from the City of St. Louis and 59 counties in all six Natural Divisions (MU, SEMO, UMDC).

Label data. Biological: *Acer negunda*, *Lespedeza*, *Salix* sp., *Solidago*, alfalfa, big bluestem, black locust, corn, grain sorghum, impatiens, milkweed, milkweed pod, pin oak leaf, partridge pea, soybeans, sycamore, red clover, flowers and shrubs,

glade edge, grass, with *Leptocoris trivittatus*, prairie, roadside vegetation, tall grass at forest edge, weeds, blacklight, light trap, lights, malaise trap, mercury vapor light (MU); *Arundinaria gigantea* (SEMO); in leaf litter under large trees nr river beach (30 Dec.), *Urtica*, cotton, cavern area, blacklight for SWCB, bollworm pheromone trap, bollworm trap, European corn borer pheromone trap, European corn borer trap, pheromone trap, southwestern corn borer trap, UV trap (UMDC). Date extremes in Missouri: 1 March–30 December (MU, UMDC).

Discussion. This species is known commonly as the green stink bug and was described from Missouri specimens. McPherson and Tecic (1997) provided data on the field life history. The biology of this species (as *Acrosternum hilare*) was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). In Missouri in August, this species was observed mating and feeding on asparagus (Froeschner 1941).

Chinavia pennsylvanica (Gmelin)

Cimex viridis pensylvanicus [sic] De Geer, 1773: Mem. Ins. 3: 330, pl. 34, fig 5.

Cimex pensylvanicus [sic] Gmelin, 1790: Car. Lin. Syst. Nat. 1: 2148.

Chinavia pennsylvanica: Schwertner and Grazia, 2006, Iher. Ser. Zool. Por. Aleg. 96.

Distribution. Quebec to Florida west to Iowa and Louisiana (Froeschner 1988). The sole Missouri record is from near Eminence, Shannon County in Ozark Natural Division.

Label data. Biological: sweeping weeds. Date collected: 16 June 1940.

Discussion. The biology and distribution of this species (as *Acrosternum pensylvanicum*) were reviewed by McPherson (1982). This species is rare in Missouri and was collected by sweeping weeds in an overgrown orchard (Froeschner 1941).

Chlorochroa persimilis Horvath

Chlorochroa persimilis Horvath, 1908: An. Mus. Nat. Hung. 6: 555.

Distribution. Florida to Quebec west to Arkansas and Alberta (Froeschner 1988). Missouri records are from the City of St. Louis and six counties in Ozark, Ozark Border, Glaciated Plains, and Osage Plains Natural Divisions.

Label data. Biological: red clover (MU); JB [Japanese beetle] trap (MDA); swept from *Melilotus* (Froeschner 1941). Date extremes in Missouri: 12 April–24 October.

Discussion. Several problems exist in the literature concerning species of *Chlorochroa* from Missouri. Two species, *C. sayi* (Stål) and *C. uhleri* (Stål), were included in the species of Pentatomidae known from Missouri (Froeschner 1941); however, each of these was based on only a few old records and identifications prior to the revision by Buxton et al. (1983). All of those Missouri records are now considered to pertain to *C. persimilis* (D. Thomas, pers. comm.). In addition, Missouri was given as a state in which the primarily western species *C. faceta* (Say) and *C. ligata* (Say) occur (Froeschner 1988). These were based on insects collected by Say in his expedition through the Missouri Territory to the Rocky Mountains. Because his notes were stolen, Say had to match specimens to localities from memory. Thus for *C. faceta* and *C. ligata*, we consider that either (1) the part of Missouri Territory where these specimens were collected was west of what is now the state of Missouri, (2) they were collected in what is now Missouri, but their ranges have contracted, or (3) they were collected in what is now Missouri but actually were *C. persimilis*. The latter possibility cannot be confirmed because the types are lost. Further, more recent revisions

did not list Missouri in the distribution for *C. faceta* (Thomas 1983) and *C. ligata* (Buxton et al. 1983).

In Missouri, *C. persimilis* is one of the larger species of Pentatomidae, and was observed on red clover in high abundance (Oetting and Yonke 1971c) and collected on *Amsonia* spp. (Buxton et al. 1983). This species was reared in the laboratory and life history data were reported by Oetting and Yonke (1971c). The biology and distribution were reviewed by McPherson (1982).

Coenus delius (Say)

Pentatoma delia Say, 1831b: Descrip. Het. Hem. N. Am., p. 8.

Coenus delius: Stål, 1867, Öfv. K. Svens. Vet.-Akad. Förh. 24(7): 526.

Distribution. British Columbia to Quebec south to Texas and Florida (Froeschner 1988). Missouri records are from 19 counties in Ozark, Ozark Border, Osage Plains, and Glaciated Plains Natural Divisions.

Label data. Biological: red clover, timothy, white clover, lake vegetation, prairie. Date extremes in Missouri: 9 April–13 November (Oetting and Yonke 1971c, MU).

Discussion. The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). The type specimens are from Massachusetts and Missouri. This species is locally scarce and has been swept from *Solidago* (Froeschner 1941).

Coenus inermis Harris and Johnston

Coenus inermis Harris and Johnston, 1936: Ia. St. Coll. J. Sci. 10: 378.

Distribution. Kansas, Louisiana (Rider 1996), Oklahoma, Arkansas, and Missouri (Froeschner 1988).

Discussion. Froeschner (1941) indicated that *C. inermis* was collected in Marion County, Arkansas, which is adjacent to Missouri. Therefore, he considered it likely to occur in the south central part of Missouri. Although specific data were not given, Missouri was included in the list of states for this species in the catalog of Heteroptera (Froeschner 1988); however, we have not seen any specimens from Missouri.

Cosmopepla intergressa (Uhler)

Eysarcoris melanocephalus: Uhler, 1876, Bull. U.S. Geol. Geogr. Surv. Terr. 1, pl. 9, fig. 7.

Cosmopepla humboldtensis Bliven, 1955: Stud. Ins. Redwood Emp., 1: 8.

Cosmopepla intergressa: McDonald, 1986, J. N. Y. Ent. Soc. 94: 11.

Distribution. British Columbia and Montana south to California, Kansas (Froeschner 1941), and Missouri. The sole Missouri record is from Ranken, St. Louis County in the Ozark Border Natural Division.

Label data. Date collected: 13 May 1934.

Discussion. McDonald (1986) reviewed the genus. This specimen was determined by D. B. Thomas and is the first record of this species from Missouri.

Cosmopepla lintneriana Kirkaldy

Cimex carnifex Fabricius, 1798: Ent. Syst., Suppl. p. 535.

Cosmopepla lintneriana Kirkaldy, 1909: Cat. Hem. 1: 80.

Distribution. British Columbia to Nova Scotia south to New Mexico, Georgia and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 20 counties in Ozark, Ozark Border, Glaciated Plains, Mississippi Lowlands, and Big Rivers Natural Divisions.

Label data. Biological: cotton, mullein, red clover, tobacco, flowers, flower garden, flowers & shrubs, grass, vegetation, weeds, wildflowers, blacklight. Date extremes in Missouri: 20 April–20 November.

Discussion. McDonald (1986) reviewed the genus. Specimens of *C. lintneriana* (as *C. bimaculata*) were reared in the laboratory by McPherson (1976b) and the field life history was studied by McPherson and Tecic (1997). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) reported that this species usually is found by sweeping weeds along streams.

Dendrocoris humeralis (Uhler)

Liotropis humeralis Uhler, 1877: Bull. U. S. Geol. Geogr. Surv. Terr. 3: 400.

Dendrocoris humeralis: Bergroth, 1891, Rev. Ent. 10: 228.

Distribution. Maine to Georgia west to California (Froeschner 1988), and Canada (Paiero et al. 2003). Missouri records are from 11 counties in Ozark, Ozark Border, Glaciated Plains, and Mississippi Lowlands Natural Divisions.

Label data. Biological: black locust, black oak, red oak, woods, grass by river, sticky boards in oak hickory canopy, mercury vapor light. Date extremes in Missouri: 2 April–17 October.

Discussion. The biology of this species was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This scarce species in Missouri has been taken on oak trees (Froeschner 1941).

Euschistus ictericus (Linnaeus)

Cimex ictericus Linnaeus, 1763: Cent. Ins., p. 16.

Euschistus ictericus: Dallas, 1851, List Hem. Brit. Mus. 1: 206.

Distribution. Florida, Vermont, and Ontario west to Texas and Colorado (Froeschner 1988). Missouri records are from the City of St. Louis and 5 counties in Ozark, Ozark Border, and Big Rivers Natural Divisions.

Label data. Biological: *Salix*, Japanese beetle trap (Froeschner 1941). Date extremes in Missouri: 18 July–21 October (Froeschner 1941, MU).

Discussion. The life history and immature stages of *E. ictericus* were described by McPherson and Paskewitz (1984b) and mating behavior by Drickamer and McPherson (1992). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982).

Euschistus politus Uhler

Euschistus politus Uhler, 1897: Can. Ent. 29: 117.

Distribution. Missouri and Arkansas east to New Hampshire and Tennessee (Froeschner 1988). Missouri records are from 12 counties in Ozark, Ozark Border, and Big Rivers Natural Divisions.

Label data. Biological: *Quercus borealis* Michx., *Quercus stellata* Wang, sweeping vegetation, malaise (MU); swept from open woods, Japanese beetle trap (Froeschner 1941). Date extremes in Missouri: 2 May–31 October.

Discussion. Information on laboratory rearing was presented by McPherson (1974a) and mating behavior by Drickamer and McPherson (1992). The biology of *E. politus* was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982).

Euschistus servus (Say)

Pentatoma serva Say, 1831b: Descrip. Het. Hem. N. Am., p. 4.

Euschistus servus: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 26.

Distribution. British Columbia and Nova Scotia south to Arizona, Florida, and Mexico (Froeschner 1988). Missouri records are from 84 counties in all six Natural Divisions (MU, UMDC, Froeschner 1941).

Label data. Biological: *Ambrosia* sp., *Amorpha canescens*, black nightshade *Solanum americanum*, *Daucus carota* L. flower, hollyhock *Athaea rosea*, *Lespedeza*, *Mirabilis nyctaginea*, *Phlox divarticula*, *Rudbeckia*, *Rumex verticillatus*, *Salix* sp., *Solidago* spp., alfalfa, alsike clover, bedstraw, Bermuda, cheat, corn, fescue, hop clover, partridge pea, red clover, sunflower, sweet clover, thistle, timothy, tomato plant, vetch roadside, white clover, willow, winter cress, alfalfa/orchard grass mixture, around pond, emerg. veg., grass, grass/scrub, grasses near a forest, meadow, mixed grass prairie, near shore, prairie, river bottom veg., riverbank, shoreline vegetation, sweep riparian veg., tall grass prairie, tree border at lawn, vegetation, weeds, blacklight, fluorescent light, lights, light trap, malaise, merc. vapor light, USDA Japanese beetle trap (MU); *Arundinaria gigantea* (SEMO); oak, soybean, sugarbeet, alive with eggs (13 Apr.), bollworm pher. trap, southwestern corn borer trap, Japanese beetle pher. trap (UMDC). Date extremes in Missouri: 31 March–13 November.

Discussion. This species is known commonly as the brown stink bug and is represented by two subspecies. The nominate subspecies occurs in the southeastern U. S. and *E. servus euschistoides* (Vollenhoven) occurs across northern North America, with intergrade forms along a broad band extending from Maryland to Kansas (Sailer 1954). In Illinois, McPherson (1982) determined the entire state south of 40° 30'N (roughly equivalent to the northern border of Missouri) to be populated by intergrade forms, with *E. s. euschistoides* in the northern part of the state. The distribution of subspecies in Missouri should mirror that of the southern part of Illinois, with most specimens from throughout the state exhibiting combinations of characteristics of both subspecies. Thus, most specimens from Missouri are best referred to as *E. s. servus* - *E. s. euschistoides* intergrades.

The genus in Mesoamerica was revised by Rolston (1974). The biology of *E. servus* was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Information on laboratory life history and behavior were presented by Youther and McPherson (1975), life history, laboratory rearing, and descriptions of immature stages by Munyaneza and McPherson (1994), and mating behavior by Drickamer and McPherson (1992). In Missouri, nymphal stages and adults feed on *Verbascum* and other plants, and adults overwinter beneath mullein leaves and in grass clumps (Froeschner 1941). This species is very common throughout Missouri.

Euschistus tristigmus (Say)

Pentatoma tristigmus Say, 1831b: Descrip. Het. Hem. N. Am., p. 4.

Euschistus tristigma: Dallas, 1851, List. Hem. Brit. Mus. 1: 207.

Distribution. Nova Scotia and Florida west to Colorado (Froeschner 1988). Missouri records are from the City of St. Louis and 55 counties in all six Natural Divisions (MU, SEMO, UMDC).

Label data. Biological: *Commelina diffusa*, *Fraxinus pennsylvanicus* trunk, *Quercus velutina*, *Solidago* spp., alfalfa, black-eyed susan, buckeye, corn, fescue, grain sorghum, oak, red clover, red delicious apple tree, smartweed, soybeans, white clover, fallow unweeded field/forest, flowers, grass, herbage, meadow, riparian veg., tree edge, vegetation, weeds, wooded area, blacklight beside pond, blacklight, fluorescent light, light trap, malaise trap, mercury vapor light (MU); *Arundinaria gigantea* (SEM); pheromone trap (UMDC). Date extremes in Missouri: 28 February–26 October.

Discussion. This species is known commonly as the dusky stink bug and is represented by two subspecies. McPherson (1982) suggested that populations north of 41° N were *E. t. luridus* Dallas and those to the south were the nominate subspecies. He also provided a taxonomic key to distinguish them from each other and from congeners. The northern border of Missouri is at latitude 40° 35', thus, based on this geographic delineation, all specimens from Missouri are south of 41° latitude and should be the nominate subspecies. However, specimens from areas near the line, including the northern counties of Missouri, should be examined closely to determine to which subspecies they belong.

The genus in Mesoamerica was revised by Rolston (1974). The life history of *E. t. tristigmus* based on laboratory rearing and field observations were presented by McPherson (1975b) and mating behavior by Drickamer and McPherson (1992). The biology of *E. tristigmus* was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). McPherson (1974b, 1975a, 1976a, 1979c,e) and McPherson and Paskewitz (1982) conducted a series of controlled laboratory experiments on the effects of photoperiod on adult morphology. Adults of this species have been found feeding *Ambrosia* and adults and nymphs on *Quercus* and blackberries (Froeschner 1941).

Euschistus variolarius (Palisot)

Pentatoma variolaria Palisot de Beauvois, 1817: Ins. Rec. Afr. Am., p. 149.

Euschitus [sic] *punctipes*: Rathvon, 1869, Hist. Lanc. Co. Pa., p. 549.

Euschistus variolarius: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 26.

Distribution. Quebec and Florida west to British Columbia and Utah (Froeschner 1988). Missouri records are from the City of St. Louis and 93 counties in all six Natural Divisions.

Label data. Biological: *Aesculus*, *Aster*, *Baptisia alba*, *Baptisia leucantha*, *Bidens* at pond margin, *Lonicera japonica*, *Matricaria* sp, *Monarda futulosa*, *Rudbeckia*, *Salix* flowers, *Shrankia*, *Solidago*, *Verbascum thaspi*, *Verbascum*, *Zinnia*, adino clover, alfalfa, alsike, barley, cheat, corn, fescue, hickory tree, hop clover, milkweed, partridge pea, peaches, red clover, soybeans, timothy, wheat, white clover, winter cress, around pond, building wall (October), field with many types of weeds, glade, grass field, grass, ground vegetation, lake vegetation, meadow, native grass plot, prairie meadow, prairie, roadside vegetation, tree border at lawn, under bark of dead tree (Nov. 10), weeds, yellow flower, blacklight, light trap, lights, malaise trap, mercury vapor lt. (MU); tobacco budworm trap (UMDC). Date extremes in Missouri: 26 February–1 December.

Discussion. Comparative information on mating behavior was presented by Drickamer and McPherson (1992). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This very common and widespread species overwinters as adults under leaves and in grass clumps (Froeschner 1941).

***Halyomorpha halys* (Stål)**

Pentatoma halys Stål, 1855: Öfv. K. Svens. Vet.-Akad. Förh. 12(4): 182.

Halyomorpha picus: auctorum (nec Fabricius, 1794: 115).

Halyomorpha halys: Josifov and Kerzher, 1978, Frag. Faun. 23: 172.

Distribution. Maine to Florida west to Illinois (Zhu et al. 2012) and Mississippi, with a disjunct population in California, Oregon, and Washington. The sole Missouri record to date is from Maryland Heights, St. Louis County in the Ozark Border Natural Division.

Label data. Date of collection: 16 March 2012.

Discussion. *Halyomorpha halys* is known commonly as the brown marmorated stink bug. This invasive species is native to eastern Asia where it is known from approximately 300 host plant species and is a pest on tree fruits and soybeans (Nielsen and Hamilton 2009, and citations therein). It also is a nuisance pest as it enters homes in large numbers at the onset of cold weather (Hoebeke and Carter 2003). This species was introduced recently to Europe (Wermelinger et al. 2008) and New Zealand (Harris 2010). It was first found in the U. S. in Pennsylvania in 1996 (Hoebeke and Carter 2003) and its range in North America has been expanding rapidly. Nielsen and Hamilton (2009) reported on the life history of *H. halys* in the northeastern United States. The entire state of Missouri is in the area considered to be highly suitable for invasion by this species (Zhu et al. 2012). The first live specimen in Missouri, a female, was collected recently on a curb near an interstate highway near St. Louis. This is the first record of this species from Missouri.

***Holcostethus limbolarius* (Stål)**

Peribalus limbolarius Stål, 1872: K. Svens. Vet.-Akad. Handl. 10(4): 34.

Holcostethus limbolarius: Kirkaldy, 1909, Cat. Hem. 1: 48.

Distribution. Maine to Georgia west to British Columbia and Arizona (Froeschner 1988). Missouri records are from the City of St. Louis and 49 counties in all six Natural Divisions (MU, UMDC).

Label data. Biological: *Cleoma serrulata*, *Euthamia gymnospermoides*, *Solidago* & *Eupatorium*, alfalfa, bean, corn & bean, goldenrod, meadow goldenrod, meadow-smooth aster, red clover, wheat, white clover, brush & flower, fence row, garden turnip broccoli etc, grass, leaf litter, oak-hickory 2nd growth, prairie, red clover/fescue, blacklight, lights, malaise (MU); sugar beet (UMDC). Date extremes in Missouri: 14 January–7 December.

Discussion. The genus in North America was revised by McDonald (1974). Biological information was provided by Oetting and Yonke (1971c). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) considered this to be the second most common pentatomid species in the state. He reported that its host plants include *Solidago* and *Polygonum* and that it overwinters in protected places, such as under mullein leaves and in grass clumps.

***Hymenarcys nervosa* (Say)**

Pentatoma nervosa Say, 1831b: Descrip. Het. Hem. N. Am., p. 9.

Hymenarcys perpunctata Amyot and Serville, 1843: Hist. Nat. Ins. Hem., p. 124.

Hymenarcys nervosa: Walker, 1867, Cat. Hem. Het. Brit. Mus. 2: 283.

Distribution. Quebec to Florida west to Iowa and Texas (Froeschner 1988). Missouri records are from the City of St. Louis and 52 counties in all six Natural Divisions (MU, UMDC).

Label data. Biological: *Lespedeza*, *Verbascum*, alfalfa, blue grass, goldenrod, hop clover, low hop clover, mullein leaves, red clover, sweet clover, white clover, under bark (14 Apr.), under log (9 Apr.), vegetation, woods, Berlese sample, malaise, mercury vapor light (MU); weed (UMDC). Date extremes in Missouri: 7 January–3 December.

Discussion. The genus was reviewed by Rolston (1973). The biology of *H. nervosa* was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). In Missouri, this species overwinters as adults in grass clumps and under rocks and mullein leaves (Froeschner 1941).

Mcphersonarcys aequalis (Say)

Pentatoma aequalis Say, 1831b: Descrip. Het. Hem. N. Am., p. 7.

Hymenarcys aequalis: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 30.

Mcphersonarcys aequalis: Thomas, 2012, Gr. Lakes Ent. 45: 127.

Distribution. Massachusetts to Montana south to Florida, Texas, and Mexico (Froeschner 1988). Missouri records are from 12 counties in Ozark, Glaciated Plains, and Mississippi Lowlands Natural Divisions.

Label data. Biological: red clover, weeds, under bark (16 Nov.) (MU); under bark of standing tree (Feb.), weedy fields (Froeschner 1941). Date extremes in Missouri: 1 January–16 November.

Discussion. The genus (as *Hymenarcys*) was reviewed by Rolston (1973). Descriptions of immature stages and biology were given by Oetting and Yonke (1971b). The biology of this species was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982).

Mecidea major Sailer

Mecidea longula: Uhler, 1876, Bull. U.S. Geol. Geogr. Surv. Terr. 1: 283 (in part).

Mecidea major Sailer, 1952: Proc. U.S. Nat. Mus. 102: 478, 486.

Distribution. Most states in a line from Arizona to Illinois (Froeschner 1988). Missouri records are from 3 counties in Ozark, Ozark Border, and Osage Plains Natural Divisions.

Label data. Biological: grass field. Date extremes in Missouri: 10 September–10 October.

Discussion. Sailer (1952) reported this species from Missouri. Comparative laboratory rearing was presented by Bundy et al. (2005). Biology and distribution were reviewed by McPherson (1982).

Mecidea minor Ruckes

Mecidea longula: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 17 (in part).

Mecidea minor Ruckes, 1946a: Bull. Brook. Ent. Soc. 41: 87.

Distribution. South Dakota and Iowa southwest to California, Texas, and Mexico (Froeschner 1988).

Discussion. Sailer (1952) reported this species from Missouri. Comparative laboratory rearing was presented by Bundy et al. (2005), and life history and descriptions of immature stages by Bundy and McPherson (2011). Biology and distribution were reviewed by McPherson (1982). We have not seen specimens from Missouri and its inclusion here is based on Sailer (1952).

***Meneclis insertus* (Say)**

Pentatoma inserta Say, 1831b: Descrip. Het. Hem. N. Am., p. 6.

Meneclis insertus: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 31.

Distribution. Quebec to New Jersey west to California (Froeschner 1988). Missouri records are from 10 counties in Osage Plains, Ozark Border, and Big Rivers Natural Divisions (MU, UMDC).

Label data. Biological: sandy bank, light, light trap (MU); grass (UMDC). Date extremes in Missouri: 4 April–11 November.

Discussion. *Meneclis insertus* was described from specimens from Arkansas and Missouri. The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) reported this species usually is found in association with various oaks.

***Mormidea lugens* (Fabricius)**

Cimex lugens Fabricius, 1775: Syst. Ent., p. 716.

Mormidea lugens: Walker, 1868, Cat. Hem. Brit. Mus. 3: 551.

Distribution. Nova Scotia to Manitoba south to Florida, Texas and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 59 counties in Ozark, Ozark Border, Osage Plains, Glaciated Plains, and Mississippi Lowlands Natural Divisions.

Label data. Biological: alfalfa, fescue, hop clover, oak foliage, partridge pea, red clover, tall fescue, wheat, white clover, meadow, near pond, night sweeping native prairie, prairie, sweeping grasses, vegetation, weeds, malaise trap (MU); sugar beet (UMDC). Date extremes in Missouri: 28 January–10 December.

Discussion. Information on biology was provided by Oetting and Yonke (1971c) and McPherson (1974a). The biology of this species was reviewed by McPherson and Mohlenbrock (1976). Nymphs have been found in Missouri from June through August (Froeschner 1941).

***Murgantia histrionica* (Hahn)**

Strachia histrionica Hahn, 1834: Wanz. Ins. 2: 116.

Murgantia histrionica: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 37.

Distribution. Connecticut to California south to Florida and Mexico (Froeschner 1988). Missouri records are from 21 counties in all six Natural Divisions (MU, UMDC).

Label data. Biological: beans, cabbage, cleome, kale leaf, squash, turnips (MU); collards, mustard, sweeping weeds (UMDC). Date extremes in Missouri: 4 April–1 November (Froeschner 1941, MU).

Discussion. This species is known commonly as the harlequin bug and can be a serious pest of cabbage (Froeschner 1941). The biology and distribution were reviewed by McPherson (1982).

***Neottiglossa cavifrons* Stål**

Neottiglossa cavifrons Stål, 1872: K. Svens. Vet.-Akad. Handl. 10(4): 18.

Distribution. Oregon to Arizona east to Virginia and Georgia (Froeschner 1988). Missouri records are from the City of St. Louis and 13 counties in Ozark, Ozark Border, Glaciated Plains, and Mississippi Lowlands Natural Divisions.

Label data. Biological: white clover, prairie. Date extremes in Missouri: 6 May–27 October.

Discussion. This genus in North America was reviewed by Rider (1990). This species was reported from Missouri by Froeschner (1941) and Oetting and Yonke (1971c). Descriptions of immature stages and biological information was provided by Oetting and Yonke (1971c). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This species often is found with its congener, *N. sulcifrons*, but is slightly more numerous (Froeschner 1941).

Neottiglossa sulcifrons Stål

Neottiglossa sulcifrons Stål, 1872: K. Svens. Vet.-Akad. Handl. 10(4): 18.

Distribution. New Jersey to Georgia west to Utah and New Mexico (Froeschner 1988), and Canada (Scudder 2004). Missouri records are from 23 counties in all six Natural Divisions.

Label data. Biological: *Andropogon*, prairie, sandbar, malaise. Date extremes in Missouri: 1 May–1 December.

Discussion. This genus in North America was reviewed by Rider (1990). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This common species has been collected in Missouri from dry, weedy fields and open woods (Froeschner 1941).

Neottiglossa undata (Say)

Pentatoma undata Say, 1831b: Descrip. Het. Hem. N. Am., p. 8.

Neottiglossa undata: Uhler, 1871, Proc. Bost. Soc. Nat. Hist. 14: 395 (in part).

Distribution. British Columbia to Quebec south to California, Nebraska (Froeschner 1988) and North Carolina (Torre Bueno 1913). The sole Missouri record is from Columbia, Boone County in the Ozark Border Natural Division.

Label data. Biological: sweep. Date collected: 28 August 1989.

Discussion. The biology and distribution were reviewed by McPherson (1982). This specimen was determined by D. Rider as part of his 1990 review of North American species, and is the first record of this species from Missouri.

Oebalus pugnax (Fabricius)

Cimex pugnax Fabricius, 1775: Syst. Ent., p. 704.

Oebalus typhoeus: Stål, 1868, K. Svens. Vet.-Akad. Handl. 7(11): 27.

Oebalus pugnax: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 22.

Distribution. Connecticut to Florida west to Minnesota, Arizona, and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 47 counties in Ozark, Ozark Border, Osage Plains, Glaciated Plains, and Mississippi Lowlands Natural Divisions.

Label data. Biological: *Passiflora*, alfalfa, barley, hop clover, partridge pea, ragweed, red clover, rice, sorghum, timothy, white clover, bush & flower, grass, grass/shrub, meadow, prairie, roadside ditch, soybeans & corn, tall grass mating (1 Sept.), vegetation, weeds, blacklight, fluorescent light, light trap, malaise trap (MU); *Arundinaria gigantea* (SEMO); sugar beet, field margin, black cutworm trap, bollworm trap, bollworm pheromone trap, European corn borer trap, light trap, southwestern corn borer trap, soybean looper trap (UMDC). Date extremes in Missouri: 15 May–28 October (UMDC, SEMO).

Discussion. This species is known commonly as the rice stink bug and can reach population densities sufficiently high to cause economic damage to rice by reducing quality or yield. The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) reported that this species (as *Solubea pugnax*) tends to be more common in the southern counties of Missouri, that it was observed feeding on the grass *Setaria*, and that adults overwinter in grass clumps.

Parabrochymena arborea (Say)

Pentatoma arborea Say, 1825: J. Acad. Nat. Sci. Phila. 4: 311.

Parabrochymena arborea: Larivière, 1992, Mem. Ent. Soc. Can. 163: 7.

Distribution. Quebec to Florida west to Kansas, New Mexico, and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 22 counties in Ozark, Ozark Border, and Glaciated Plains Natural Divisions (MU, SEMO, UMDC).

Label data. Biological: *Quercus imbricaria* Mich., goldenrod, oak, pin oak, red delicious apple, picnic table, sandy bank, sweeping grass (MU); hybrid elm (UMDC). Date extremes in Missouri: 12 April–5 November (UMDC, SEMO).

Discussion. This species was described from Missouri (Say 1825). The biology (as *Brochymena arborea*) was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). This species was considered to be locally uncommon in Missouri by Froeschner (1941).

Piezodorus guildinii (Westwood)

Raphigaster guildinii Westwood, 1837: Hope Cat., p. 31.

Piezodorus guildingi [sic]: Uhler, 1894, Proc. Zool. Soc. Lond., p. 175.

Distribution. Argentina (Panizzi and Slansky 1985) north to New Mexico, Georgia (Froeschner 1988), and Missouri (Tindall and Fothergill 2011). Missouri records are from 2 counties in the Mississippi Lowlands Natural Division (Tindall and Fothergill 2011).

Label data. Biological: black light. Date extremes in Missouri: 10–11 October.

Discussion. This predominantly Neotropical species is known commonly as the redbanded stink bug and a pest on soybeans. Its biology and ecology on soybeans were studied by Arroyo and Kawamura (2003) and host plant information was provided by Panizzi and Slansky (1985). More recent accounts of this species on soybeans in the U. S. have been reported in Arkansas (Smith et al. 2009), Louisiana (Temple 2011), and Missouri (Tindall and Fothergill 2011).

Prionosoma podopioides Uhler

Prionosoma podopioides Uhler, 1863: Proc. Ent. Soc. Phila. 2: 364.

Distribution. Arizona to British Columbia east to Michigan and Illinois (Froeschner 1988). Missouri records are from 7 counties in Ozark, Ozark Border, Glaciated Plains, and Osage Plains Natural Divisions.

Label data. Date extremes in Missouri: 11 February–27 November (MU), and to December (Froeschner 1941).

Discussion. McPherson and Cuda (1975) caught an adult female and kept it alive in a mason jar for 1.5 months by feeding it *Plantago aristata* Michaux. The biology and distribution of this species were reviewed by McPherson (1982) and Wheeler (1988). Froeschner (1941) reported Missouri records of this scarce

species from fields and open woods where *P. aristata* was common, and that an adult was collected beneath bark in December.

***Proxys punctulatus* (Palisot)**

Halys punctulatus Palisot de Beauvois, 1817: Ins. Rec. Afr. Am., p. 188.

Proxys punctulatus: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 29.

Distribution. Pennsylvania and Missouri south to Florida, Texas (Froeschner 1988), and Brazil (Gomez and Mizell 2012). Missouri records are from 13 counties in Ozark, Ozark Border, Osage Plains, and Mississippi Lowlands Natural Divisions (MU, SEMO, UMDC).

Label data. Biological: blacklight, lights (MU); soybeans, soybean looper trap, UV trap (UMDC); Japanese beetle trap (Froeschner 1941). Date extremes in Missouri: 23 May–29 September.

Discussion. This species is known commonly as the black stink bug and was reported from Japanese beetle traps in St. Louis by Froeschner (1941). The life history and laboratory rearing of this species were reported by Vangieson and McPherson (1975). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982).

***Tepa vanduzeei* Rider**

Tepa vanduzeei Rider, 1986: J. N. Y. Ent. Soc. 94: 555.

Distribution. California to South Dakota south to Mexico (Froeschner 1988). The sole Missouri record is from Metz, Vernon County in the Osage Plains Natural Division.

Label data. Date collected in Missouri: 21 April 1940.

Discussion. The only known Missouri specimen is a paratype. This specimen originally was reported as *Thyanta rugulosa* (Say) (now *Tepa rugulosa*) by Froeschner (1941), and was revised by Rider (1986).

***Thyanta calceata* (Say)**

Pentatoma calceata Say, 1831b: Descrip. Het. Hem. N. Am., p. 8.

Thyanta calceata: Barber, 1911, J. N. Y. Ent. Soc. 19: 108.

Distribution. Virginia to Florida west to Texas (Froeschner 1988). Missouri records are from the City of St. Louis and 41 counties in all six Natural Divisions (MU, MDA, Rider and Chapin 1992).

Label data. Biological: *Commelina diffusa*, *Rhus aromaticus*, alfalfa, hop clover, low hop clover, red clover, timothy, flowers, grass, herbage, prairie, soybeans & corn, vegetation, light trap, malaise, mercury vapor light. Date extremes in Missouri: 4 April–7 November.

Discussion. The biology of this species was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). McPherson (1977a, 1978), and McPherson et al. (1983) conducted controlled laboratory experiments on the effects of photoperiod on adult morphology. The immature stages were described by Paskewitz and McPherson (1982) and data on seasonal dimorphism was presented by McPherson (1977b). Froeschner (1941) considered this species to be scarce in Missouri and that most specimens were collected from Ozark woods, although that was based on records from only 6 counties. The species appears to be widespread throughout the state based on records from current museum holdings.

Thyanta custator accerra McAtee

Cimex custator Fabricius, 1803: Syst. Rhyn. p. 164.

Thyanta custator: Stål, 1860, K. Svens. Vet.-Akad. Handl. 2(7): 58.

Thyanta custator var. *accerra* McAtee, 1919: Bull. Brook. Ent. Soc. 14: 16.

Distribution. Missouri records are from the City of St. Louis and 88 counties in all six Natural Divisions (MU, SEMO, UMDL).

Label data. Biological: *Acacia greggii*, *Chrysanthemum leucanthemum* L. flower, feeding on fruit of *Cirsium vulgare* (Shari) *tenore*, *Cleoma serrulata*, *Commelina diffusa*, *Gallardia aristata*, *Lespedeza*, *Medicago sativa* L., *Mirabilis nyctaginea*, *Rhus aromaticus*, *Rudbeckia*, *Thuja*, alfalfa, aster, blue grass, buckbrush, goldenrod, hop clover, low hop clover, marigold, partridge pea, peaches, red clover, soybeans, sweet clover, timothy, white clover, flowers, herbage, pasture, prairie, soybean & corn, sweeping flowers, sweeping grasses, vegetation, blacklight, incandescent light, light trap, lights, malaise, mercury vapor light (MU); mustard, soybeans with small pods, wheat, mixed sample from soybean and cotton, black cutworm [trap], blacklight for southwestern corn borer, bollworm trap, bollworm pher. trap (UMDL). Date extremes in Missouri: 4 April–11 December (MU, SEMO).

Discussion. This subspecies is known commonly as the redshouldered stink bug (McPherson 1982). There has been confusion regarding the taxonomy of *T. custator* and the status of what is now regarded as the subspecies *T. custator accerra* McAtee. The latter has been variously recognized as a variety of *T. custator*, a full species, and a subspecies of *T. pallidovirens* (Rider and Chapin 1992). The range of the nominate subspecies is along the Gulf and Atlantic coastlines and does not extend into Missouri. Thus, all specimens of *T. custator* from Missouri are *T. c. accerra*.

The biology (as *T. pallido-virens accerra*) was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution (as *T. accerra*) by McPherson (1982). Comparative information on mating behavior was presented by Drickamer and McPherson (1992). McPherson (1979d) conducted controlled laboratory experiments on the effects of photoperiod on adult morphology. Oetting and Yonke (1971c) provided supplemental rearing data based on Missouri specimens, reported parasitoids of this species in Missouri, and observed feeding on mullein, soybeans, and red clover. Oetting and Yonke (1971c) further reported that although *T. custator accerra* attacks some crops, its density does not reach economic injury levels. Froeschner (1941) considered this to be the most common stink bug in Missouri and reported that adults overwinter in grass clumps and under mullein leaves.

Trichopepla semivittata (Say)

Pentatoma semivittata Say, 1831b: Descrip. Het. Hem. N. Am., p. 9.

Trichopepla semivittata: Uhler, 1871, Proc. Bost. Soc. Nat. Hist. 14: 96.

Distribution. Quebec to Florida west to Colorado, Texas, and Mexico (Froeschner 1988). Missouri records are from the City of St. Louis and 30 counties in Ozark, Ozark Border, Osage Plains, Glaciated Plains, and Mississippi Lowlands Natural Divisions (MU, MDA).

Label data. Biological: *Eupatorium* & asters, alsike, alfalfa, meadow goldenrod, Queen Anne's lace, red clover, white aster, wild carrot, low woodland veg., garden turnip brussel sprouts, prairie, weeds (MU); JB [Japanese beetle] trap, USDA traps (MDA). Date extremes in Missouri: 27 April–26 October (MU), and to late November (Froeschner 1941).

Discussion. The genus in North America was revised by McDonald (1976). *T. semivittata* was reared in the laboratory on wild carrot (McPherson 1972).

The biology of this species was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). In Missouri, this species tends to be found only within 18 inches from the ground (Froeschner 1941).

SUBFAMILY – PODOPINAE

Amaurochrous brevitylus Barber and Sailer

Amaurochrous brevitylus Barber and Sailer, 1953: J. Wash. Acad. Sci. 43: 160.

Distribution. Massachusetts and Quebec south to Pennsylvania and west to Nebraska, Kansas, and Arizona (Froeschner 1988). Missouri records are from 7 counties in Glaciated Plains, Ozark Border, and Mississippi Lowland Natural Divisions (MU, SEMO).

Label data. Biological: prairie, under debris, light trap, malaise, sweep, vacuum sweep (MU); *Arundinaria gigantea* (SEMO). Date extremes in Missouri: 28 January–23 December.

Discussion. The turtle bugs were revised by Barber and Sailer (1953). The biology and distribution of this mostly northern species was reviewed by McPherson (1982). Although in Illinois *A. brevitylus* is known from only the northern half of the state, the few Missouri records are from throughout the state, including the bootheel. This is the first published account of this species from Missouri.

Amaurochrous cinctipes (Say)

Tetyra cinctipes Say, 1828: Phila. Mus. 3: plate 43.

Podops (Amaurochrous) cinctipes: Stål, 1872, K. Svens. Vet.-Akad. Handl. 10(4): 15.

Amaurochrous cinctipes: Schouteden, 1905, Gen. Ins. 30: 33.

Distribution. Quebec and South Carolina west to Nebraska and Texas (Froeschner 1988). Missouri records are from the City of St. Louis and 6 counties in the Glaciated Plains, Osage Plains, Ozark Border, and Mississippi Lowlands Natural Divisions.

Label data. Biological: hollow weeds, prairie, USDA traps (MU); Japanese beetle traps (Froeschner 1941). Date extremes in Missouri: 6 May–16 October.

Discussion. The turtle bugs were revised by Barber and Sailer (1953). This species was reared in the laboratory and immature stages were described by McPherson and Paskewitz (1984a). The biology was reviewed by McPherson and Mohlenbrock (1976) and biology and distribution by McPherson (1982). Froeschner (1941) reported this species occurs in low marshy areas or among weeds bordering bodies of water and that it is scarce in Missouri.

Species Of Possible Occurrence In Missouri

Chlorochroa belfragei Stål. This apparently northern species is considered rare and has been recorded from Canada, Illinois, Iowa, and Nebraska (McPherson 1982). Nothing is known about the life history of *C. belfragei*. In Missouri, its occurrence is most probable in the Glaciated Plains Natural Division.

Nezara viridula (Linnaeus). The southern green stink bug is a major pest of soybeans in the southeastern U. S. and is known from as far north as Pine Hills, Union County, Illinois (McPherson and Cuda 1974) and Oklahoma (Anonymous 1974). Its occurrence in the southern part of Missouri, especially in the Mississippi Lowlands Natural Division, is probable.

Acknowledgments

Foremost, we thank J. E. McPherson for his encouragement, insight, spirit, and friendship over many years. It is solely because of his influence on us that this paper was published. We thank Collin Wamsley and Sarah Phipps, Missouri Department of Agriculture, for access to their pentatomid collection and for donating the state record specimen of *Halyomorpha halys* to the Enns Entomology Museum. We also thank Kelly Tindall, University of Missouri Delta Center - Portageville, for providing records of pentatomids from the Delta Center collection, and Lisa Miehl for data collection from MU specimens. We are grateful to Richard Thom, Missouri Department of Conservation, and James Wilson, University of Missouri - St. Louis, for permission to reprint the Missouri Natural Divisions figure. We thank Donald B. Thomas, USDA - Kerrville, TX, and David A. Rider, University of North Dakota, for helpful comments during preparation of this manuscript.

Literature Cited

- Amyot, C. J. B., and A. Serville. 1843. Histoire Naturelle des Insectes. Hémiptères. Librairie Encyclopedique de Roret ed., Paris, lxxvi + 675 pp.
- Anonymous. 1974. Detection. U.S.D.A. Cooperative Economic Insect Report 23(13): 171.
- Araujo e Silva, A. G. 1933. Contribuição para o estudo da biologia de tres pentatomideos. Ocampo 4: 23–25.
- Arroyo, L., and N. Kawamura. 2003. Biología y ecología de *Piezodorus guildinii* Westwood en soya. Artículos de Investigación, Centro Tecnológico Agropecuario en Bolivia 2: 3–6.
- Barber, H. G. 1911. The resurrection of *Thyanta calceata* Say from synonymy. Journal of the New York Entomological Society 19: 108–112.
- Barber, H. G., and R. I. Sailer. 1953. A revision of the turtle bugs of North America (Hemiptera: Pentatomidae). Journal of the Washington Academy of Sciences 43: 150–162.
- Barton, H. E., and L. A. Lee. 1981. The Pentatomidae of Arkansas. Proceedings of the Arkansas Academy of Science 35: 20–25.
- Bergroth, E. 1891. Contributions à l'étude des Pentatomoides. Revue d'Entomologie 10: 200–235.
- Blatchley, W. S. 1926. Heteroptera, or true bugs of eastern North America, with especial reference to the faunas of Indiana and Florida. The Nature Publishing Co., Indianapolis, 1116 pp.
- Bliven, B. P. 1955. Studies on insects of the Redwood Empire 1. Private Publication, Eureka, California, pp. 1–27.
- Bundy, C. S., and J. E. McPherson. 2011. Life history and laboratory rearing of *Mecidea minor* (Hemiptera: Heteroptera: Pentatomidae), with descriptions of immature stages. Annals of the Entomological Society of America 104: 605–612.
- Bundy, C. S., J. E. McPherson, and P. F. Smith. 2005. Comparative laboratory rearing of *Mecidea major* and *M. minor* (Heteroptera: Pentatomidae). Journal of Entomological Science 40: 291–294.
- Buxton, G. M., D. B. Thomas, and R. C. Froeschner. 1983. Revision of the species of the *sayi*-group of *Chlorochroa* Stål (Hemiptera: Pentatomidae). Occasional Papers in Entomology (Sacramento) 29: 23 pp.
- Coudron, T. A., and Y. Kim. 2004. Life history and cost analysis for continuous rearing of *Perillus bioculatus* (Heteroptera: Pentatomidae) on a zoophylogenous artificial diet. Journal of Economic Entomology 97: 807–812.
- Cuda, J. P., and J. E. McPherson. 1976. Life history and laboratory rearing of *Brochymena quadripustulata* with descriptions of immature stages and additional notes on *Brochymena arborea* (Hemiptera: Pentatomidae). Annals of the Entomological Society of America 69: 977–983.

- Dallas, W. S. 1851.** List of specimens of hemipterous insects in the collection of the British Museum, Pt. 1. Taylor & Francis, London. pp. 1–368, pls. 1–11.
- DeCoursey, R. M. 1963.** The life histories of *Banasa dimidiata* and *Banasa calva* (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* 56: 687–693.
- DeGeer, C. 1773.** Mémoires pour servir à l'histoire des insectes. Vol. 3. Pierre Hesselberg, Stockholm, 696 pp.
- Drickamer, L. C., and J. E. McPherson. 1992.** Comparative aspects of mating behavior patterns in six species of stink bugs (Heteroptera: Pentatomidae). *The Great Lakes Entomologist*. 25[1993]: 287–295.
- Evans, E. W. 1982.** Habitat differences in feeding habits and body size of the predatory stinkbug *Perillus circumcinctus* (Hemiptera: Pentatomidae). *Journal of the New York Entomological Society*. 90: 129–133.
- Fabricius, J. C. 1775.** *Systema Entomologiae, sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus.* Officina Libraria Kortii, Flensburgi et Lipsiae. xxx + 832 pp.
- Fabricius, J. C. 1794.** *Entomologia systematica emendata et aucta, secundum classes, ordines, genera, species, adiectis synonymis, locis, observationibus, descriptionibus.* Hafniae, Proft. 8. Bd. IV: 1–472.
- Fabricius, J. C. 1803.** *Systema Rhyngotorum secundum ordines, genera, species adiectis synonymis, locis, observationibus, descriptionibus.* C. Reichard, Brunsvigae, x + 335 pp.
- Franz, J. M. 1961.** Biological control of pest insects in Europe. *Annual Review of Entomology* 6: 183–200.
- Froeschner, R. C. 1941.** Contributions to a synopsis of the Hemiptera of Missouri. Pt. 1, Scutelleridae, Podopidae, Pentatomidae, Cydnidae, Thyreocoridae. *The American Midland Naturalist* 26: 122–146.
- Froeschner, R. C. 1988.** Family Pentatomidae Leach, 1815. The stink bugs, pp. 544–597. *In* T. J. Henry, and R. C. Froeschner (eds.), *Catalog of the Heteroptera, or True Bugs, of Canada and the Continental United States.* E. J. Brill, New York. 958 pp.
- Furth, D. G. 1974.** The stink bugs of Ohio (Hemiptera: Pentatomidae). *Bulletin of the Ohio Biological Survey* 5: 1–60.
- Gates, D. E., and L. L. Peters. 1962.** Insects in Kansas. Kansas State University Extension Service B-94: 1–307.
- Gmelin, J. F. 1790.** *Caroli a Linné, systema naturae.* Tome I, Pars IV: 1517–2224. Lipsiae.
- Gomez, C., and R. F. Mizell III. 2012.** Black stink bug *Proxys punctulatus* (Palisot) (Insecta: Hemiptera: Pentatomidae). University of Florida Extension, EENY-432, pp. 1–3.
- Hahn, C. W. 1834.** *Die Wanzenartigen Insekten.* C. H. Zeh'schen Buchhandlung, Nürnberg 2: 101–120.
- Harris, A. C. 2010.** *Halyomorpha halys* (Hemiptera: Pentatomidae) and *Protaetia brevitarsis* (Coleoptera: Scarabaeidae: Cetoniinae) intercepted in Dunedin. *The Weta* 40: 42–44
- Harris, H. M., and H. G. Johnston. 1936.** A new genus and species of Podopidae and a new *Coenus* (Hemiptera: Scutelleroideae [sic]). *Iowa State College Journal of Science* 10: 377–380.
- Hart, C. A. 1919.** The Pentatomoidea of Illinois with keys to the Nearctic genera. *Illinois Natural History Survey Bulletin* 13: 157–223.
- Herrich-Schäffer, G.A.W. 1853.** *Die Wanzenartigen Insekten.* C. H. Zeh'schen Buchhandlung, Nürnberg 9(6): 257–348.

- Hoebeke, E. R., and M. E. Carter. 2003.** *Halyomorpha halys* (Stål) (Heteroptera: Pentatomidae): A polyphagous plant pest from Asia newly detected in North America. *Proceedings of the Entomological Society of Washington* 105: 225–237.
- Hoffman, R. L. 1971.** The insects of Virginia: no. 4. Shield bugs (Hemiptera; Scutellerodea: Scutelleridae, Corimelaenidae, Cydnidae, Pentatomidae). *Virginia Polytechnic Institute Research Division Bulletin* 67: 1–61.
- Hoffman, R. L. 2005.** The Virginia species of *Banasa*, three decades later (Heteroptera: Pentatomidae). *Banisteria* 25: 41–44.
- Horváth, G. 1908.** Remarques sur quelques Hémiptères de l'Amérique du Nord. *Annales Musei Nationales Hungarici* 6: 555–569.
- Jones, P. A., and H. C. Coppel. 1963.** Immature stages and biology of *Apateticus cynicus* (Say) (Hemiptera: Pentatomidae). *The Canadian Entomologist* 95: 770–779.
- Josifov, M. V., and I. M. Kerzhner. 1978.** Heteroptera aus Korea. II. Teil (Aradidae, Berytidae, Lygaeidae, Pyrrhocoridae, Rhopalidae, Alydidae, Coreidae, Urostylidae, Acanthosomatidae, Scutelleridae, Pentatomidae, Cydnidae, Plataspidae). *Fragmenta Faunistica* 23(9): 137–196.
- Kirkaldy, G. W. 1909.** Catalogue of the Hemiptera (Heteroptera) with biological and anatomical references, lists of foodplants and parasites, etc. Vol. I. Cimicidae. Berlin, xl + 392 pp.
- Larivière, M.-C. 1992.** Description of *Parabrochymena*, new genus, and redefinition and review of *Brochymena* Amyot and Audinet-Serville (Hemiptera: Pentatomidae), with considerations on natural history, chorological affinities, and evolutionary relationships. *Memoirs of the Entomological Society of Canada* 163: 1–75.
- LeConte, J. L., Jr. 1859.** The complete writings of Thomas Say on the Entomology of North America. Bailliere Brothers, New York. 2 volumes, 1: 1–412, 2: 1–814.
- Linnaeus, C. von. 1763.** *Centuria insectorum rariorum*. Upsaliae, 6 + 32 pp.
- Linnaeus, C. von. 1767.** *Systema naturae per regna tria naturae secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Editio duodecima, reformata. Hemiptera, 1(2): 687–743.
- McAtee, W. L. 1919.** Notes on Nearctic Heteroptera. *Bulletin of the Brooklyn Entomological Society* 14: 8–16.
- McDonald, F.J.D. 1974.** Revision of the genus *Holcostethus* in North America (Hemiptera: Pentatomidae). *Journal of the New York Entomological Society* 82: 245–258.
- McDonald, F.J.D. 1976.** Revision of the genus *Trichopepla* (Hemiptera: Pentatomidae) in N. America. *Journal of the New York Entomological Society* 84: 9–22.
- McDonald, F.J.D. 1986.** Revision of *Cosmopepla* Stål (Hemiptera: Pentatomidae). *Journal of the New York Entomological Society* 94: 1–15.
- McPherson, J. E. 1970.** A key and annotated list of the Scutellerodea of Michigan (Hemiptera). *The Michigan Entomologist* 3: 34–63.
- McPherson, J. E. 1972.** Laboratory rearing of *Trichopepla semivittata* (Hemiptera: Pentatomidae) on wild carrot. *Annals of the Entomological Society of America* 65: 985–987.
- McPherson, J. E. 1974a.** Notes on the biology of *Mormidea lugens* and *Euschistus politus* (Hemiptera: Pentatomidae) in southern Illinois. *Annals of the Entomological Society of America* 67: 940–942.
- McPherson, J. E. 1974b.** Photoperiod effects in a southern Illinois population of the *Euschistus tristigmus* complex (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* 67: 943–952.
- McPherson, J. E. 1975a.** Effects of developmental photoperiod on adult morphology in *Euschistus tristigmus tristigmus* (Say) (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* 68: 1107–1110.

- McPherson, J. E. 1975b.** Life history of *Euschistus tristigmus tristigmus* (Hemiptera: Pentatomidae) with information on adult seasonal dimorphism. *Annals of the Entomological Society of America* 68: 333–334.
- McPherson, J. E. 1976a.** Effects of photoperiod on a population of *Euschistus tristigmus* (Hemiptera: Pentatomidae) from Storrs, CT. *Annals of the Entomological Society of America* 69: 691–694.
- McPherson, J. E. 1976b.** Notes on the biology of *Cosmopepla bimaculata* (Hemiptera: Pentatomidae) in southern Illinois. *Transactions of the Illinois State Academy of Science* 9: 362–366.
- McPherson, J. E. 1976c.** The first record in Illinois of *Brochymena punctata punctata* (Hemiptera: Pentatomidae). *Transactions of the Illinois State Academy of Science* 69: 281–282.
- McPherson, J. E. 1977a.** Effects of developmental photoperiod on adult color and pubescence in *Thyanta calceata* (Hemiptera: Pentatomidae) with information on ability of adults to change color. *Annals of the Entomological Society of America* 70: 373–376.
- McPherson, J. E. 1977b.** Notes on the biology of *Thyanta calceata* (Hemiptera: Pentatomidae) with information on adult seasonal dimorphism. *Annals of the Entomological Society of America* 70: 370–372.
- McPherson, J. E. 1978.** Sensitivity of immature *Thyanta calceata* (Hemiptera: Pentatomidae) to photoperiod as reflected by adult color and pubescence. *The Great Lakes Entomologist* 11: 71–76.
- McPherson, J. E. 1979a.** Additions and corrections to the list of Michigan Pentatomoidea (Hemiptera). *The Great Lakes Entomologist* 12: 27–29.
- McPherson, J. E. 1979b.** A revised list of the Pentatomoidea of Illinois (Hemiptera). *The Great Lakes Entomologist* 12: 91–98.
- McPherson, J. E. 1979c.** Effects of continuous and split developmental photophases during each 24 hour period on adult morphology in *Euschistus tristigmus tristigmus* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 12: 79–81.
- McPherson, J. E. 1979d.** Effects of various photoperiods on color and pubescence in *Thyanta pallidovirens accerra* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 12: 83–84.
- McPherson, J. E. 1979e.** Effects of various photoperiods on morphology in *Euschistus tristigmus tristigmus* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 12: 23–26.
- McPherson, J. E. 1980a.** A list of the prey species of *Podisus maculiventris* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 13: 17–24.
- McPherson, J. E. 1980b.** The first report of the occurrence of *Brochymena carolinensis* in Missouri (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 13: 168.
- McPherson, J. E. 1982.** The Pentatomoidea (Hemiptera) of northeastern North America with emphasis on the fauna of Illinois. Southern Illinois University Press, Carbondale.
- McPherson, J. E., and D. L. Tecic. 1997.** Notes on the life histories of *Acrosternum hilare* and *Cosmopepla bimaculata* (Heteroptera: Pentatomidae) in southern Illinois. *The Great Lakes Entomologist* 30: 79–84.
- McPherson, J. E., and J. P. Cuda. 1974.** The first record in Illinois of *Nezara viridula* (Hemiptera: Pentatomidae). *Transactions of the Illinois State Academy of Science* 67: 461–462.
- McPherson, J. E., and J. P. Cuda. 1975.** The first record in Illinois of *Prionosoma podopioides* (Hemiptera: Pentatomidae). *Journal of the Kansas Entomological Society* 48: 371–373.
- McPherson, J. E. and R. H. Mohlenbrock. 1976.** A list of the Scutelleroidea of the La Rue-Pine Hills Ecological Area with notes on biology. *The Great Lakes Entomologist* 9: 125–169.

- McPherson, J. E. and R. M. McPherson. 2000.** Stink Bugs of economic importance in America north of Mexico. CRC Press, Boca Raton, 253 pp.
- McPherson, J. E., and S. M. Paskewitz. 1982.** Effects of various split developmental photophases and constant light during each 24-hour period on adult morphology in *Euschistus tristigmus tristigmus* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 15: 159–161.
- McPherson, J. E., and S. M. Paskewitz. 1984a.** Laboratory rearing of *Amaurochrous cinctipes* (Hemiptera: Pentatomidae: Podopinae) with descriptions of immature stages. *Journal of the New York Entomological Society* 92: 61–68.
- McPherson, J. E., and S. M. Paskewitz. 1984b.** Life history and laboratory rearing of *Euschistus ictericus* (Hemiptera: Pentatomidae), with descriptions of immature stages. *Journal of the New York Entomological Society* 92: 53–60.
- McPherson, J. E., T. E. Vogt, and S. M. Paskewitz. 1983.** Effects of various split developmental photophases and constant light during each 24-hour period on adult morphology in *Thyanta calceata* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 16: 43–46.
- Munyaneza, J., and J. E. McPherson. 1994.** Comparative study of life histories, laboratory rearing, and immature stages of *Euschistus servus* and *Euschistus variolarius* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 26: 263–274.
- Nielsen, A. L., and G. C. Hamilton. 2009.** Life history of the invasive species *Halyomorpha halys* (Hemiptera: Pentatomidae) in northeastern United States. *Annals of the Entomological Society of America* 102: 608–616.
- Oetting, R. D., and T. R. Yonke. 1971a.** Immature stages and biology of *Podisus placidus* and *Stiretrus fimbriatus* (Hemiptera: Pentatomidae). *The Canadian Entomologist* 103: 1505–1516.
- Oetting, R. D., and T. R. Yonke. 1971b.** Immature stages and biology of *Hymenarcys nervosa* and *H. aequalis* (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* 64: 1289–1296.
- Oetting, R. D., and T. R. Yonke. 1971c.** Biology of some Missouri stink bugs. *Journal of the Kansas Entomological Society* 44: 446–459.
- Oetting, R. D., and T. R. Yonke. 1975.** Immature stages and notes on the biology of *Euthyrhynchus floridanus* (L.) (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* 68: 659–662.
- Paiero, S. M., S. A. Marshall, and K. G. A. Hamilton. 2003.** New records of Hemiptera from Canada and Ontario. *Journal of the Entomological Society of Ontario* 134: 115–129.
- Palisot de Beauvois, A.M.F.J. 1817.** Insectes recueillis en Afrique et en Amérique, dans les royaumes d'Oware et de Benin, a Saint-Domingue et dans les États-Unis pendant les années 1786–1797. Imprimerie de Fain et Compagnie, Paris, Parts 9–10: 137–172.
- Panizzi, A. R., and F. Slansky, Jr. 1985.** Review of phytophagous pentatomids (Hemiptera: Pentatomidae) associated with soybean in the Americas. *Florida Entomologist* 68: 184–214.
- Paskewitz, S. M., and J. E. McPherson. 1982.** Descriptions of nymphal instars of *Thyanta calceata* (Hemiptera: Pentatomidae). *The Great Lakes Entomologist* 15: 231–235.
- Prebble, M. L. 1933.** The biology of *Podisus serieventris* Uhler in Cape Breton, Nova Scotia. *The Canadian Journal of Research* 9: 17–30.
- Rathvon, S. S. 1869.** Introduction and Hemiptera, pp. 521–523, 548–552. *In* Mombert, J. I. (ed.), *Authentic History of Lancaster County in the State of Pennsylvania*. J. E. Barr & Co., Lancaster, PA.
- Richman, D. B., and F. W. Mead. 2011.** Predatory stink bug, *Alcaeorrhynchus grandis* (Dallas) (Hemiptera: Pentatomidae). *University of Florida, Institute of Food and Agricultural Sciences EENY-165: 1–3.*

- Richman, D. B., and W. H. Whitcomb. 1978.** Comparative life cycles of four species of predatory stink bugs. *Florida Entomologist* 61: 113–118.
- Rider, D. A. 1986.** A new species and new synonymy in the genus *Tepa* Rolston and McDonald (Hemiptera: Pentatomidae). *Journal of the New York Entomological Society* 94: 552–558.
- Rider, D. A. 1990.** Review of the New World species of the genus *Neottiglossa* Kirby (Heteroptera: Pentatomidae). *Journal of the New York Entomological Society* 97[1989]: 394–408.
- Rider, D. A. 1996.** Review of the genus *Coenus* Dallas, with the description of *C. explanatus*, new species (Heteroptera: Pentatomidae). *Journal of the New York Entomological Society* 103[1995]: 39–47.
- Rider, D. A., and J. B. Chapin. 1992.** Revision of the genus *Thyanta* Stål, 1862 (Heteroptera: Pentatomidae) II. North America, Central America, and the West Indies. *Journal of the New York Entomological Society* 100: 42–98.
- Rolston, L. H. 1973.** A review of *Hymenarcys* (Hemiptera: Pentatomidae). *Journal of the New York Entomological Society* 81: 111–117.
- Rolston, L. H. 1974.** Revision of the genus *Euschistus* in middle America (Hemiptera, Pentatomidae, Pentatomini). *Entomologia Americana* 48: 1–102.
- Ruckes, H. 1946a.** *Mecidea minor*, a new species of pentatomid from New Mexico. *Bulletin of the Brooklyn Entomological Society* 41: 86–88.
- Ruckes, H. 1946b.** Notes and keys on the genus *Brochymena* (Pentatomidae, Heteroptera). *Entomologia Americana* 26: 143–238.
- Sailer, R. I. 1952.** A review of the stink bugs of the genus *Mecidea*. *Proceedings of the United States National Museum* 102(3309): 471–505.
- Sailer, R. I. 1954.** Interspecific hybridization among insects with a report on crossbreeding experiments with stink bugs. *Journal of Economic Entomology* 47: 377–383.
- Say, T. 1825.** Descriptions of new hemipterous insects collected in the expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under command of Major Long. *Journal of the Academy of Natural Sciences of Philadelphia* 4: 307–345.
- Say, T. 1828.** American entomology, or descriptions of the insects of North America. Volume 3, Philadelphia Museum (unpaginated).
- Say, T. 1831a.** Descriptions of new species of North American insects, found in Louisiana by Joseph Barabino. New Harmony, Indiana, School Press, pp. 3–19.
- Say, T. 1831b.** Descriptions of new species of heteropterous Hemiptera of North America. New Harmony, Indiana 39 pp.
- Schouteden, H. 1905.** Heteroptera Fam. Pentatomidae. Subfam. Graphosomatinae, pp. 1–46, 3 pls. In M. P. Wytzman (ed.), *Genera Insectorum*, fascicule 30, Brussels.
- Schwertner, C. F., and J. Grazia. 2006.** Descriçao de seis species de *Chinavia* (Hemiptera, Pentatomidae, Pentatominae) da America do Sul. *Iheringia Serie Zoologica Porto Alegre* 96: 237–248.
- Scudder, G. G. E. 2004.** Heteroptera (Hemiptera: Prosorrhyncha) new to Canada. Part 2. *Journal of the Entomological Society of British Columbia* 101: 125–129.
- Smith, J. F., R. G. Lutrell, and J. K. Greene. 2009.** Seasonal abundance, species composition, and population dynamics of stink bugs in production fields of early and late soybean in south Arkansas. *Journal of Economic Entomology* 102: 229–236.
- Stål, C. 1855.** Nya Hemiptera. Öfversigt af Kongelige Svenska Vetenskaps-Akademien Förhandler 12(4): 181–192.
- Stål, C. 1860.** Bidrag till Rio Janeiro-traktens, Hemipter-fauna. *Kongelige Svenska Vetenskaps-Akademien Handlingar* 2(7)[1858]: 1–84.

- Stål, C. 1862.** Hemiptera Mexicana enumeravit species-que novas descripsit. Stetin Entomologische Zeitung 23(1-3): 81-118.
- Stål, C. 1867.** Bidrag till Hemipterernas Systematik. Öfversigt af Kongelige Svenska Vetenskaps-Akademien Förhandler 24(7): 491-560.
- Stål, C. 1868.** Hemiptera Fabriciana. Fabricianska Hemipterater efter de i Köpenhaven och Kiel förvarade typexemplaren granskade och beskrifne. Kongelige Svenska Vetenskaps-Akademien Handlingar 7(11): 1-148.
- Stål, C. 1870.** Enumeratio Hemipterorum. Bidrag till en företeckning öfver alla hittils kända Hemiptera, Jemte Systematiska meddelanden. 1. Kongelige Svenska Vetenskaps-Akademien Handlingar 9(1): 1-232.
- Stål, C. 1872.** Enumeratio Hemipterorum. Bidrag till en förteckning öfver alla hittils kända Hemiptera, Jemte Systematiska meddelanden. 2. Kongelige Svenska Vetenskaps-Akademien Handlingar, Stockholm 10(4): 1-159.
- Stoner, D. 1920.** The Scutelleroidea of Iowa. University of Iowa Studies in Natural History 8: 1-140.
- Temple, J. H. 2011.** Redbanded stink bug, *Piezodorus guildinii* (Westwood): Pest status, control strategies, and management in Louisiana soybean. Ph. D. dissertation, Louisiana State University. Xii + 135 p.
- Thom, R. H., and J. H. Wilson. 1980.** The natural divisions of Missouri. Transactions of the Missouri Academy of Science 14: 9-23.
- Thomas, D. B. 1983.** Taxonomic status of the genera *Chlorochroa* Stål, *Rhytidilomia* Stål, *Uodermion* Kirkaldy, and *Pitedia* Reuter, and their included species (Hemiptera: Pentatomidae). Annals of the Entomological Society of America 76: 215-224.
- Thomas, D. B. 1992.** Taxonomic synopsis of the asopine Pentatomidae (Heteroptera) of the Western Hemisphere. Entomological Society of America (Thomas Say Monograph) 16: 1-156.
- Thomas, D. B. 2012.** *Mepheronarcys* a new genus for *Pentatoma aequalis* Say (Heteroptera: Pentatomidae). The Great Lakes Entomologist 45: 127-133.
- Thomas, D. B. and T. R. Yonke. 1981.** A review of the Nearctic species of the genus *Banasa* Stål (Hemiptera: Pentatomidae). Journal of the Kansas Entomological Society 54: 233-248.
- Tindall, K. V., and K. Fothergill. 2011.** First records of *Piezodorus guildinii* in Missouri. Southwestern Entomologist 36: 203-205.
- Torre-Bueno, J. R. de la. 1903.** A preliminary list of the Pentatomidae within fifty miles of New York. Journal of the New York Entomological Society 11: 128-129.
- Torre Bueno, J. R. de la. 1913.** Some heteropterous Hemiptera from Southern Pines, N. C. The Canadian Entomologist 45: 57-60.
- Uhler, P. R. 1861.** Descriptions of a few new species of Hemiptera, and observations upon some already described. Proceedings of the Entomological Society of Philadelphia 1(1): 21-24.
- Uhler, P. R. 1863.** Hemipterological contributions. - No. 2. Proceedings of the Entomological Society of Philadelphia 2: 361-366.
- Uhler, P. R. 1870.** (untitled). American Entomologist 2: 203.
- Uhler, P. R. 1871.** Notices of some Heteroptera in the collection of Dr. T. W. Harris. Proceedings of the Boston Society of Natural History 14: 93-109.
- Uhler, P. R. 1876.** List of the Hemiptera of the region west of the Mississippi River, including those collected during the Hayden explorations of 1873. Bulletin of the United States Geological and Geographical Survey of the Territories 1: 267-361.

- Uhler, P. R. 1877.** Report upon the insects collected by P. R. Uhler during the explorations of 1875, including monographs of the families Cydnidae and Saldae, and the Hemiptera collected by A. S. Packard, Jr., M. D. Bulletin of the United States Geological and Geographical Survey of the Territories 3(2): 355–475, 765–801.
- Uhler, P. R. 1894.** On the Hemiptera-Heteroptera of the Island of Grenada, West Indies. Proceedings of the Zoological Society of London, pp. 167–224.
- Uhler, P. R. 1897.** In: A. H. Kirkland, Notes on predaceous Heteroptera with Prof. Uhler's description of two species. The Canadian Entomologist 29: 115–118.
- Van Duzee, E. P. 1909.** Synonymical and descriptive notes on North American Heteroptera. The Canadian Entomologist 41: 369–375.
- Van Duzee, E. P. 1917.** Catalogue of the Hemiptera of America, north of Mexico excepting the Aphididae, Coccidae and Aleurodidae. University of California Publications: Technical Bulletins. Entomology 2: 1–902.
- Vangeison, K. W., and J. E. McPherson. 1975.** Life history and laboratory rearing of *Proxys punctulatus* (Hemiptera: Pentatomidae) with descriptions of immature stages. Annals of the Entomological Society of America 68: 25–30.
- Waddill, V., and M. Shepard. 1974.** Biology of a predaceous stink bug, *Stiretrus anchorago*, (Hemiptera: Pentatomidae). Florida Entomologist 57: 249–253.
- Walker, F. 1867.** Catalogue of the specimens of Hemiptera-Heteroptera in the collection of the British Museum. Part II. E. Newman, London, pp. 241–417.
- Walker, F. 1868.** Catalogue of the specimens of Hemiptera Heteroptera in the collection of the British Museum. Part III. E. Newman, London, pp. 418–599.
- Wermelinger B., D. Wyniger, and B. Forster. 2008.** First records of an invasive bug in Europe: *Halyomorpha halys* Stål (Heteroptera: Pentatomidae), a new pest on woody ornamentals and fruit trees? Mitteilungen der Schweizerische Entomologische Gesellschaft 81: 1–8.
- Westwood, J. O. 1837.** In: Hope, F. W., A catalogue of Hemiptera in the collection of the Rev. F. W. Hope, M. A. with short Latin diagnoses of the new species. London, Pt. 1: 46 pp.
- Wittmeyer, J. L., and T. A. Coudron. 2001.** Life table parameters, reproductive rate, intrinsic rate of increase, and estimated cost of rearing *Podisus maculiventris* (Heteroptera: Pentatomidae) on an artificial diet. Journal of Economic Entomology 94: 1344–1352.
- Wheeler, A. G., Jr. 1988.** First southeastern U.S. records of the western heteropterans *Prionosoma podopioides* (Pentatomidae) and *Aufeius impressicollis* (Rhopalidae), with a review of distribution and host plants. Journal of the New York Entomological Society 96: 304–309.
- Youther, M. L., and J. E. McPherson. 1975.** A study of fecundity, fertility, and hatch in *Euschistus servus* (Hemiptera: Pentatomidae) with notes on precopulatory and copulatory behavior. Transactions of the Illinois State Academy of Science 68: 321–338.
- Zhu, G. W. Bu, Y. Gao, and G. Liu. 2012.** Potential geographic distribution of brown marmorated stink bug invasion (*Halyomorpha halys*). PLoS ONE 7(2): 1–10, e31246.
- Zimmer, J. T. 1911.** The Thyreocoridae and Pentatomidae of Nebraska. ETD collection for University of Nebraska - Lincoln, 251 pp.