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A Synopsis of the Damsel Bugs (Heteroptera: Nabidae) of Michigan

D. R. Swanson¹

Abstract

An overview of the 13 species of Nabidae found in Michigan is presented, along with an identification key, distribution maps, and relevant literature. New state records for *Himacerus major* (Costa) (Nabinae), *Metatropiphorus belfragii* Reuter (Nabinae), *Nabis Americolimbatus* (Carayon) (Nabinae), and *Pagasa fusca* (Stein) (Prostemmatinae) are included.

The Nabidae are a family of predaceous true bugs comprising 41 species in 9 genera in the United States (Kerzhner and Henry 2008). Although not a particularly speciose group, the family displays high rates of natural (and passive) vagility, and non-native species constitute approximately 12% of the fauna of America north of Mexico. These insects also have been the focus of extensive biological control studies in agroecosystems, particularly for their proclivity for feeding on pestiferous species; Braman (2000) provided an extensive bibliography of such studies.

The group has been marked by a particularly tumultuous level of generic classification, brought about by the elevation and demotion of subgeneric names. This flux contributes to the already difficult process of identifying nabids, particularly those of the nominate genus. In the family, a high incidence of wing polymorphism, great variation in color development, and a paucity of non-genital taxonomic characters in the external morphology also have increased the difficulty in species delimitation and subsequent identification.

The group never has been treated in Michigan. O'Brien (1983, 1988) enumerated the relevant sources of information for the terrestrial arthropods of Michigan. Of these references, Townsend (1890) listed the Heteroptera found in the vicinity of Constantine (Saint Joseph County); Hussey (1921) subsequently clarified some of these records. Hussey (1922) also catalogued the Heteroptera of several different habitats found in Berrien County.

To augment the knowledge of the Michigan Heteroptera, the author herein presents the results of his study of the Nabidae of Michigan.

Materials and Methods

The author examined the nabid holdings of the two major university collections in southern Michigan. County records were compiled, identification keys were modified, and the existing natural history information, both Michiganian and extralimital, was summarized.

The identification of the 1,480 specimens included in this study was rendered or confirmed by the author, and all specimens reside in one of the collections listed below unless otherwise noted. Collection dates indicate the earliest and latest adults examined and refer specifically to specimens collected in

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Michigan. Locations of Michigan counties from which specimens were collected are depicted in Figure 1. In the few instances where it is provided, label data are not transcribed verbatim, but locality information is included in its entirety.

The habitus plates (Figs. 2, 3) are intended to provide a visual reference for the abundance of forms found in a family marked by a dearth of visual representation in past treatments. However, several species may be separated only by genitalic characters; thus, comparison with the plates will not serve as a replacement for keying out specimens.



Figure 1. The counties of the State of Michigan.

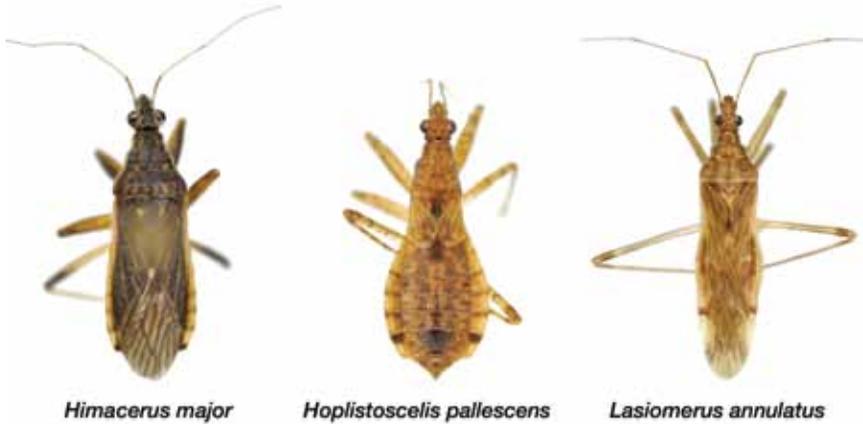


Figure 2. Nabidae of Michigan, dorsal habitus.

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

Results and Discussion

Family NABIDAE Costa, 1853

The damsel bugs are small to medium-sized (less than 13 mm in Michigan) predators found in a wide variety of ecosystems throughout the world. In the United States, the delicate-looking insects of the nominate subfamily generally inhabit foliage in an array of habitats and may be collected frequently when sweeping, whereas the more robust prostemmatines are ground hunters, often collected in pitfall traps. Many species exhibit positive nocturnal phototaxis and are frequently encountered in large numbers around lights at night. They may maintain a univoltine or multivoltine life history (Harris 1928, Guppy 1986); adults typically overwinter and oviposit in leaf stems in the spring (Harris 1928). Despite their slight stature, these insects are capable of delivering a painful “bite” with the rostrum when harassed (Harris 1928). Lattin (1989) covered the bionomics of the Nabidae, and Braman (2000) discussed the economic importance of the family.

The phylogenetic position of the Nabidae has a contentious past, having previously been assigned to the Reduvoioidea or the Cimicoidea. The current arrangement of heteropteran classification places the Nabidae, comprising two monophyletic subfamilies, in the Nabioidea along with the African Medocostidae (Schuh and Stys 1991, Schuh and Slater 1995). Phylogenetically, the family is recognized by the presence of the fossettes parastigmatiques and Eklblom’s organ as well as the labial structure and hemelytral venation (Schuh and Stys 1991). The Nabidae superficially resemble small assassin bugs (Reduvoioidea: Reduviidae) and may be more informally recognized by the four-segmented rostrum, the series of small marginal cells in the hemelytral membrane, and the presence of an apical “collar” at the anterior margin of the pronotum.

As mentioned above, the generic classification has changed frequently, and Kerzhner and Henry (2008) provided an updated checklist for the taxa found in America north of Mexico. Each of the two subfamilies is represented in Michigan, and 13 species in 6 genera are found in the state (Table 1).



Metatropiphorus belfragii



Nabis Americolimbatus



Nabis propinquus



Nabis subcoleopratus



Nabis roseipennis



Nabis rufusculus



Nabis Americoferus



Pagasa fusca



Pagasa pallipes

Figure 3. Nabidae of Michigan (cont.), dorsal habitus.

Table 1. Species of Nabidae found in Michigan.

Nabinae	Prostemmatinae
<i>Himacerus (Anaptus) major</i> (Costa), 1842	<i>Pagasa (Lampropagasa) fusca</i> (Stein), 1857
<i>Hoplistoscelis pallescens</i> (Reuter), 1872	<i>Pagasa (Lampropagasa) insperata</i>
<i>Lasiomerus annulatus</i> (Reuter), 1872	Hussey, 1953
<i>Metatropiphorus belfragii</i> Reuter, 1872	<i>Pagasa (Pagasa) pallipes</i> Stål, 1873
<i>Nabis (Dolichonabis) americolimbatus</i>	
(Carayon), 1961	
<i>Nabis (Limnonabis) propinquus</i>	
Reuter, 1872	
<i>Nabis (Nabicula) subcoleopratus</i>	
(Kirby), 1837	
<i>Nabis (Nabis) roseipennis</i> Reuter, 1872	
<i>Nabis (Nabis) rufusculus</i> Reuter, 1872	
<i>Nabis (Reduviolus) americanoferus</i>	
Carayon, 1961	

Blatchley (1926) treated the species of the eastern United States, but the monograph of Harris (1928) remains the most relevant for those wishing to identify the North American nabids. However, its outdated status, particularly regarding generic names and placement, makes it difficult to use without additional investigation. Nevertheless, the basic framework of the key is preserved from that work. Henry and Lattin's catalog (1988) remains useful for sorting out past records as do the clarifications provided by Kerzhner (1993) and Kerzhner and Henry (2008).

Key to the Nabidae of Michigan

- 1 Pronotum with apical collar extremely narrow or absent; antennae 5-segmented; rostrum somewhat stout; legs short and thick; clavus not or scarcely widened posteriorly (Prostemmatinae: *Pagasa*)2
- 1' Pronotum with apical collar wide and distinct; antennae 4-segmented; rostrum more slender; legs longer and more slender; clavus widened posteriorly (Nabinae).....4
- 2 (1) Second rostral segment extending beyond base of head; protibiae broadly and suddenly dilated along apical half to two-fifths; hemelytra, in greater part, opaque (subgenus *Pagasa*).....*Pagasa pallipes*
- 2' Second rostral segment scarcely attaining posterior margin of eyes; protibiae angularly dilated only for short distance near apex; hemelytra shiny (subgenus *Lampropagasa*) 3
- 3 (2') Male paramere thicker, less sharply bent, apex abruptly truncate, not so narrowed; hemelytra variable, macropterous or brachypterous *Pagasa fusca*
- 3' Male paramere more narrow, thus appearing to be more sharply bent or incurved, apex more elongate and narrow; hemelytra brachypterous, extending no further than anterior margin of third abdominal tergite*Pagasa insperata*
- 4 (1') Scape approximately twice as long as head, abruptly and evenly thickened along its apical third; hemelytral membrane only with unclosed discal cells; mesotibiae unarmed ventrally
.....*Metatropiphorus belfragii*

- 4' Scape not twice as long as head, not abruptly thickened; hemelytral membrane usually with closed discal dells; mesotibiae armed ventrally with sharp spines or spine-like teeth 5
- 5 (4') Pro- and mesofemora armed ventrally with minute, blunt, piceous teeth in addition to spine-like setae; tibiae annulate throughout entire length *Hoplistoscelis pallescens*
- 5' Pro- and mesofemora unarmed or armed only with minute, piceous, spine-like setae, never with short teeth; tibiae not annulate or if so, only at bases and apices 6
- 6 (5') Posterior pronotal lobe strongly punctate; costal margins of hemelytra sinuate, appearing distinctly constricted before the middle, margins ciliate; femora with subapical ring before apices; metatibiae clothed with long, suberect setae *Lasiomerus annulatus*
- 6' Posterior pronotal lobe not or only very faintly punctate; costal margins of hemelytra essentially parallel or evenly convex, clothed only with few shorter setae; femora usually not annulate before apices; tibiae clothed with shorter, more depressed setae which arise at sharp angles from surface 7
- 7 (6') Abdominal connexiva not separated from venter by distinct longitudinal depression; abdominal sterna with small shiny black bare spot mesad of each spiracle *Himacerus major*
- 7' Abdominal connexiva separated from venter by distinct longitudinal depression; abdominal sterna without shiny bare spots (genus *Nabis*) 8
- 8 (7') Head distinctly and obliquely narrowed behind eyes; body shiny black, with antennae, rostrum, legs, and margins of connexiva yellowish (subgenus *Nabicula*) *Nabis subcoleopratus*
- 8' Head behind eyes parallel-sided or nearly so; body, in greater part, greyish, brownish, or reddish 9
- 9 (8') Scutellum with conspicuous, depressed, semicircular, shiny spots on each basal angle; body often elongate; scape always distinctly longer than width of head through eyes; macropterous form rare, brachypterous form with hemelytra not extending beyond third abdominal tergite 10
- 9' Basal depressed spots of scutellum absent or only obsoletely developed; body usually broader, oblong-ovate; scape scarcely or not longer than width of head through eyes, at least in brachypterous forms; macropterous form more common, brachypterous form with hemelytra extending beyond middle of abdomen 11
- 10 (9) Body greatly elongate, lateral margins of abdomen, especially in females, more or less parallel-sided, distance from apex of scutellum to abdominal apex at least 3.3 times as long as greatest abdominal width; length of scape usually greater than 3.5 times interocular distance; male paramere with wide semi-circular disc provided with slight preapical notch; length 9-12 mm (subgenus *Limnonabis*) *Nabis propinquus*
- 10' Body shorter, lateral margins of abdomen, especially in females, more arcuate, distance from apex of scutellum to abdominal apex less than 3.3 times as long as greatest abdominal width; length of scape less than 3.4 times interocular distance; male paramere with rather narrow disc lacking preapical notch; length less than 10 mm (subgenus *Dolichonabis*) *Nabis americolimbatus*

- 11 (9) Color, in greater part, grey to greyish testaceous; fourth antennomere subequal to or slightly shorter than scape (subgenus *Reduviolus*); brachypterous form more rare [head ventrally, in greater part, yellowish to testaceous; metatibiae essentially immaculate]
 *Nabis americanoferus*
- 11' Color, in greater part, yellowish to reddish brown; fourth antennomere longer than scape (subgenus *Nabis*); brachypterous form more common 12
- 12 (11) Head ventrally, in greater part, fuscous to black; metatibiae often conspicuously dotted with fuscous; male clasper with long sinuate stem
 *Nabis roseipennis*
- 12' Head ventrally, in greater part, yellowish to testaceous; metatibiae essentially immaculate; male clasper with short rectangular stem
 *Nabis rufusculus*

Subfamily NABINAE Costa, 1853

Tribe NABINI Costa, 1853

Genus HIMACERUS Wolff, 1811

Subgenus ANAPTUS Kerzhner, 1968

Himacerus major (Costa), 1842. (Figs. 2, 4). – **(NEW STATE RECORD)**. This Palearctic endemic has been accidentally introduced into two regions in North America via ballast dumps (Lattin 1966, Wheeler 1976) and has spread subsequently in the northern United States and Canada. Several specimens collected by the author demonstrate the establishment of *H. major* in Michigan. Label data as follows: MICHIGAN: Washtenaw Co., Ann Arbor, U-M Museum of Zoology, 7 January 2008, 42.2784°N 83.7348°W, 880 ft., D. R. Swanson #1 [1 female] (DRS); MICHIGAN: Washtenaw Co., Ann Arbor, 1001 Maiden Ln., apt. complex, 27 July 2009, 42.2887°N 83.7354°W, 755 ft., D. R. Swanson #98 [1 female] (DRS); MICHIGAN: Kent Co., Wyoming, 3811 Cook Court, home garden, 16 October 2011, 42.8950°N 85.7235°W, 645 ft., D. R. Swanson #64 [1 female] (DRS). The first record from Ann Arbor represents an overwintering adult taken inside the research wing of the Museum; the single female from Kent County was taken from under a patch of catmint (*Nepeta* sp.) in a suburban garden. Lattin (1966) and Wheeler (1976) discussed the introduction and spread of this Old World species in the Pacific Northwest and northeastern United States, and Maw et al. (2000) and Wheeler and Hoebeke (2004) contributed records for British Columbia and Nova Scotia, respectively. The generic placement of this species, like that of many other nabids, has been in flux; previously, it has been in *Nabis* Latreille, 1802, *Aptus* Hahn, 1831, *Stalia* Reuter, 1872, and *Anaptus*, and most recently it was transferred to *Himacerus* by Kerzhner and Henry (2008). The morphological feature described in couplet 7 also will separate *H. major* from all other nabines, including the three species in the preceding couplets; however, the longitudinal depression also is absent in members of the prostemmatine genus *Pagasa* Stål, 1862. 3 specimens examined. Collection dates from 7 January to 16 October.

Genus HOPLISTOSCELIS Reuter, 1890

Hoplistoscelis pallescens (Reuter), 1872. (Figs. 2, 5). – Hussey's (1922) record of this species from Michigan (as *Nabis sordidus*) apparently was overlooked by Henry and Lattin (1988). Hussey noted these nabids were taken infrequently from "undergrowth in the woods and from woodland grasses"; it also has been taken in similar situations by the author in Kent and Washtenaw counties. Kerzhner and Henry (2008) clarified the identity of the eastern species; previously, this species had been confounded with *Hoplistoscelis sordida* (Reuter), 1872. Harris



Figure 4. Distribution of *Himacerus (Anaptus) major* in Michigan.

Figure 5. Distribution of *Hoplistoscelis pallescens* in Michigan.

(1928) reported some biological aspects of this species (as *Nabis (Hoplistoscelis) sordidus*). 26 specimens examined. Collection dates from 2 May to 13 November.

Genus LASIOMERUS Reuter, 1890

Lasiomerus annulatus (Reuter), 1872. (Figs. 2, 6). – Hussey (1922) reported this species from Michigan (as *Nabis annulatus*). This record, apparently overlooked by Henry and Lattin (1988), noted several individuals “beaten from alder in a swamp.” Harris (1928) reported some biological aspects for this species (as *Nabis (Lasiomerus) annulatus*), noting that eggs overwinter. 26 specimens examined. Collection dates from 23 July to 5 September.

Genus METATROPIPHORUS Reuter, 1872

Metatropiphorus belfragii Reuter, 1872. (Figs. 3, 7). – (**NEW STATE RECORD**). Members of this genus seem to be rare in collections. The author examined one specimen from Michigan with the following label data: MICHIGAN: Livingston Co., E. S. George Reserve, 22 July 1954, H. K. Wallace [1 female] (UMMZ). This species has been found in Illinois and New York, among other states (Henry and Lattin 1988); Paiero et al. (2003) gave Ontario as the first Canadian record. 1 specimen examined. Collection date is 22 July.

Genus NABIS Latreille, 1802

Subgenus DOLICHONABIS Reuter, 1908

Nabis Americolimbatus (Carayon), 1961. (Figs. 3, 8). – (**NEW STATE RECORD**). It is unsurprising to find this species in Michigan as it is known from Minnesota and New York as well as Ontario (Henry and Lattin 1988). Harris (1928) indicated this species “inhabits vegetation in and around bogs and marshes.” Although the occurrence of true *Nabis (Dolichonabis) limbatus* Dahlbom, 1851 has been confirmed recently in Newfoundland (Larivière 1994, Kerzhner and Henry 2008), most previous records from the United States were referred incorrectly to the Palearctic endemic before Carayon (1961) clarified their status (see also *Nabis (Reduviolus) americanoferus* below). 11 specimens examined. Collection dates from 9 July to 8 September.

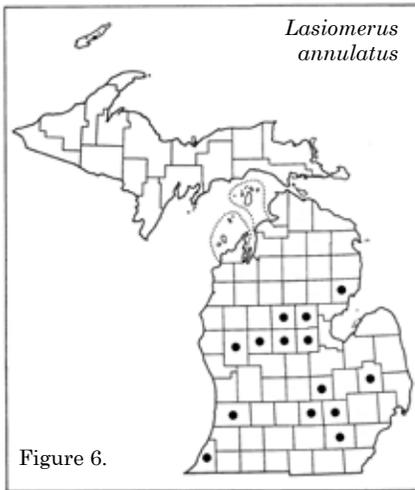


Figure 6. Distribution of *Lasiomerus annulatus* in Michigan.

Figure 7. Distribution of *Metatropiphorus belfragii* in Michigan.

Subgenus LIMNONABIS Kerzhner, 1968

Nabis propinquus Reuter, 1872. (Figs. 3, 9). – Hussey (1922) reported this species from Michigan as “[m]oderately common on bulrushes and sedges in the marshes at New Buffalo and at Stevensville.” Harris (1928) indicated this species “frequents the edges of marshes and ponds where the reeds and sedges flourish...in such situations in company with *Protenor belfragei* Haglund” (Alydidae: Micrelytrinae). Asquith and Lattin (1990) provided information regarding the taxonomy, morphology, cladistics, and biogeography of this species. 47 specimens examined. Collection dates from 24 June to 2 September.

Subgenus NABICULA Kirby, 1837

Nabis subcoleopratus (Kirby), 1837. (Figs. 3, 10). – Hussey (1922) reported this species from Michigan. He noted these nabids “[p]lentiful in the grass in moist situations about the Warren Woods, and in similar places in the dune region.” Label data indicate it has been taken in prairies and grassy fields in Jackson, Kalamazoo, and Oakland counties, and the author has found them abundant in such situations in early summer, an observation shared with Hussey (1922). This species has been taken “eating [a] coccinellid [larvae] on *Asclepias syriaca*” in Cheboygan County and “at flowers of *Epilobium angustifolium*” in Dickinson County. This nabid also has been collected from Isle Royale (Keweenaw County). Macropterous forms exist but micropterous forms are far more common. The black body renders *N. subcoleopratus* instantly recognizable among the Michigan nabines, although it superficially resembles members of the prostemmatine genus *Pagasa*. Individuals of this species, particularly the late-instar nymphs, are ant-mimetic and may be confused in Michigan with nymphs of the broad-headed bug genera *Alydus* Fabricius and *Megalotomus* Fieber (Alydidae: Alydinae). Harris (1928) and Larivière (1994) reported some biological aspects for this species; the former indicated that *N. subcoleopratus* is known to overwinter as an egg. 578 specimens examined. Collection dates from 27 May to 18 September.

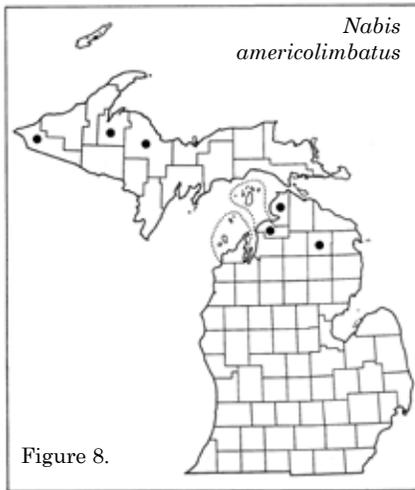


Figure 8. Distribution of *Nabis (Dolichonabis) americolimbatus* in Michigan.

Figure 9. Distribution of *Nabis (Limnonabis) propinquus* in Michigan.

Subgenus NABIS Latreille, 1802

Nabis roseipennis Reuter, 1872. (Figs. 3, 11). – Hussey (1922) reported this species being generally common in southwestern Michigan. Label data indicate it has been taken on weeds and in a prairie in Kalamazoo County. Munding (1922) and Harris (1928) reported aspects of biology for this species. Elvin and Sloderbeck (1984) provided a key for identifying nymphs. 127 specimens examined. Collection dates from 5 March to 18 November.

Nabis rufusculus Reuter, 1872. (Figs. 3, 12). – Hussey (1922) reported this species from Michigan, noting several “beaten from bushes at the edge of the Warren Woods.” The author has taken this species sweeping an open field in Jackson County and marsh grasses in Washtenaw County. Label data also indicate it has been taken from tamarack (*Larix laricina* Du Roi) in Oakland County and bracken (*Pteridium* sp.) in Chippewa County. This species has been collected from Isle Royale (Keweenaw County) and Drummond Island (Chippewa County). 169 specimens examined. Collection dates from 29 April to 4 November.

Subgenus REDUVIOLUS Kirby, 1837

Nabis americanoferus Carayon, 1961. (Figs. 3, 13). – Townsend (1890) and Hussey (1922) reported this species from Michigan as *Coriscus ferus* and *Nabis ferus*, respectively; indeed, all past records for this species were referred to the Palearctic *Nabis ferus* (Linnaeus), 1758 before Carayon (1961) clarified its status (see also *Nabis (Dolichonabis) americolimbatus* above). Hussey (1922) indicated the following of the species:

“One of the most abundant Hemiptera of the grasslands in Berrien County. The specimens taken late in June appear to average somewhat smaller than those taken later in the summer. This species was very active at night: several specimens came to light, and large numbers could be taken by sweeping the grasses after dark: many of these were feeding when taken.”

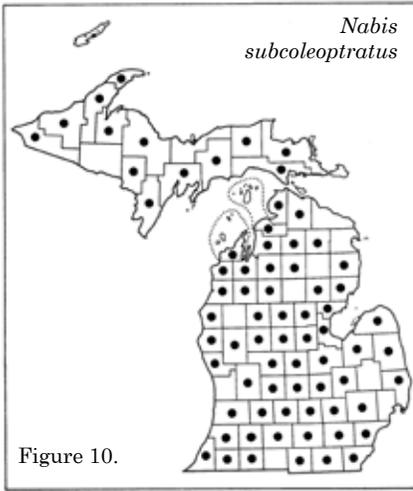


Figure 10. Distribution of *Nabis (Nabicula) subcoleopratus* in Michigan.

Figure 11. Distribution of *Nabis (Nabis) roseipennis* in Michigan.



Figure 12. Distribution of *Nabis (Nabis) rufusculus* in Michigan.

Figure 13. Distribution of *Nabis (Reduviolus) americoferus* in Michigan.

Label data indicate its collection from weeds and a prairie in Kalamazoo County, red clover (*Trifolium pratense* L.) and alfalfa (*Medicago sativa* L.) in Ingham County, cultivated strawberries in Berrien County, and a 5-year-old plantation of *Pinus sylvestris* L. in Wexford County. This species also has been collected from Isle Royale (Keweenaw County). Potential specimens of *Nabis kalmii* Reuter, 1872 are included here (see discussion below). Harris (1928) discussed some additional biological aspects, and Guppy (1986) reported bionomic information. Elvin and Sloderbeck (1984) provided a key for identifying nymphs. 456 specimens examined. Collection dates from 3 March to 16 November.

Nabis inscriptus (Kirby), 1837. – Harris (1928) indicated individuals of *Nabis americanoferus*, *N. roseipennis*, and *N. rufusculus* often were misidentified as this species. Because all three are common to Michigan, it is unknown to which species Townsend's (1890) record of *Coriscus inscriptus* refers. Hussey (1921) suggested *N. roseipennis* as its true identity, a suggestion with which the author agrees, and if not that species, it certainly refers to *N. rufusculus* as Townsend already had listed *Coriscus ferus*. True *N. inscriptus*, a species endemic to the Palearctic, probably does not occur in Michigan as it is known from Alaska, Colorado, and Idaho in the United States and Alberta, British Columbia, Newfoundland, Northwest Territories, Quebec, and Yukon in Canada (Henry and Lattin 1988, Maw et al. 2000).

Subgenus TROPICONABIS Kerzhner, 1968

Nabis capsiformis Germar, 1968. – The author has examined one Michigan specimen of this pantropical species, with the following label data: MICHIGAN: Ingham Co., 22 [or 27] October 1949 [no collector] [1 male] (MSUC). Because this species is known only from the southern United States (Henry and Lattin 1988), it seems improbable that *N. capsiformis* is established in Michigan. There also exists a strong possibility that the specimen is mislabeled. Given these doubts, it should be excluded from the Michigan faunal list unless more specimens are found. This species, however, is notorious for high rates of dispersal (Kerzhner 1983, Lattin 1989, Kerzhner and Henry 2008), and *N. capsiformis* remains a potential adventive within the Michigan fauna. Only macropterous individuals are known (Lattin 1989). This species will run to *Nabis americanoferus* (couplet 11) in the key provided, and it may be separated from all Michigan *Nabis* species by the slender habitus and the absence of dark speckling on the corium, the latter condition being occasionally present in pale specimens of *N. americanoferus*.

Subfamily PROSTEMMATINAE Reuter, 1890

Tribe PROSTEMMATINI Reuter, 1890

Genus PAGASA Stål, 1862

Subgenus LAMPROPAGASA Reuter, 1909

Pagasa fusca (Stein), 1857. (Figs. 3, 14). – **(NEW STATE RECORD)**. Kerzhner (1993) characterized a portion of the range of *P. fusca* as “USA (almost the whole territory)”; yet, to the author's knowledge, no Michigan localities or specimen data have been given for this species. Collections from pitfall traps have yielded several specimens in the state; label data indicate that traps yielding *P. fusca* were laid in an abandoned field in Kalamazoo County, a 5-year-old plantation of *Pinus sylvestris* L. in Wexford County, and on a green roof in Ingham, Kent, and Ottawa counties. This species also has been collected from Isle Royale (Keweenaw County). Harris (1928) reported some biological aspects for this species. 35 specimens examined. Collection dates from 5 April to 19 October.

Pagasa insperata Hussey, 1953. (Fig. 15). – This species was described from a single male taken in Oceana County (Hussey 1953). Holotype data as follows: MICHIGAN: Oceana Co., Silver Lake State Park, 26 July 1934, Ada



Figure 14. Distribution of *Pagasa (Lampropagasa) fusca* in Michigan.

Figure 15. Distribution of *Pagasa (Lampropagasa) insperata* in Michigan.

L. Olson and Leonora K. Gloyd (UMMZ). Kerzhner (1993) and Kerzhner and Henry (2008) clarified the identity of Hussey's species and synonymized the new subgenus *Parapagasa* Hussey, 1953, explaining it was based on an imperfect specimen. 1 specimen (holotype) examined. Collection date is 26 July.

Subgenus PAGASA Stål, 1862

Pagasa pallipes Stål, 1873. (Figs. 3, 16). – Hussey (1921) reported a single specimen from Ingleside, Cheboygan County, Michigan. Harris (1928) questioned the validity of the record, although it was included by Henry and Lattin (1988). No specimens examined. Collection date is 14 August.

Notes on Additional Species

Nabis (Dolichonabis) nigrovittata nearctica Kerzhner, 1981. – Of the three subspecies of *N. nigrovittata* delimited by Kerzhner (1981), this is the only Nearctic form. Known from Alaska, Colorado, Idaho, New York, and all adjacent territories in Canada (Henry and Lattin 1988, Larivière 1994, Maw et al. 2000, Kerzhner and Henry 2008), this subspecies is a potential addition to the Michigan fauna, although no Michigan individuals of this species have been examined by the author. It closely resembles *N. americolimbatus* and brachypterous forms may be separated from that species by the hemelytra extending past the basal margin of the third abdominal tergite and the acutely rounded to pointed apex; this contrasts the broadly rounded or truncate hemelytra that do not extend beyond the base of the third abdominal tergite in *N. americolimbatus* (Larivière 1994). Additionally, the shaft of the male paramere is more or less straight or slightly curved mesad when viewed from above in *N. nigrovittata nearctica*, whereas the shaft curves laterad in *N. americolimbatus* (Larivière 1994).

Nabis (Reduviolus) kalmii Reuter, 1872. – This species was treated in the monograph as *Nabis ferus* var. *pallidipennis* Harris, 1928; the two forms were synonymized by Kerzhner (1981), who retained *N. kalmii* as a good species. Known from Alberta, Iowa, Kansas, Maine, Manitoba, Massachusetts, Minnesota, Montana, Newfoundland, New Hampshire, New Jersey, New York,



Figure 16.

Figure 16. Distribution of *Pagasa (Pagasa) pallipes* in Michigan.

North Dakota, Nova Scotia, Ohio, Pennsylvania, South Dakota, and Wisconsin (Henry and Lattin 1988, Kerzhner and Henry 2008), *N. kalmii* should occur in Michigan. Harris (1928) separated this species from *N. americanoferus* by the slightly paler coloration and the slightly longer scape of the former. Of these differences, he remarked:

“This form [*N. ferus* var. *pallidipennis*] may, when only a few examples are at hand, appear sufficiently distinct to be accorded specific rank. However, with a long series for study it is evident that the differential characters are quite variable. It seems to be no more than a form of our very variable *N. [americano]ferus* that is characteristic of drier and warmer situations.”

Although the male parameres are similar, the shape of the genital capsule and the internal male and female genitalia will distinguish the two species (Henry, pers. comm.). Unfortunately, *N. kalmii* is, at most, peripherally present in contemporary treatments (Kerzhner 1968, 1981, 1993; Kerzhner and Henry 2008), and to the author’s knowledge, none provide a diagnosis for *N. kalmii* or a description of the male genitalia. Specimens of *N. americanoferus* from Michigan examined by the author show a range of variation in the length of the scape, even within a single series, such that the two forms *sensu* Harris (1928) could not be separated adequately. The author also has made a careful survey of the male parameres within the examined material of *N. americanoferus*, and while minor variations were observed, no forms seemed to indicate the presence of another species. As no other diagnostic characters are available and the genitalic differences are unknown to the author, *N. kalmii* has been excluded from this treatment.

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