THE INSECTS AND ARACHNIDS OF CANADA

PART 8

The Plant Bugs of the Prairie Provinces of Canada

Heteroptera: Miridae

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Introduction

The Miridae, or plant bugs, are of great economic importance to man because they feed on plants, or prey on other arthropods. The bugs may also act as vectors of plant virus diseases. Damage to crops by these bugs has often resulted in losses of millions of dollars.

This group of bugs is not well known in Canada, particularly in the northern areas of the Prairie Provinces, the Yukon, and the Northwest Territories. Despite their large numbers, the plant bugs are poorly represented in collections, and confusion exists in naming them. In recent years special efforts have been made to collect the Miridae from coast to coast in Canada, and especially in the farming and ranching areas of the Prairie Provinces. As a result, knowledge of the range and distribution of the species has been expanded and new information on their habits and ecology has been obtained. The aim of this report is to help the economic entomologists and other field workers in the Prairie Provinces and elsewhere to identify the species of this important group of plant bugs so often encountered in field surveys and control programs.

This faunal work treats the species of Miridae known to occur in the Prairie Provinces. The work was initiated by the late Arthur R. Brooks and the author in 1949 at Agriculture Canada's Research Station, Saskatoon, Sask. At the outset, many difficulties were encountered in identifying species because the only publications available were Knight (1923*b*, 1941*c*) and Blatchley (1926). With the publication of *A catalogue of the Miridae of the world* by Carvalho (1957-1959), and subsequent publications by Kelton (see References), Kelton and Knight (1962), Knight (1974), and Kelton and Herring (1978), 45 species have been reported from the Prairie Provinces. This work shows that 314 species of Miridae occur in this area. Most of the species are restricted to the Nearctic region, but 27 species are Holarctic in distribution. Most of the Holarctic species are native to North America, but several have been introduced by man.

In economic terms the effect of harmful species seems to far outweigh the beneficial effect of the predaceous species. The bugs suck juices from plants and when large populations are allowed to develop, they may destroy or greatly reduce the yield of grain, seed, and vegetable crops. Their feeding may also reduce plant vigor, deform foliage of ornamental flowers and

shrubs, and cause malformed fruit, resulting in reduced yields and lower commercial grades of apples, plums, currants, and strawberries. Certain species may also destroy plants by transmitting virus diseases.

There are several species of Miridae that are predators. However, the use of the Miridae for biological control of arthropod pests and weeds in the Prairie Provinces has not been fully explored.

This faunal work includes brief descriptions of adults and selected illustrations of adults and of the male genital claspers. The known habitats and the distribution of the species are given. Keys to subfamilies, tribes, genera, and species are also included.

Collecting and preserving specimens

There are three ways to collect Miridae, and the collecting methods depend on the habitat, type of vegetation, and type of species to be collected. The three ways are sweeping the plants, using a regular sweep net; beating the branches, using a beating stick and sheet; and attracting the species, using a light trap.

The sweeping method is used to collect mirids living on grasses, sedges, herbaceous plants, flexible shrubs, and delicate foliage of deciduous trees. This is the most productive method for general collecting and, when plants are isolated, may give accurate host associations. Because the mirids are fragile and delicate insects, sweeping must be done carefully so as not to damage the bugs in the net. Flower heads, leaves, and other debris often picked up in sweeping can damage the bugs in the net if sweeping is prolonged; therefore the bugs should be picked out of the net frequently with an aspirator. Sweeping should be done under dry conditions as moisture in the net will mat and ruin the specimens.

The beating stick and sheet method is used for collecting mirids on branches of coniferous trees, tough or spiny deciduous trees, and fruit trees and is the best method for obtaining accurate host records. The sheet is held under a branch and the branch is sharply struck with the stick. The bugs are jarred loose and fall on the sheet and should be picked off the sheet quickly with an aspirator.

The use of a black light on a warm, calm, and humid night will often attract mirids not collected by sweeping or beating. They are usually night-flying mirids and for many of these the host plant is unknown. A black light may be either permanently mounted on a container designed to funnel insects to poison below or temporarily set up against a white sheet and the mirids picked up with an aspirator as soon as they alight on the sheet. Since moths, beetles, and other insects are also attracted to the lights, mirids

collected by this method are less likely to be damaged by larger insects or covered with moth scales than those collected in permanently mounted traps.

The collected specimens are killed promptly in cyanide and mounted. If they cannot be mounted immediately, they may be stored for several weeks in pill boxes between layers of cellulose cotton. Each pill box is labeled with pertinent information about the specimens such as place collected, date, collector, and host plant if known. Before mounting the stored specimens, the pill boxes are placed in a relaxing container and the bugs relaxed.

Mirids should be mounted on narrow triangular bristol board points. The tip of the point is bent to fit the angle of the thorax so that the specimen will be level when mounted. Only the tip of the point should be covered with glue and the point attached to the right side of the thorax above the middle coxa. Miridae should not be pinned through the body, and they should never be placed in alcohol.

For additional details on collecting and preserving techniques, see Martin (1977).

Biology

Most mirids pass the winter in the egg stage. The eggs are normally inserted in a tender part of the host plant and hatch early in the spring when the host plant is sprouting new shoots. The nymphs, which feed on the new growth by sucking out the sap, pass through five stages of development, and at the fifth molt become adults. The adults mate, the males die soon after, and the females oviposit and die. Very few species have more than one generation a summer.

Relatively few species hibernate as adults. These adults seek shelter in the fall close to the host plant. The hibernating adults emerge in the spring, commence feeding on the tender new shoots of plants, mate, lay eggs, and gradually die off. The eggs hatch during the summer, the nymphs feed throughout their development, become adults, and continue feeding until hiberation.

Most mirids feed on ferns, herbaceous plants, shrubs, and trees. Many species are host specific or are limited to a group of related plants. Thus, the distribution of the host-specific species may be limited to the areas where the host plant grows. Other species are omnivorous, readily disperse from plant to plant, and generally have extensive distributions.

Several species of Miridae are now known to be partly or chiefly predaceous. They prey on soft bodied arthropods and may substantially reduce large colonies of aphids, psyllids, leafhoppers, and mites feeding on the host plant. Most species of *Phytocoris, Deraeocoris, Pilophorus, Ceratocapsus*, and *Hyaliodes* are beneficial predators.

Morphology

The Miridae are distinguished by the four-segmented antennae, the four-segmented rostrum, and the lack of ocelli, except the subfamily Isometopinae. The hemelytron is typically separated into clavus, corium, embolium, cuneus, and wing membrane. However, in a number of species

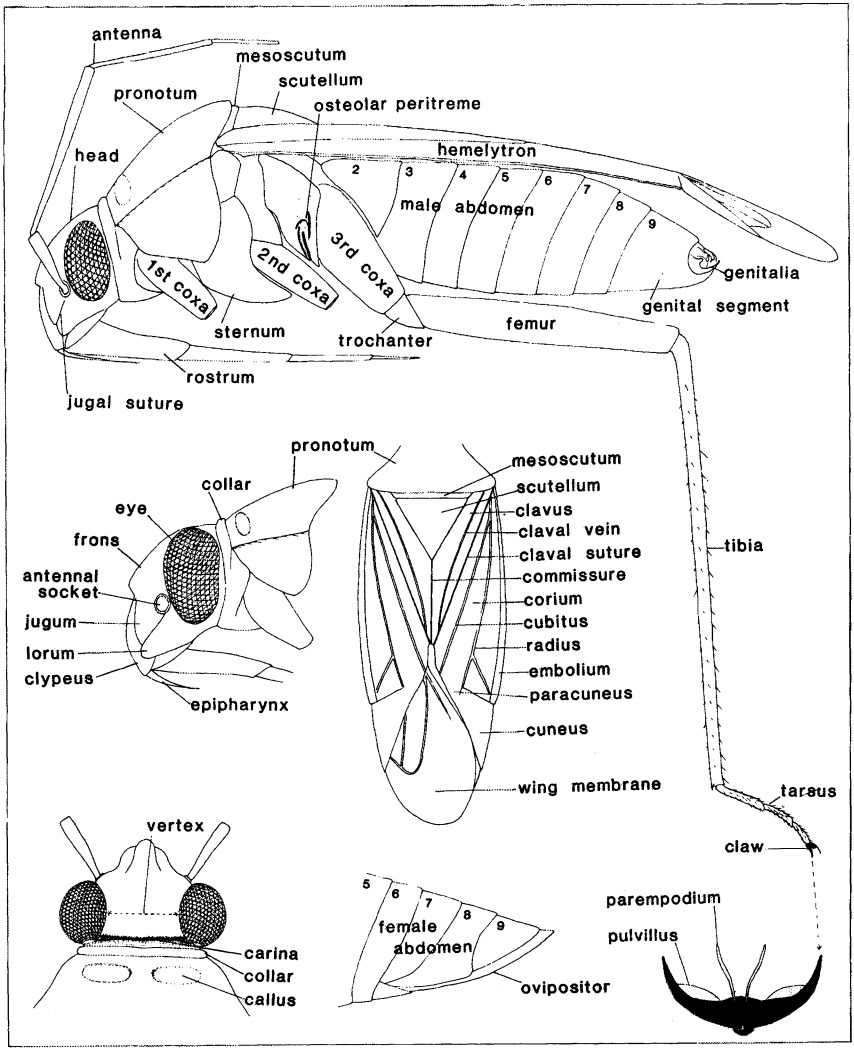


Fig. 1. Adult mirid, showing typical mirid structures and illustrating structural terms.

the hemelytra may be absent or reduced to mere pads, and these apterous or brachypterous adults may be mistaken for nymphs. Nymphs, however, do not have male or female genital structures, as shown in Fig. 1. The abdomen consists of nine segments, but only eight are visible. Each leg consists of a coxa, trochanter, femur, tibia, and usually a three-segmented tarsus. The claws and the structures between them, the parempodia and the pulvilli, provide reliable characters for separating the subfamilies. Fig. 1 shows the typical mirid structures and illustrates the structural terms.

Classification

The classification of the Miridae is based primarily on the tarsal claws proposed by Reuter (1910). The Reuter classification was further elaborated by Knight (1918*a*) and modified and condensed by Carvalho (1955*a*). The six subfamilies in the Carvalho classification system are Mirinae, Orthotylinae, Phylinae, Deraeocorinae, Bryocorinae, and Cylapinae. Kelton (1959) followed this classification in large part, but suggested that Dicyphinae be considered as a distinct subfamily. Carayon (1958) showed that the Isometopinae belong in the Miridae.

Schuh (1976) proposed major changes in the classification of the Miridae. He suggested that the Orthotylinae and the Deraeocorinae be recognized as tribes within Phylinae and Mirinae respectively, and that Dicyphinae be recognized as a tribe within Bryocorinae. For practical reasons Schuh's proposals are not adopted in this faunal work, but rather the more generally accepted classification of Carvalho (1955*a*), in part, and Kelton (1959). The Cylapinae and Isometopinae are not represented in the Prairie Provinces.

Key to subfamilies

1. Parempodia large and membraneous (Figs. 2, 3) 2
   Parempodia slender and hairlike (Figs. 4–8) 3
2. Parempodia divergent toward apices (Fig. 2); pronotal collar distinct (Fig. 9) ..... **Mirinae** Hahn (p. 16)
   Parempodia parallel or convergent at apices (Fig. 3); pronotal collar depressed, inconspicuous (Fig. 10) ..... **Orthotylinae** Van Duzee (p. 188)
3. Pronotal collar absent ..... **Phylinae** Douglas & Scott (p. 279)
   Pronotal collar present (Fig. 9) 4
4. Pulvilli absent (Figs. 6, 7) ..... **Deraeocorinae** Douglas & Scott (p. 349)
   Pulvilli present (Figs. 4, 5, 8) 5
5. Wing membrane with two cells (Fig. 11); slender species (Fig. 271) ..... **Dicyphinae** Reuter (p. 372)
   Wing membrane with one cell (Fig. 12); oval species (Fig. 278) ..... **Bryocorinae** Baerensprung (p. 379)

Subfamily Mirinae Hahn

In North America this is the largest subfamily. There are approximately 80 genera and probably over 650 species. Most of the species are phytophagous, but many are predaceous, especially in the genus *Phytocoris*.

The following are the subfamily characteristics: 1) large, free parempodia, diverging toward apices; 2) usually prominent pronotal collar; and 3) male genitalia basically with membranous lobes, and flexible ductus seminis.

In the Prairie Provinces the subfamily is represented by 4 tribes, 34 genera, and approximately 138 species.

Key to tribes of Mirinae

1. First segment of hind tarsus as long as second and third together (Fig. 13) 2
   First segment of hind tarsus shorter than second and third together (Fig. 14) .. 3
2. Antlike species; cuneus and wing membrane usually absent (Fig. 17) ..... **Pithanini** (p. 16)
   Not antlike species; cuneus and wing membrane usually present ..... **Stenodemini** (p. 20)
3. Pronotum and hemelytra velvety ..... **Resthenini** (p. 48)
   Pronotum and hemelytra shiny, not velvety ..... **Mirini** (p. 55)

Tribe Pithanini

In the Prairie Provinces the tribe is represented by two genera and two species.

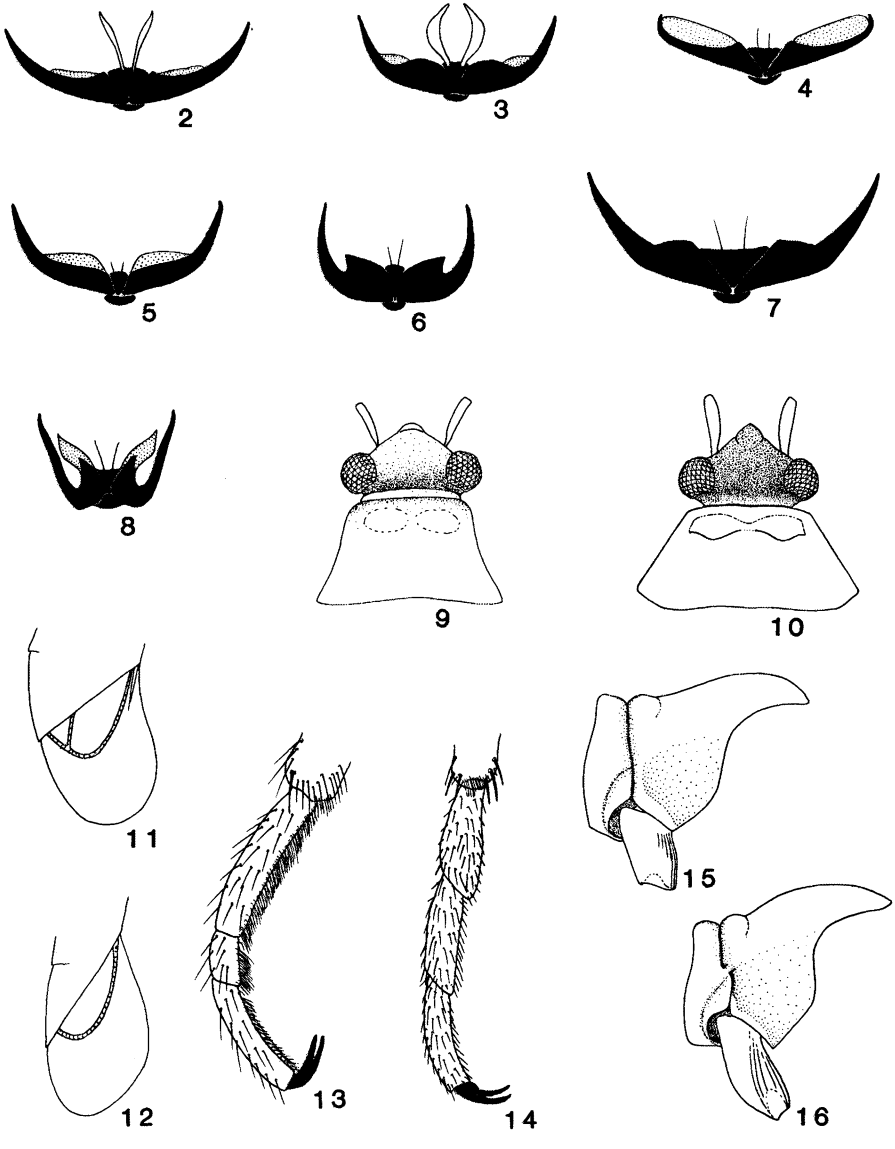
Key to genera of Pithanini

1. First antennal segment shorter than width of vertex .... ***Pithanus*** **Fieber** (p. 16)
   First antennal segment longer than width of vertex ..... ***Mimoceps*** **Uhler** (p. 18)

Genus *Pithanus* Fieber

Elongate, subcylindrical, black species. Head vertical, eyes spherical, carina between them absent. First antennal segment short. Pronotum cylindrical in brachypterous forms, trapeziform in macropterous forms, calli strongly swollen. Hemelytra glabrous.

Kelton (1966*b*) found this Holarctic species widely distributed in North America.



Figs. 2–16. Miridae structures. 2–8, Claws of Miridae; 2, Mirinae; 3, Orthotylinae; 4,5, Phylinae; 6,7, Deraeocorinae; 8, Dicyphinae; 9, Pronotum of Dicyphinae; 10, Pronotum of Phylinae; 11, Typical wing membrane; 12, Wing membrane of Bryocorinae; 13, Tarsus of Pithanini and Stenodemini; 14, Tarsus of Resthenini and Mirini; 15, Pronotum of *Opistheurista*; 16, Pronotum of *Prepops*.

Pithanus maerkeli (Herrich-Schaeffer)

Fig. 17; Map 1

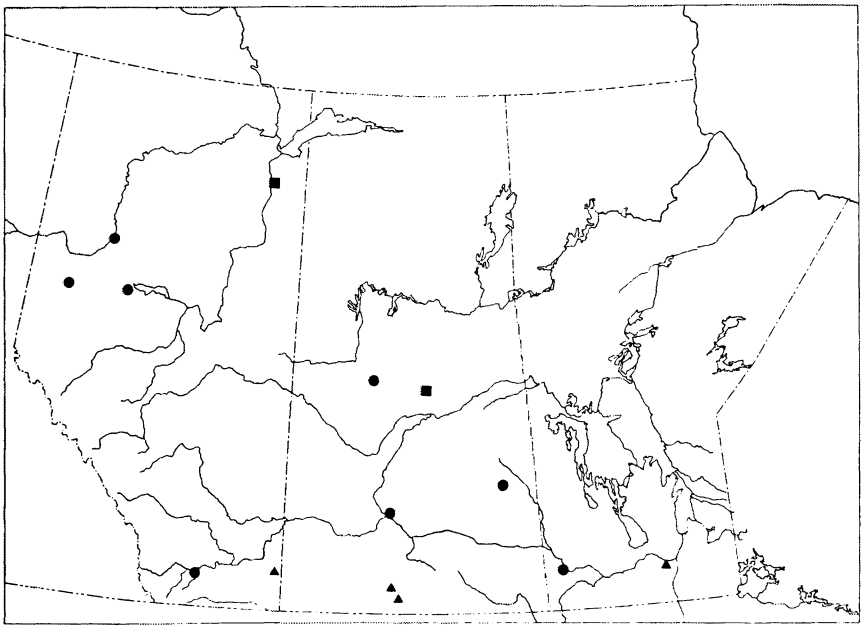
Capsus maerkeli Herrich-Schaeffer, 1838:78.
Pithanus maerkeli: Reuter, 1875*d*:103.

Length 3.50–5.32 mm; width 0.98–1.40 mm. Head, pronotum, and scutellum black. Hemelytra black, costal margin pale. Ventral surface black, legs yellow. Both sexes brachypterous, females rarely macropterous.

Remarks. The species is distinguished by its shape and form (Fig. 17).

Habitat. Collected on grasses and sedges in damp areas.

Distribution. Transcontinental in northern States and southern Canada; reported from the Prairie Provinces (Map 1).



Map 1. Collection localities for *Pithanus maerkeli* (▲), *Mimoceps insignis* (●), and *Actitocoris signatus* (■).

Genus *Mimoceps* Uhler

Elongate, subcylindrical, glabrous species. Head oblique, carina between eyes absent. Pronotum cylindrical, calli strongly swollen. Hemelytra green, banded with black.

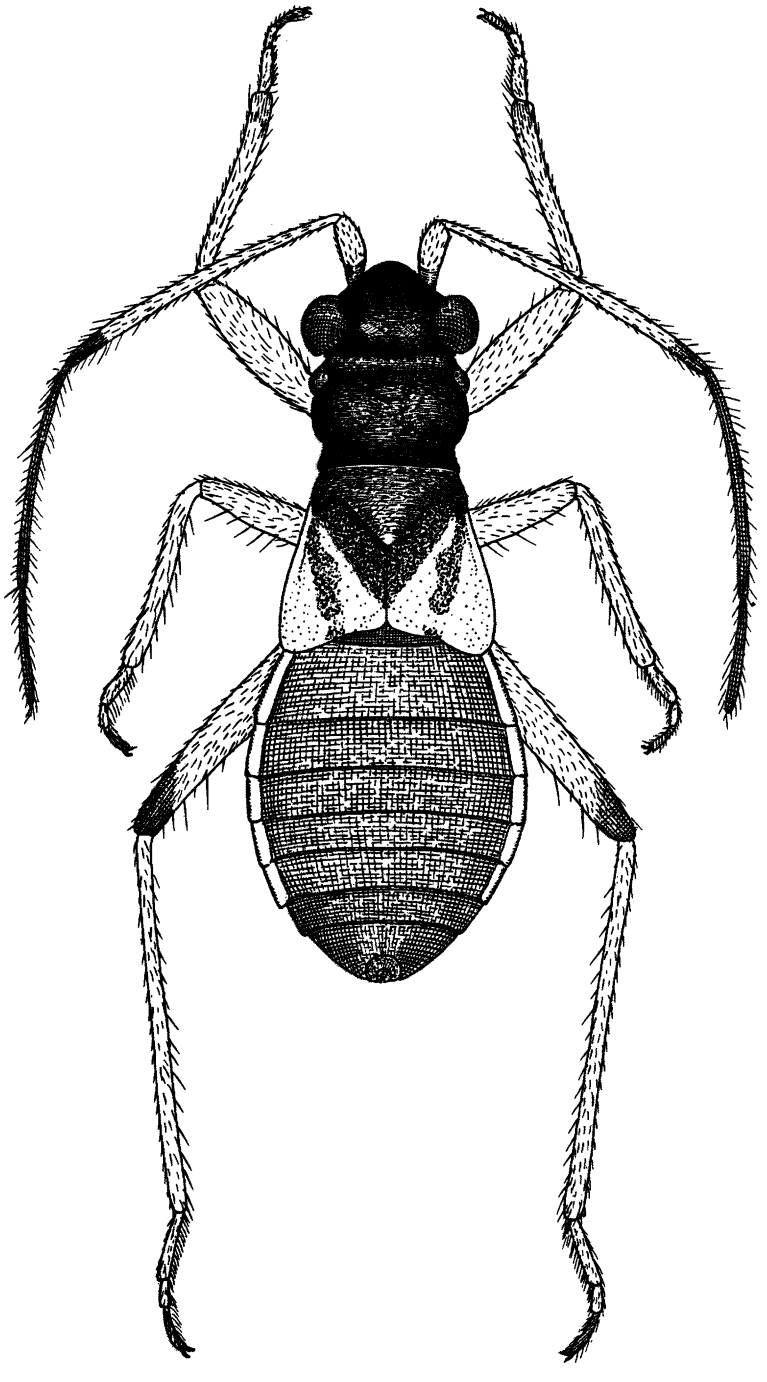


Fig. 17. *Pithanus maerkeli*

One species occurs in North America and is found in the Prairie Provinces.

Mimoceps insignis Uhler

Fig. 18; Map 1

Mimoceps insignis Uhler, 1890:84.
Mimoceps gracilis Uhler, 1890:85.

Length 3.50–5.04 mm; width 0.98–1.54 mm. Head black, two spots behind eyes pale. Pronotum black. Hemelytra brachypterous or macropterous. Legs long, slender, femora reddish.

Remarks. This species is distinguished by the banded hemelytra (Fig. 18).

Habitat. Collected on sedges.

Distribution. New York to Ohio, west to New Mexico, North Central States, Alaska, northern Canada, British Columbia, Ontario, Quebec; now known to occur in the Prairie Provinces (Map 1).

Tribe Stenodemini

In the Prairie Provinces the tribe is represented by 7 genera and 20 species.

Key to genera of Stenodemini

1. Second antennal segment clavate (Fig. 19) ..... ***Actitocoris*** **Reuter** (p. 22)
   Second antennal segment linear (Fig. 20) 2
2. Lateral margins of pronotum rounded; head strongly elongate, eyes removed from anterior margin of pronotum (Fig. 20) ..... ***Collaria*** **Provancher** (p. 22)
   Lateral margins of pronotum angulate or carinate; head not elongate 3
3. Pronotum with deep, prominent punctures 4
   Pronotum impunctate 5
4. First antennal segment thickened with long, dense pubescence (Fig. 21) ..... ***Stenodema*** **Laporte** (p. 24)
   First antennal segment slender, almost glabrous (Fig. 22) ..... ***Litomiris*** **Slater** (p. 29)
5. First antennal segment with dense, long pubescence (Fig. 23) ..... ***Leptopterna*** **Fieber** (p. 31)
   First antennal segment with short, sparse pubescence 6
6. Head long, pointed; first antennal segment shorter than head width (Fig. 24) ..... ***Trigonotylus*** **Fieber** (p. 34)
   Head short, rounded in front; first antennal segment longer than head width (Fig. 25) ..... ***Teratocoris*** **Fieber** (p. 44)

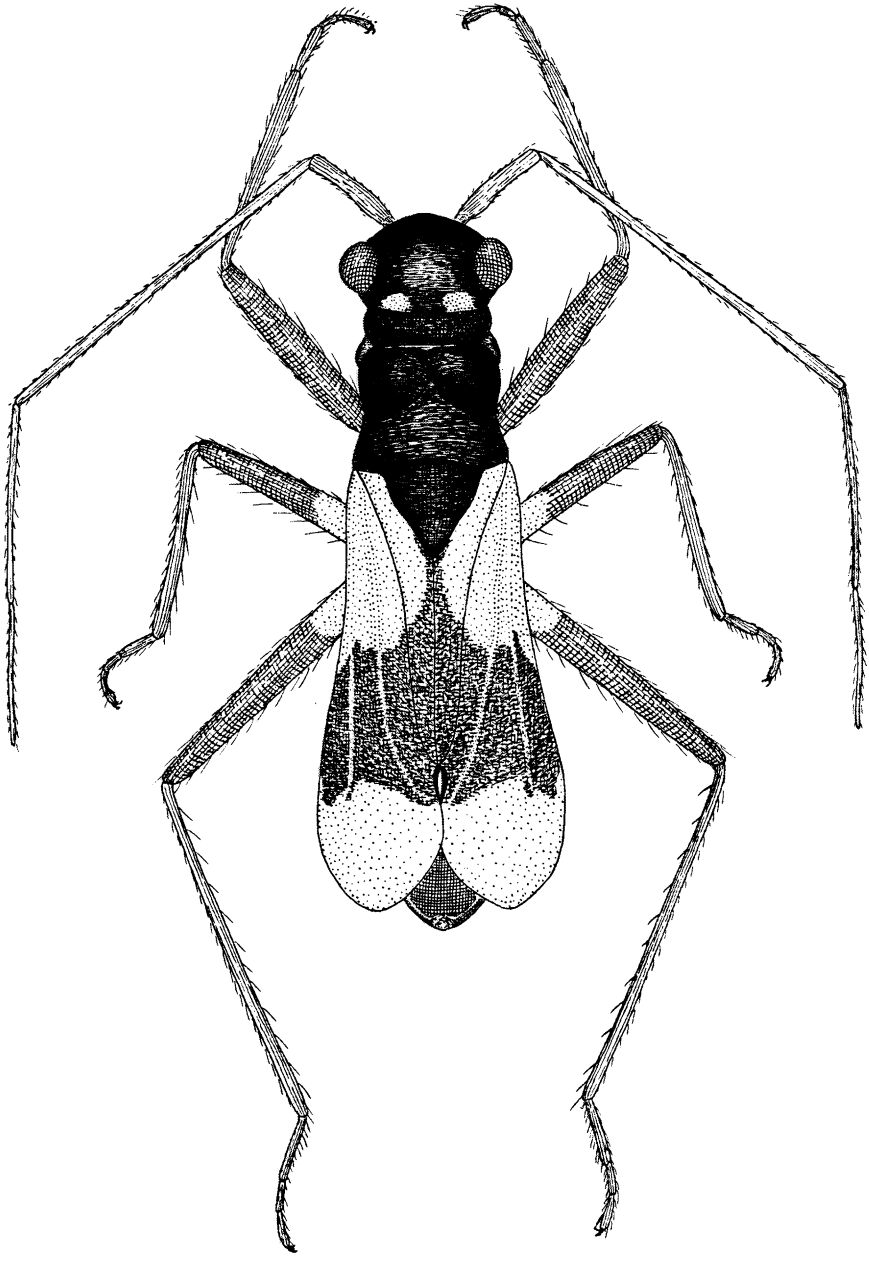


Fig. 18. *Mimoceps insignis*

Genus *Actitocoris* Reuter

Elongate, cylindrical, pubescent species. Head vertical, eyes spherical, carina between them absent. Pronotum trapeziform in macropterous forms, subcylindrical in brachypterous forms, lateral margins carinate. Hemelytra impunctate, pubescent. Tibiae strongly pilose.

Kelton (1966*b*) reported this Holarctic species from North America.

Actitocoris signatus Reuter

Fig. 19; Map 1

Actitocoris signatus Reuter, 1878:194.

Length 4.06–6.02 mm; width 1.40–1.82 mm. Head and pronotum yellowish green marked with reddish brown. Second antennal segment clavate. Hemelytra yellowish green marked with longitudinal fuscous lines.

Remarks. This species is distinguished by the clavate second antennal segment and by the pilose tibiae (Fig. 19).

Habitat. Collected on grasses and sedges.

Distribution. Northwest Territories; Alberta, Saskatchewan (Map 1).

Genus *Collaria* Provancher

Elongate, slender, subcylindrical species with long, slender legs. Head oblique, carina between eyes absent, base of head narrowed into a neck. Pronotum subcampanulate, calli strongly swollen, basal angles with large, velvety black spots. Hemelytra pale, marked with black. Legs pale, femora spotted with black.

Three species occur in North America, one in the Prairie Provinces.

Collaria meilleurii Provancher

Fig. 20; Map 2

Collaria meilleurii Provancher, 1872:79.
Nabidea coracina Uhler, 1878*a*:398.

Length 6.02–7.00 mm; width 1.40–1.82 mm. Head black with distinct neck, crescent mark behind eyes pale. Pronotum black. Legs long, slender.

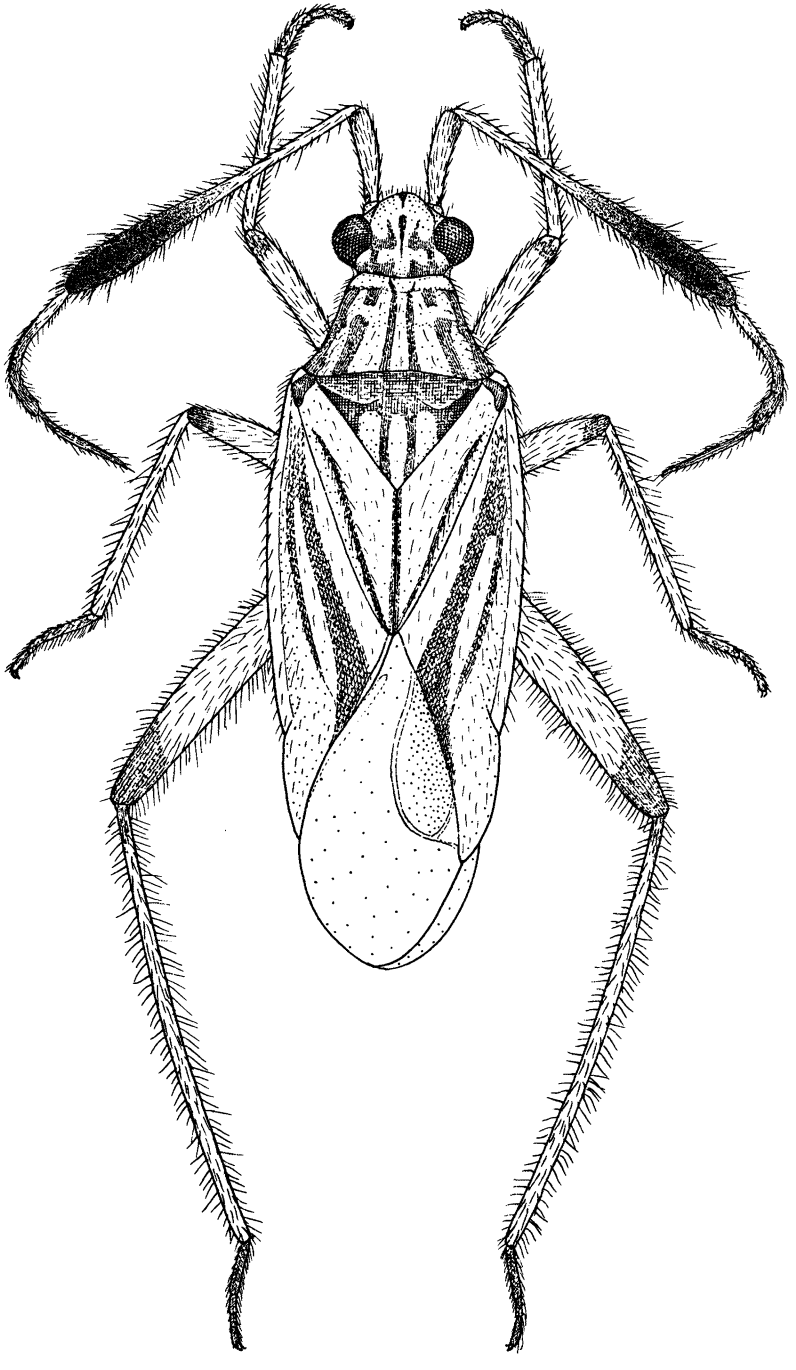
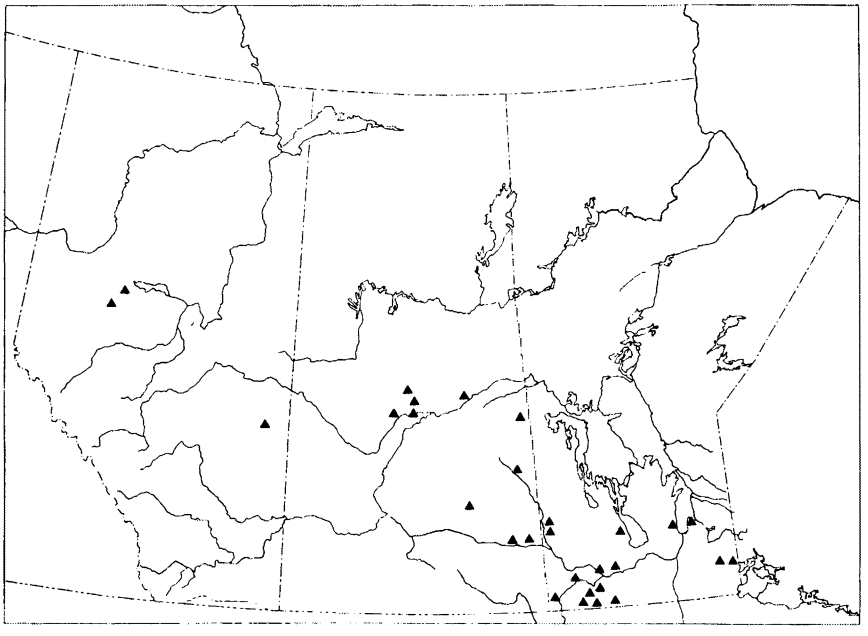


Fig. 19. *Actitocoris signatus*



Map 2. Collection localities for *Collaria meilleurii*.

Remarks. This species is distinguished by the elongate head and by the velvety black spots on the pronotum (Fig. 20).

Habitat. Collected on grasses.

Distribution. Northeastern and North Central States, West Virginia to Illinois, Eastern Canada; Alberta, now known to occur in Saskatchewan and Manitoba (Map 2).

Genus *Stenodema* Laporte

Elongate, flattened, yellowish green species. Head straight, frons striate and flattened, vertex with longitudinal groove; eyes small, carina between them absent. Pronotum trapeziform, pale yellow, punctate; lateral margins carinate and with longitudinal median carina. Hemelytra pubescent.

The Nearctic species were reviewed by Kelton (1961*a*). Six species have been described from North America, three occur in the Prairie Provinces.

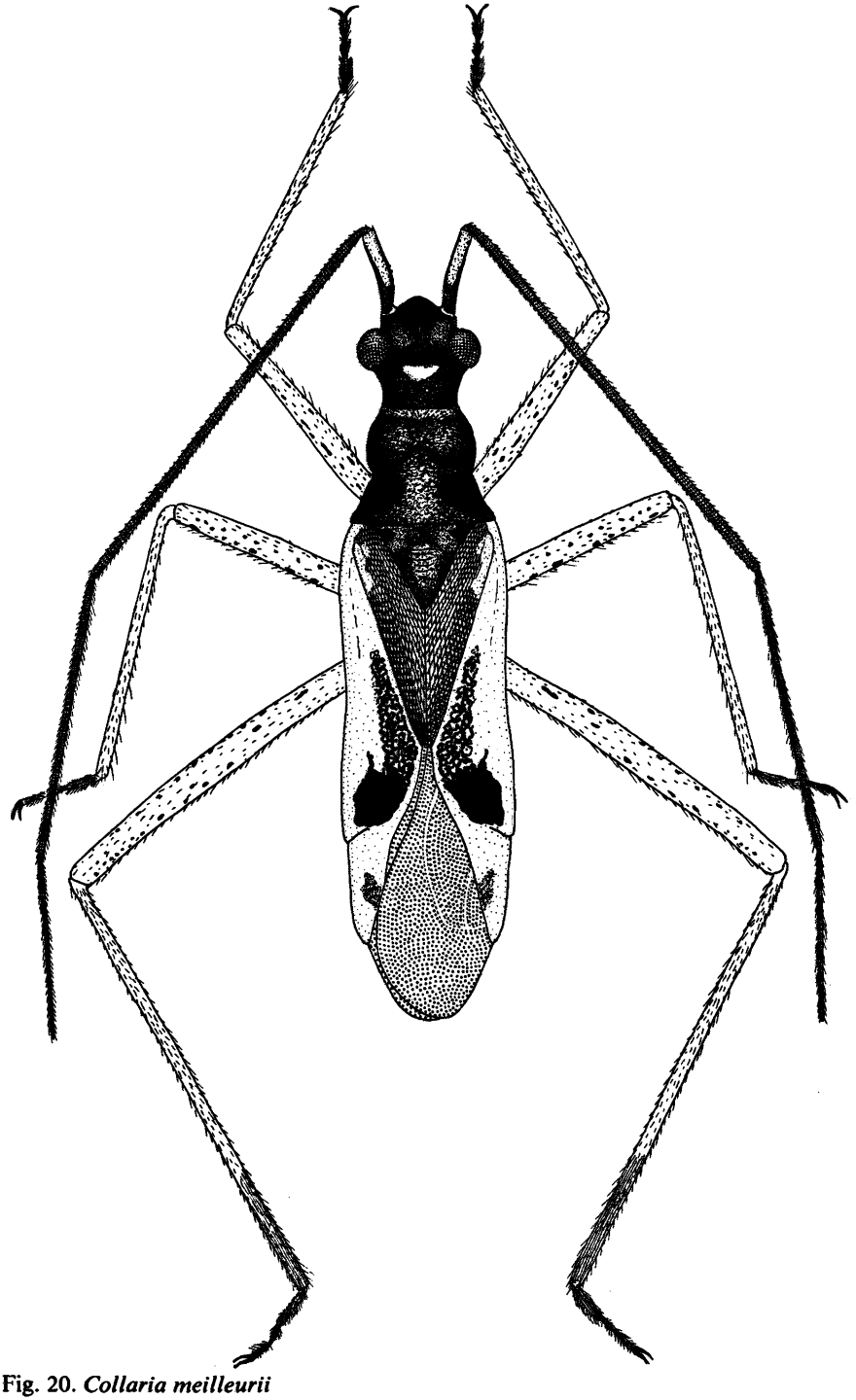


Fig. 20. *Collaria meilleurii*

Key to species of *Stenodema*

1. Hind femur with three short spines near apex ..... ***trispinosa* Reuter** (p. 26)
   Hind femur without spines 2
2. Species greenish; antennae greenish brown; hind tibia strongly pilose .....
   ..... ***pilosipes* Kelton** (p. 27)
   Species reddish brown; antennae reddish; hind tibia with short, slanting bristles
   ..... ***vicina* (Provancher)** (p. 27)

Stenodema trispinosa Reuter

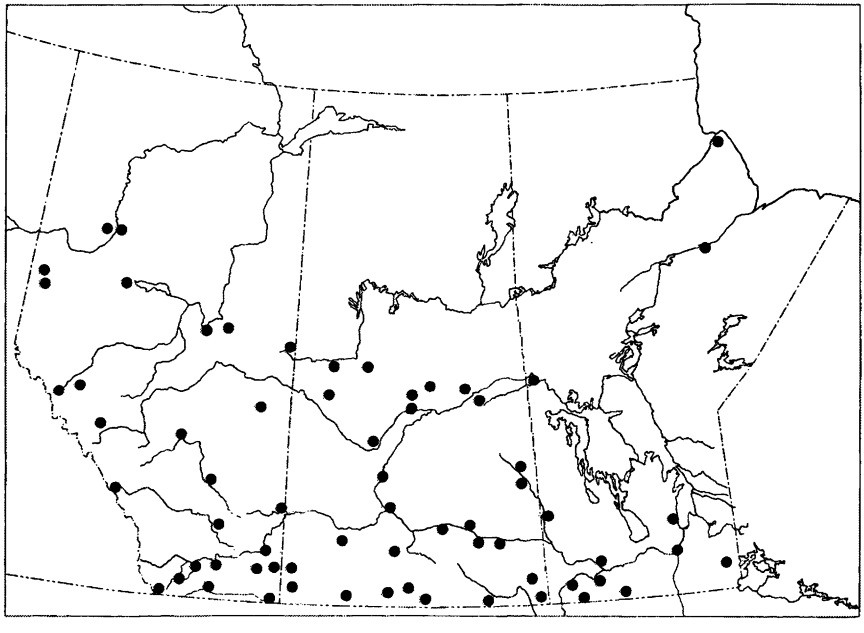
Map 3

Stenodema trispinosum Reuter, 1904:4.

Length 6.51–8.47 mm; width 1.54–2.03 mm. Straw yellow or green. Hind femur with three short spines near apex.

Remarks. The three spines on the femur readily distinguish the species.

Habitat. Collected on grasses in marshy areas, and along slough margins.



Map 3. Collection localities for *Stenodema trispinosa*.

Distribution. Holarctic, widespread in North America; reported from the Prairie Provinces (Map 3).

Stenodema pilosipes Kelton

Map 4

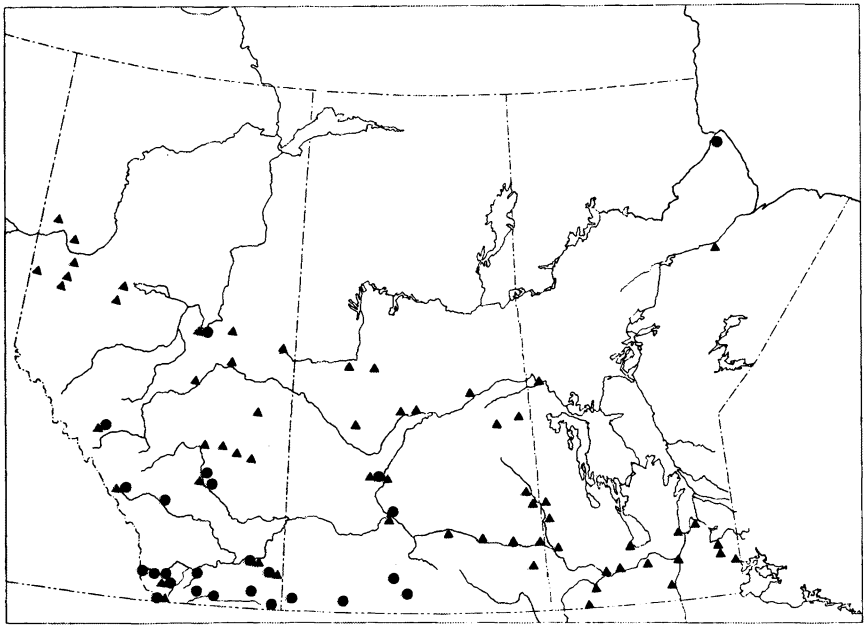
Stenodema pilosipes Kelton, 1961*a*:453.

Length 6.93–8.68 mm; width 1.68–2.17 mm. Olive green. Second antennal segment brown. Hind tibia strongly pilose.

Remarks. The pilose hind tibia is distinctive.

Habitat. Collected on grasses in meadows.

Distribution. Western North America; reported from the Prairie Provinces (Map 4).



Map 4. Collection localities for *Stenodema pilosipes* (●) and *S. vicina* (▲).

Stenodema vicina (Provancher)

Fig. 21; Map 4

Miris vicinus Provancher, 1872:77.
Miris instabilis Uhler, 1875:836.

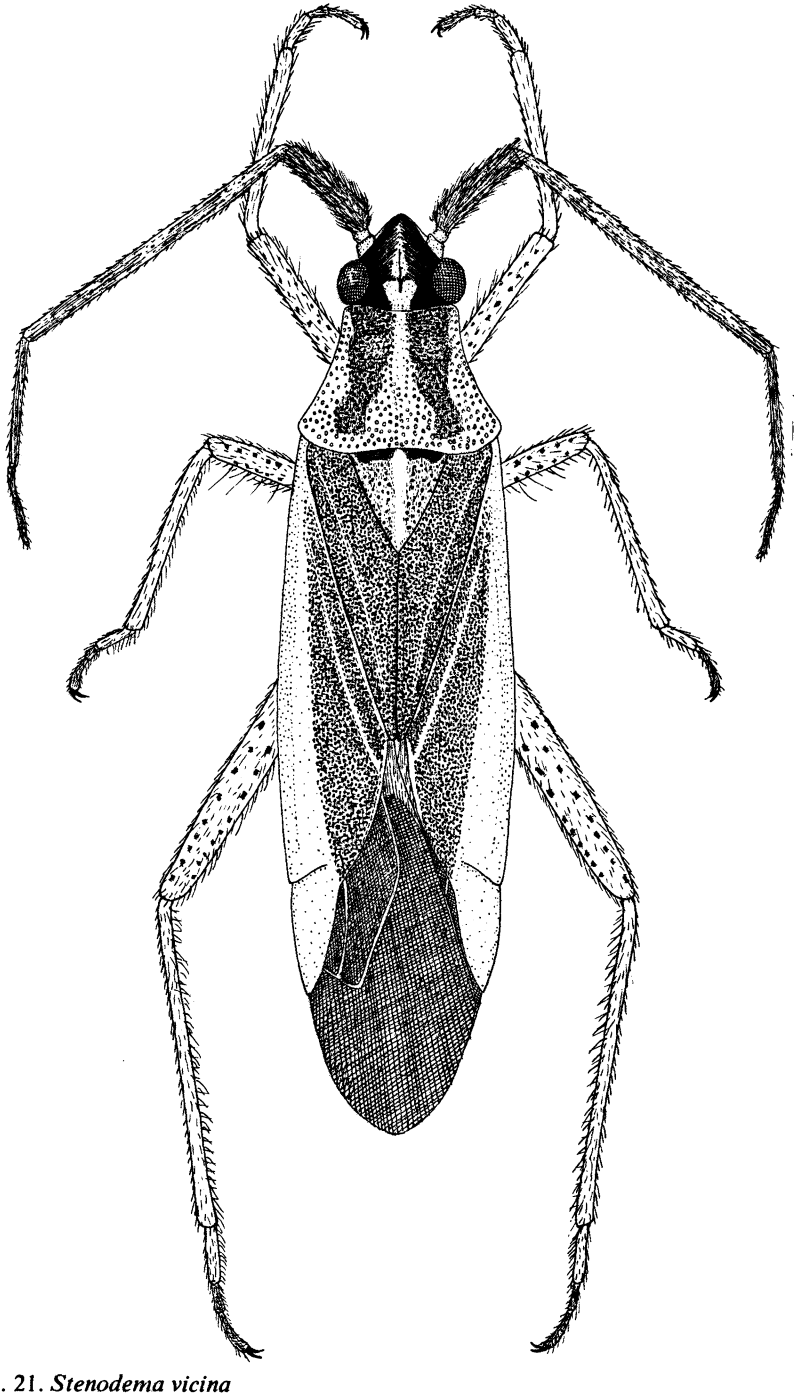


Fig. 21. *Stenodema vicina*

Miris affinis Reuter, 1875*d*:59.
Stenodema vicinum: Van Duzee, 1917:304.

Length 6.65–8.54 mm; width 1.57–2.03 mm. Hemelytra tinged with reddish brown. Second antennal segment reddish. Hind tibia with short, slanting hairs.

Remarks. This species is separated from *pilosipes* by the reddish second antennal segment, by the reddish brown hemelytra, and by the short, slanting hairs on hind tibia (Fig. 21).

Habitat. Collected on grasses in open fields and moist meadows, and often on cereal crops such as oats, wheat, and rye.

Distribution. Widespread in North America; reported from the Prairie Provinces (Map 4).

Genus *Litomiris* Slater

Elongate, pale green species. Head horizontal, frons smooth, eyes large, carina between them absent, vertex with longitudinal groove. First antennal segment long, practically glabrous. Pronotum trapeziform, punctate on basal half with longitudinal median carina. Legs long, slender.

Five species are known from North America, one occurs in the Prairie Provinces.

Litomiris debilis (Uhler)

Fig. 22; Map 5

Megaloceroea debilis Uhler, 1872:408.
Litomiris debilis: Slater, 1956:120.

Length 7.35–12.11 mm; 1.82–2.24 mm. Pale yellowish. First antennal segment long, slender. Pronotum with two sublateral black lines. Hemelytra fuscous, wide costal margin pale green.

Remarks. This species is distinguished by the long and slender first antennal segment (Fig. 22).

Habitat. Collected on native and cultivated grasses.

Distribution. District of Columbia, Iowa, Colorado to Montana, British Columbia; Alberta, now known to occur in Saskatchewan and Manitoba (Map 5).

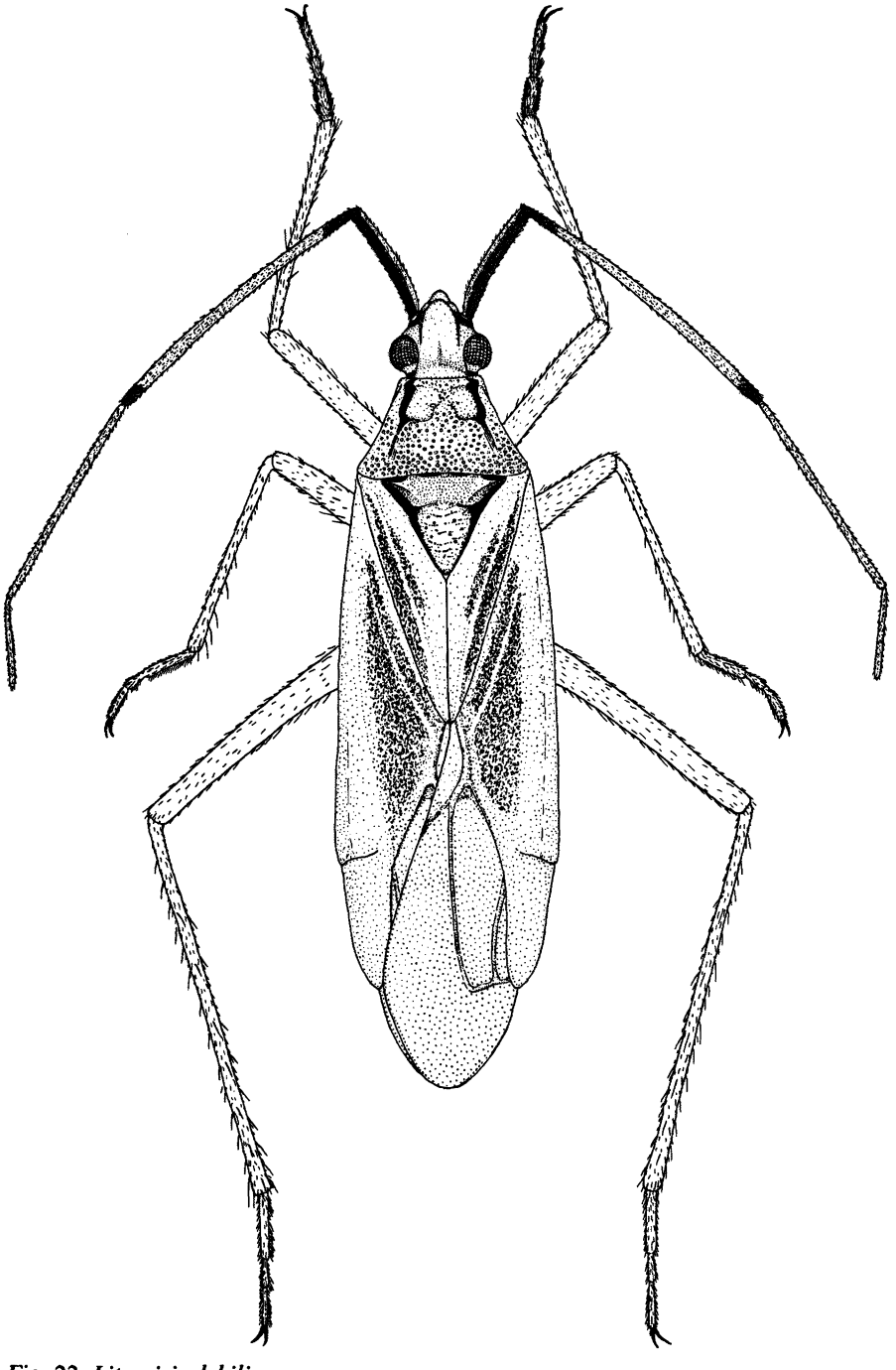
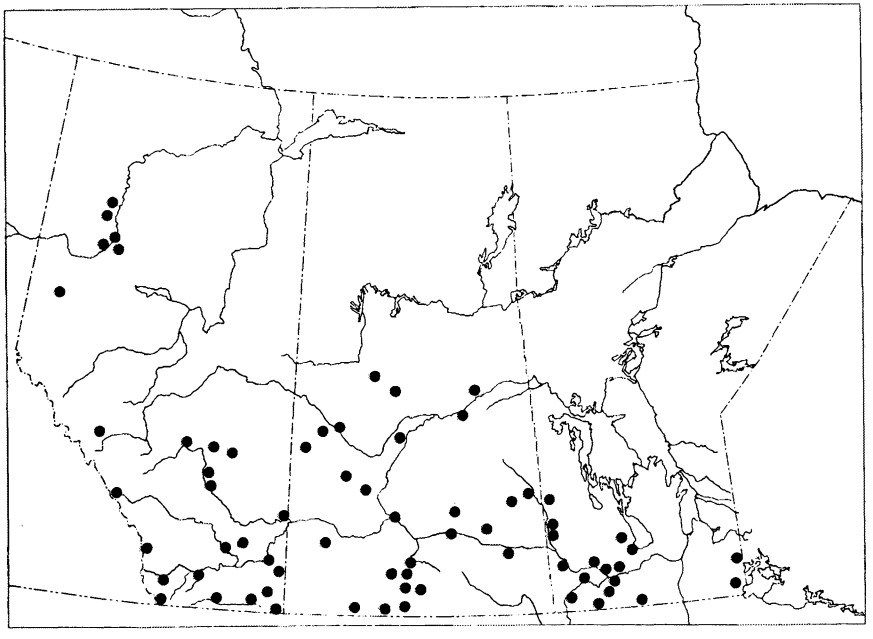


Fig. 22. *Litomiris debilis*



Map 5. Collection localities for *Litomiris debilis*.

Genus *Leptopterna* Fieber

Elongate, yellowish or reddish and black, pubescent species. Head oblique, frons tumid, eyes small, carina between them absent. First and second antennal segments with long, dense pubescence. Pronotum trapeziform, lateral margins carinate. Hemelytra reduced in female. Pubescence pale, long, erect. Legs long, slender, pilose.

Two species, both Holarctic in distribution, occur in North America.

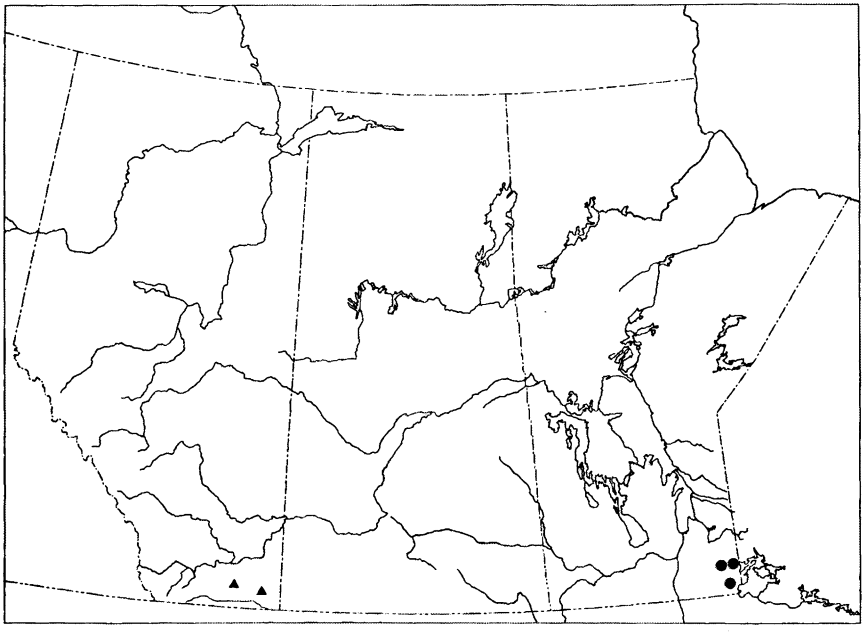
Key to species of *Leptopterna*

1. First antennal segment about as long as width of head; second antennal segment much thinner than front tibia ..... ***dolabrata* (Linnaeus)** (p. 31)
   First antennal segment much longer than width of head; second antennal segment almost as thick as front tibia (Fig. 23) ..... ***ferrugata* (Fallén)** (p. 32)

Leptopterna dolabrata (Linnaeus)

Map 6

Cimex dolabratus Linnaeus, 1758:449.
Leptopterna dolabrata: Fieber, 1861:245.
Miris belangeri Provancher, 1872:78.



Map 6. Collection localities for *Leptopterna dolabrata* (●) and *L. ferrugata* (▲).

Length 7.30–9.30 mm; width 1.90–2.40 mm. First antennal segment about as long as width of head; second segment much thinner than front tibia. Hemelytra reddish brown in male, fuscous in female, costal margins yellowish green.

Remarks. The males are reddish and black, and the female hemelytra are long, extending to tip of abdomen. The nymphs of this species emerge very early in the spring.

Habitat. Collected on grasses in meadows.

Distribution. Northeastern States, Oregon, Ontario, Quebec, British Columbia; now known to occur in Manitoba (Map 6).

Leptopterna ferrugata (Fallén)

Fig. 23; Map 6

Miris ferrugatus Fallén, 1807:107.
Leptopterna amoena Uhler, 1872:409.
Leptopterna ferrugata: Reuter, 1875*a*:14.

Length 7.70–9.80 mm; width 1.80–2.50 mm. Males yellowish. First antennal segment much longer than width of head; second segment almost

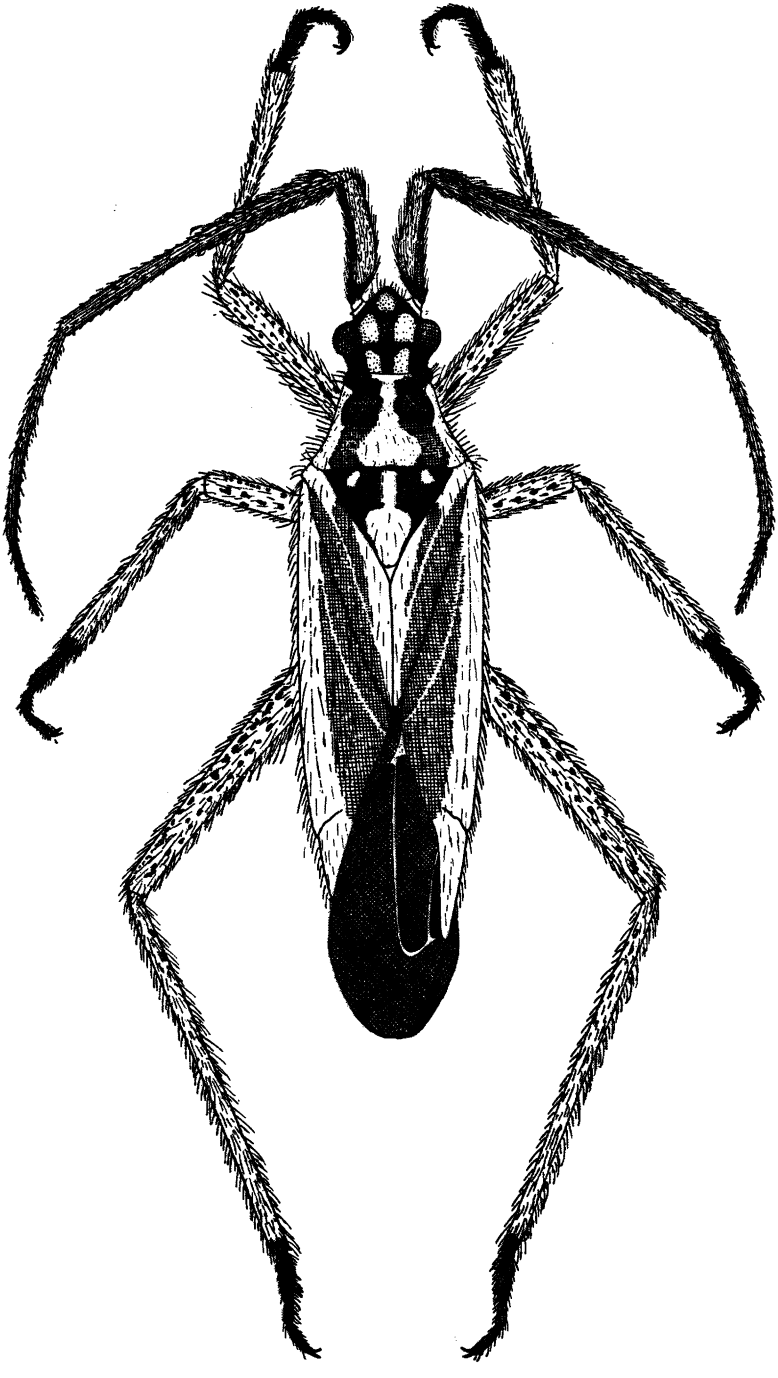


Fig. 23. *Leptopterna ferrugata*

as thick as front tibia. Hemelytra fuscous in both sexes, costal margin pale green (Fig. 23); in female hemelytra short.

Remarks. The males of this species are yellowish, those of *dolabrata* are reddish and black; the female hemelytra of *ferrugata* are short, extending to middle of abdomen.

Habitat. Collected on grasses.

Distribution. Alaska, northwestern States, Colorado to Kentucky, Quebec; now known to occur in Alberta (Map 6).

Genus *Trigonotylus* Fieber

Elongate, slender, sparsely pubescent species. Head horizontal, frons smooth, vertex with longitudinal median groove, clypeus prominent, extending forward. Pronotum finely punctate. Legs long, slender.

The North American species were revised by Kelton (1971*a*). Eighteen species are known from North America, eight occur in the Prairie Provinces, one of which is a Holarctic species.

Key to species of *Trigonotylus*

1. Frons not projecting above base of clypeus (Fig. 26) .... ***tarsalis*** **(Reuter)** (p. 37)
   Frons projecting above base of clypeus (Fig. 27) 2
2. First antennal segment thickened, spindle-shaped ..... ***antennatus*** **Kelton** (p. 39)
   First antennal segment slender 3
3. First antennal segment black ..... ***brooksi*** **Kelton** (p. 39)
   First antennal segment green, brown, or marked with red 4
4. Second antennal segment less than 1.9 mm in length; yellow, orange, or green; hind tibia green 5
   Second antennal segment more than 2.0 mm in length; reddish; hind tibia reddish 6
5. Second antennal segment yellowish orange, first segment green; rostrum 1.27 mm long ..... ***flavicornis*** **Kelton** (p. 39)
   Second antennal segment greenish brown, first segment brown; rostrum 1.15 mm long ..... ***canadensis*** **Kelton** (p. 40)
6. Rostrum more than 1.7 mm in length; first antennal segment with reddish stripes ..... ***coelestialium*** **(Kirkaldy)** (p. 42)
   Rostrum less than 1.7 mm in length; first antennal segment diffuse reddish 7
7. First antennal segment with stiff, black hairs; spiculum thick, curved ..... ***ruficornis*** **(Geoffroy)** (p. 42)
   First antennal segment with fine, black hairs; spiculum thin, straight ..... ***americanus*** **Carvalho** (p. 43)

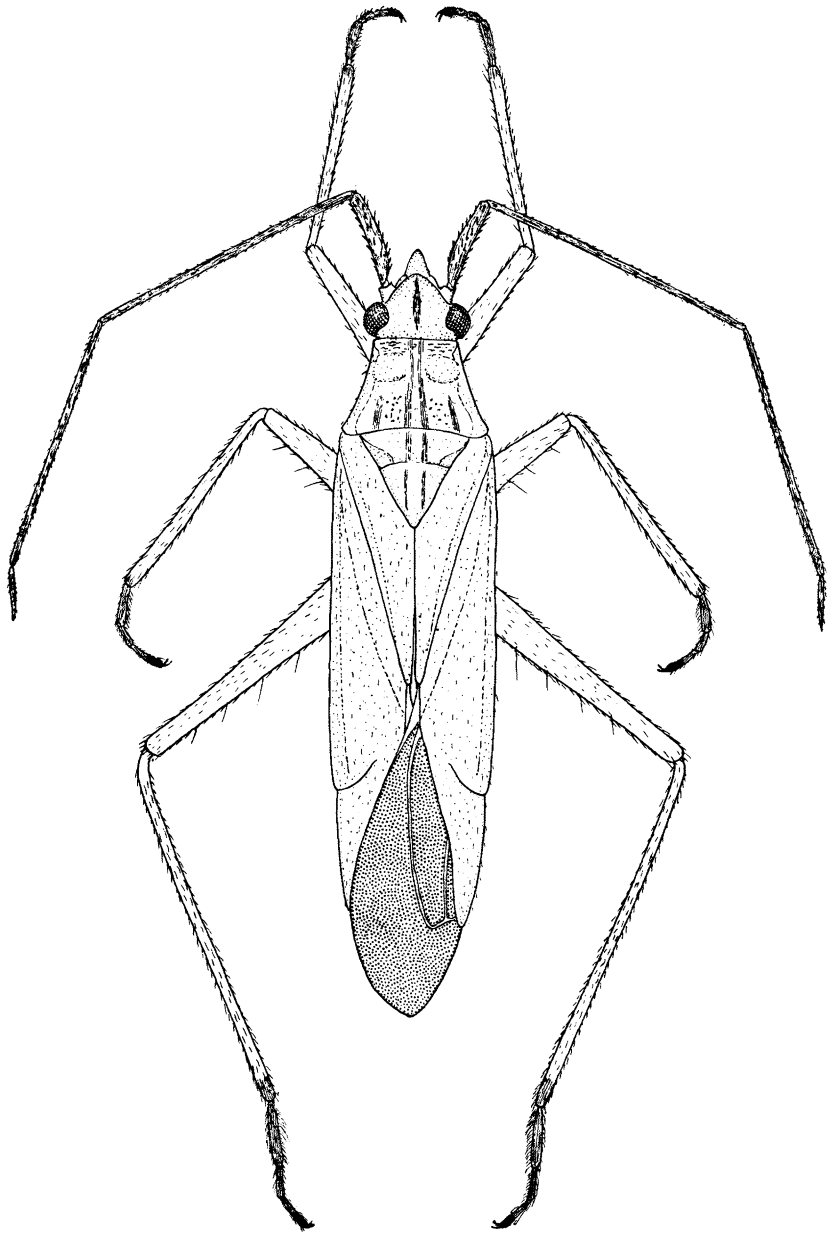


Fig. 24. *Trigonotylus ruficornis*

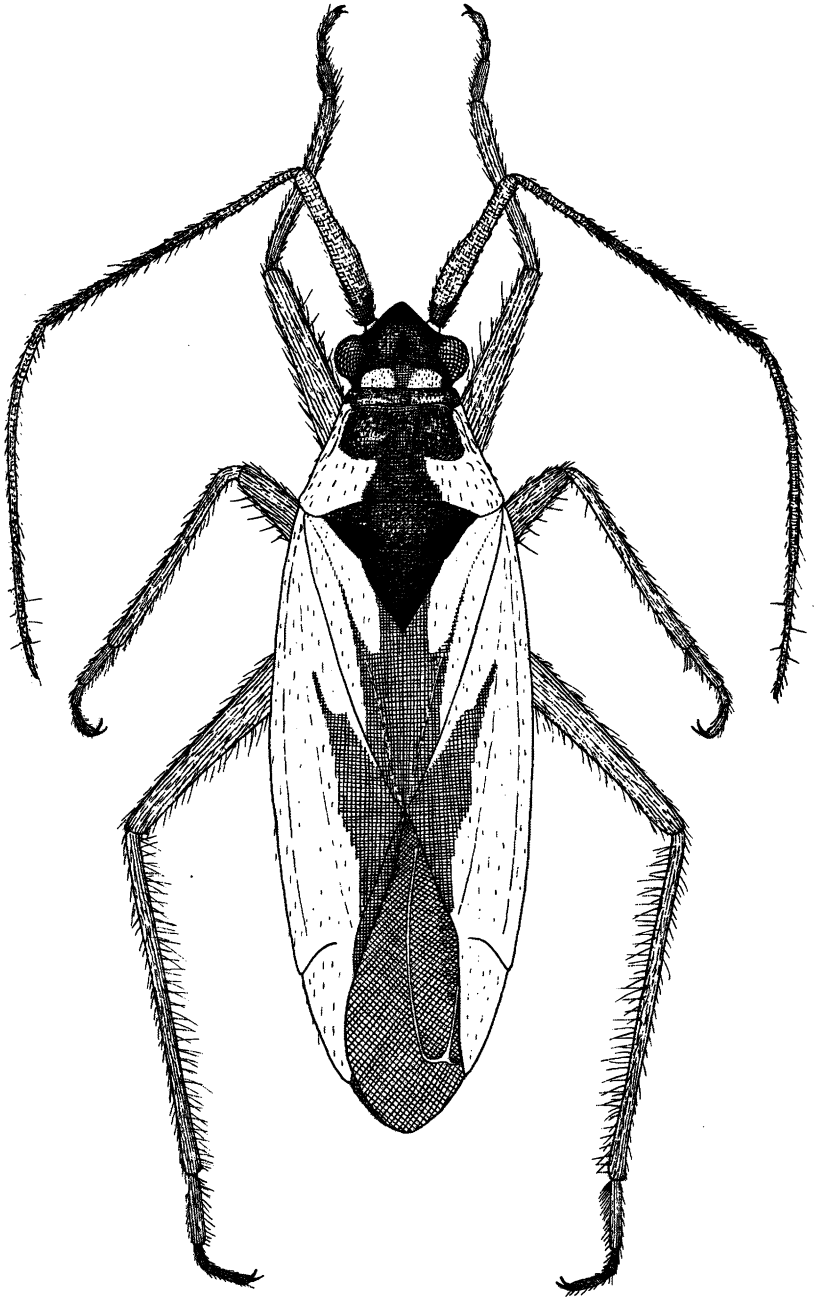


Fig. 25. *Teratocoris discolor*

Trigonotylus tarsalis (Reuter)

Figs. 26, 28; Map 7

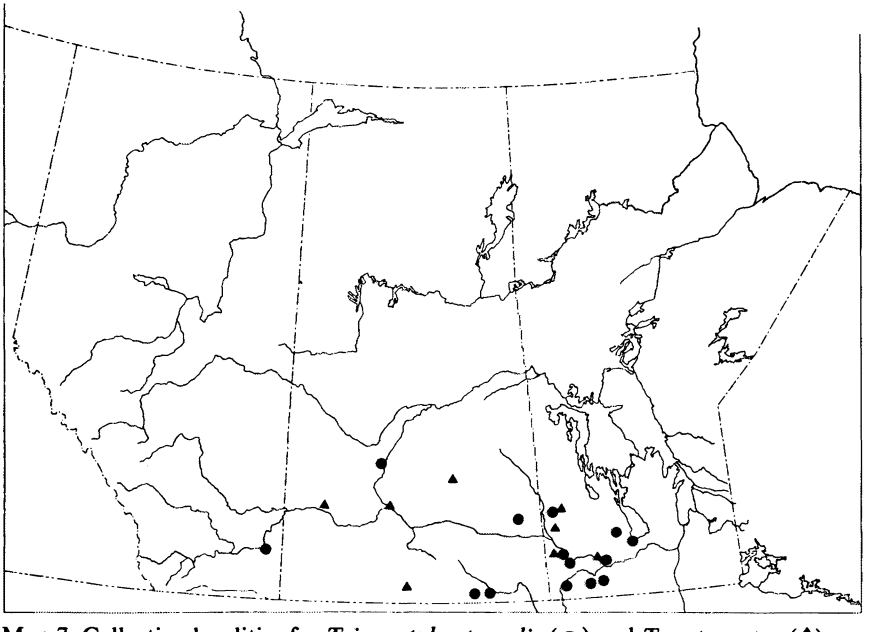
Callimiris tarsalis Reuter, 1875*a*:60.
Trigonotylus tarsalis: Reuter, 1909:6.

Length 5.18–5.74 mm; width 1.26–1.40 mm. Head pale green, frons gently sloping to base of clypeus (Fig. 26), clypeus bulbous in front. First antennal segment long, thickened with stout, black bristles. Hemelytra light green. Hind tibia and tarsus often black, tibia pilose.

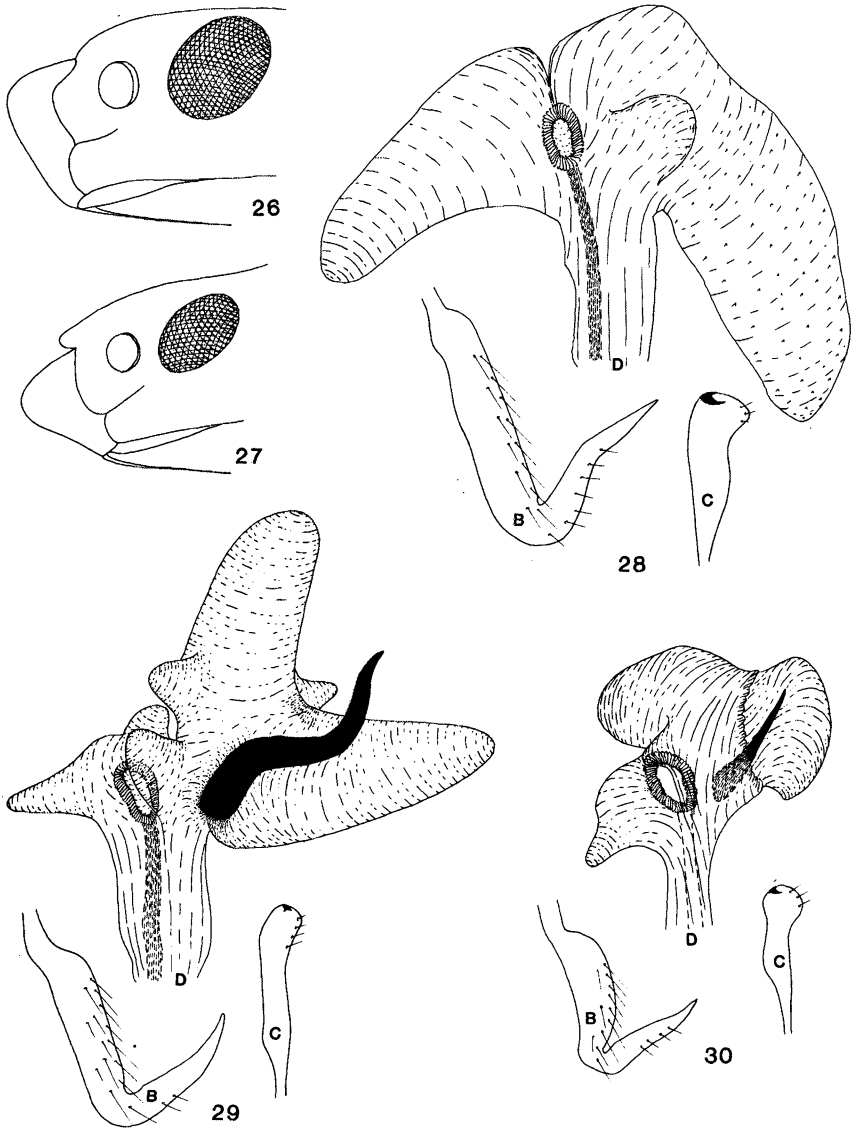
Remarks. This species is distinguished by the long and thickened first antennal segment, by the sloping frons, and by the black hind tibia. The genitalia (Fig. 28) are distinctive.

Habitat. Collected on grasses along slough margins.

Distribution. Northeastern and North Central States, Utah to Texas, Saskatchewan to Nova Scotia; now known to occur in Alberta (Map 7).



Map 7. Collection localities for *Trigonotylus tarsalis* (●) and *T. antennatus* (▲).



Figs. 26–30. Heads and genitalia of *Trigonotylus* spp. 26, *tarsalis*; 27, *flavicornis*; 28, *tarsalis*; 29, *antennatus*; 30, *brooksi*.

Trigonotylus antennatus Kelton

Fig. 29; Map 7

Trigonotylus antennatus Kelton, 1970:337.

Length 5.18–5.95 mm; width 1.12–1.40 mm. Pale green. Frons projecting over base of clypeus, clypeus acutely rounded in front. Antennae reddish orange, first segment thick, spindle-shaped. Apex of hind tibia reddish.

Remarks. This species is distinguished by the thick and spindle-shaped first antennal segment, and by the reddish orange antennae. The genitalia (Fig. 29) are distinctive.

Habitat. Collected on grasses.

Distribution. Western States, British Columbia; Saskatchewan, Manitoba (Map 7).

Trigonotylus brooksi Kelton

Fig. 30; Map 8

Trigonotylus brooksi Kelton, 1970:334.

Length 4.20–5.11 mm; width 0.98–1.12 mm. Head and pronotum pale green, longitudinal lines black; clypeus rounded in front. First antennal segment black or brown, other segments orange.

Remarks. This species is distinguished by the black or brown first antennal segment. The genitalia (Fig. 30) are distinctive.

Habitat. Collected on rangeland grasses.

Distribution. British Columbia; Saskatchewan (Map 8).

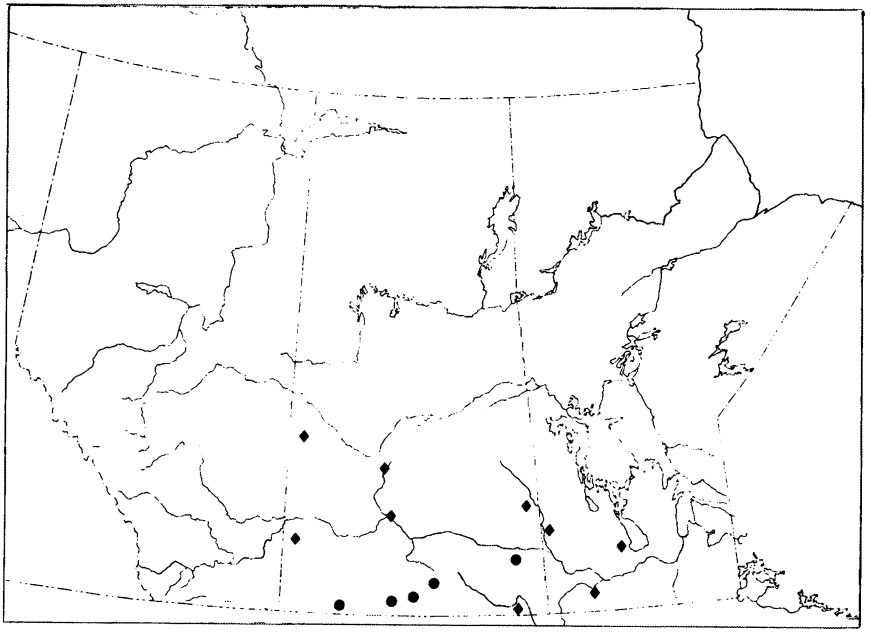
Trigonotylus flavicornis Kelton

Fig. 31; Map 8

Trigonotylus flavicornis Kelton, 1970:335.

Length 4.06–4.25 mm; width 0.94–1.05 mm. Head and pronotum yellowish green, longitudinal lines black. First antennal segment pale green, slender, with prominent stiff bristles, other segments orange.

Remarks. This species resembles *brooksi*, but the first antennal segment is green, with prominent stiff bristles. The genitalia (Fig. 31) are distinctive.



Map 8. Collection localities for *Trigonotylus brooksi* (●) and *T. flavicornis* (◆).

Habitat. Collected on prairie grasses.

Distribution. Known only from Saskatchewan and Manitoba (Map 8).

Trigonotylus canadensis Kelton

Fig. 32; Map 9

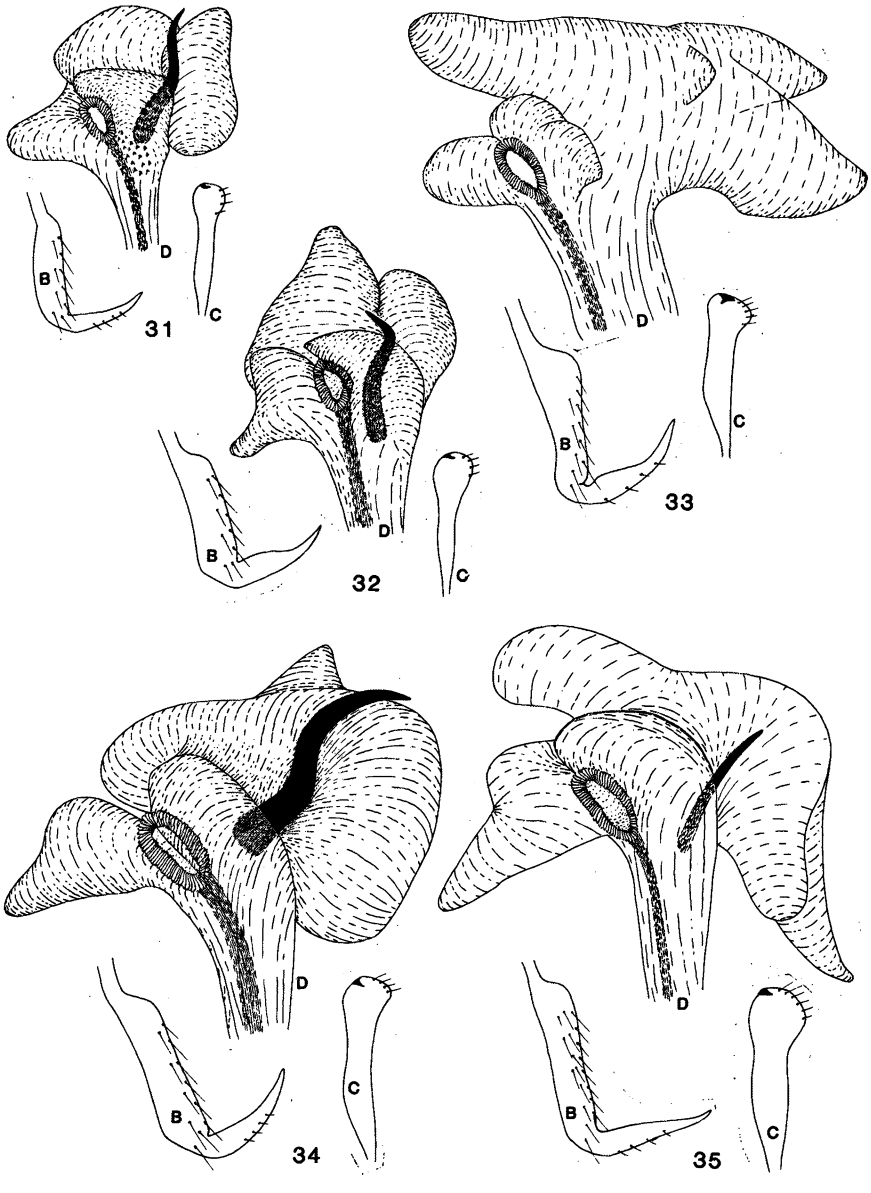
Trigonotylus canadensis Kelton, 1970:336.

Length 4.20–4.90 mm; width 0.91–1.12 mm. Head and pronotum yellowish green, longitudinal lines black. Antennal segments brown.

Remarks. This species is distinguished by the brown antennae. The male genitalia (Fig. 32) are distinctive.

Habitat. Collected on prairie grasses.

Distribution. Known only from the Prairie Provinces (Map 9).



Figs. 31–35. Genitalia of *Trigonotylus* spp. 31, *flavicornis*; 32, *canadensis*; 33, *coelestialium*; 34, *ruficornis*; 35, *americanus*.

Trigonotylus coelestialium (Kirkaldy)

Fig. 33; Map 9

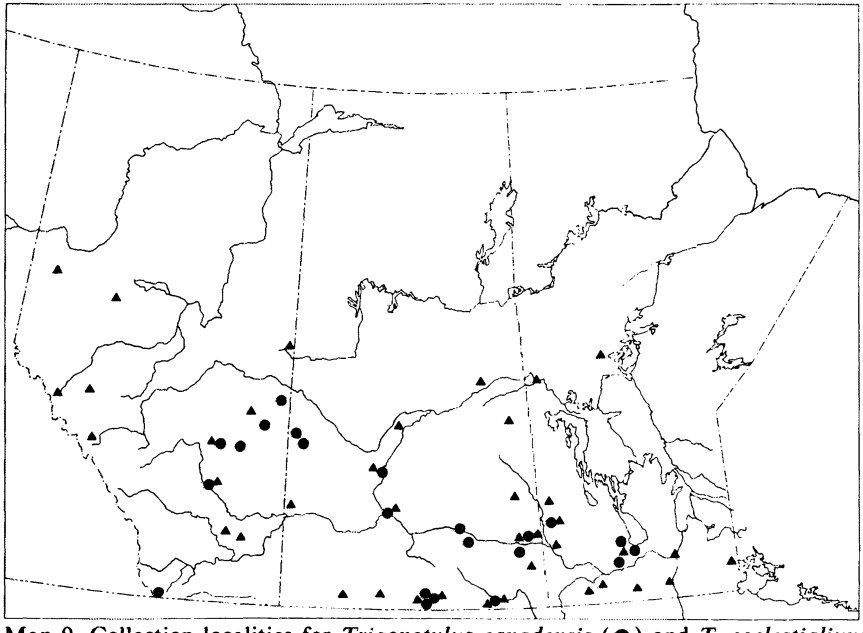
Megaloceroea coelestialium Kirkaldy, 1902:266.
Trigonotylus coelestialium: Reuter, 1903:1.

Length 5.22–6.16 mm; width 1.26–1.47 mm. Yellowish green. First antennal segment greenish with three longitudinal reddish stripes and short, fine, black hairs; other segments reddish. Hind tibia reddish near apex.

Remarks. This Holarctic species is distinguished by the reddish stripes on the first antennal segment, and by the reddish tip of the hind tibia. The male genitalia (Fig. 33) are distinctive.

Habitat. Collected on prairie grasses.

Distribution. Eastern States, Eastern Canada; Prairie Provinces (Map 9).



Map 9. Collection localities for *Trigonotylus canadensis* (●) and *T. coelestialium* (▲).

Trigonotylus ruficornis (Geoffroy)

Figs. 24, 34; Map 10

Cimex ruficornis Geoffroy, 1785:209.
Trigonotylus ruficornis: Fieber, 1861:243.

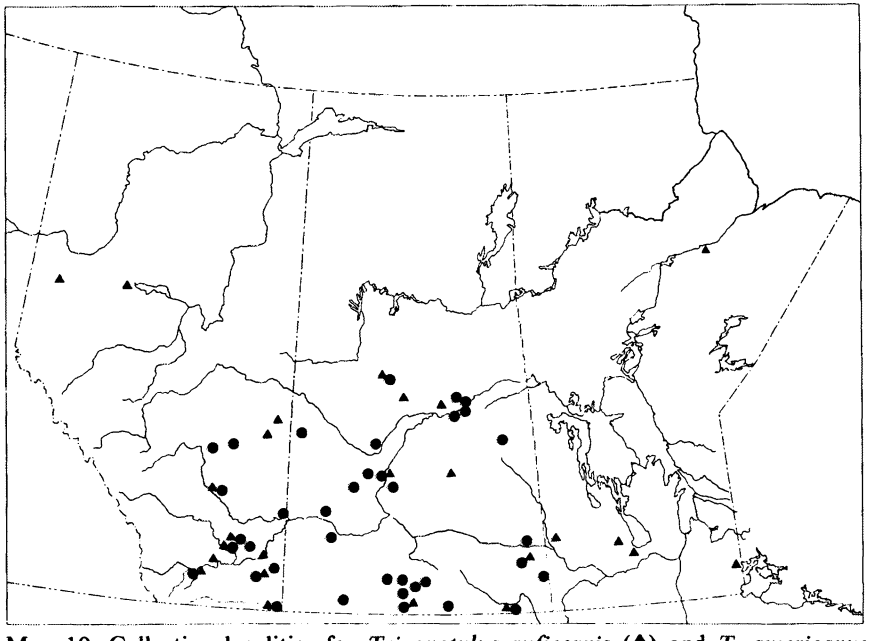
Miris viridis Provancher, 1872:78.
Trigonotylus montanus Carvalho, 1957:137.

Length 5.60–6.65 mm; width 1.33–1.61 mm. Yellowish green. First antennal segment green to brownish, often with reddish tinge, long, slender, with short, stiff, black bristles. Hind tibia reddish near apex.

Remarks. This Holarctic species is distinguished by the short, stiff, black bristles on the long and slender first antennal segment (Fig. 24). The male genitalia (Fig. 34) are distinctive.

Habitat. Collected on rangeland grasses.

Distribution. Widespread in North America; Prairie Provinces (Map 10).



Map 10. Collection localities for *Trigonotylus ruficornis* (▲) and *T. americanus* (●).

Trigonotylus americanus Carvalho

Fig. 35; Map 10

Trigonotylus americanus Carvalho, 1957:125.

Length 5.32–6.16 mm; width 1.19–1.40 mm. Yellowish green. Antennal segments mostly reddish, first segment slender with short, fine, black hairs. Hind tibia reddish near apex.

Remarks. This species is similar in appearance to *coelestialium*, but lacks the reddish stripes. The male genitalia (Fig. 35) are distinctive.

Habitat. Collected on rangeland grasses.

Distribution. Western States, British Columbia; Alberta, Saskatchewan (Map 10).

Genus *Teratocoris* Fieber

Elongate, slender, and flattened, green or green and black species. Head horizontal, short, vertex with longitudinal median groove. First antennal segment longer than width of head. Pronotum smooth, lateral margins carinate. Legs long, slender.

Six species are known from North America, four occur in the Prairie Provinces, two of which are Holarctic species. Kelton (1966*a*) reviewed the species in the Nearctic region.

Key to species of *Teratocoris*

1. Hemelytra black along inner margins of clavus and corium (Fig. 25); genitalia (Fig. 36) ..... ***discolor* Uhler** (p. 44)

Hemelytra greenish throughout 2

2. First and second antennal segments and hind tibia reddish; genitalia (Fig. 37) ..... ***paludum* Sahlberg** (p. 45)

First and second antennal segments and hind tibia not reddish 3

3. Left margin of genital segment with slender process (Fig. 38A); fifth abdominal segment of female with small median process (Fig. 38E) ..... ***saundersi* Douglas & Scott** (p. 46)

Left margin of genital segment with broad process (Fig. 39A); fifth abdominal segment of female entire ..... ***caricis* Kirkaldy** (p. 46)

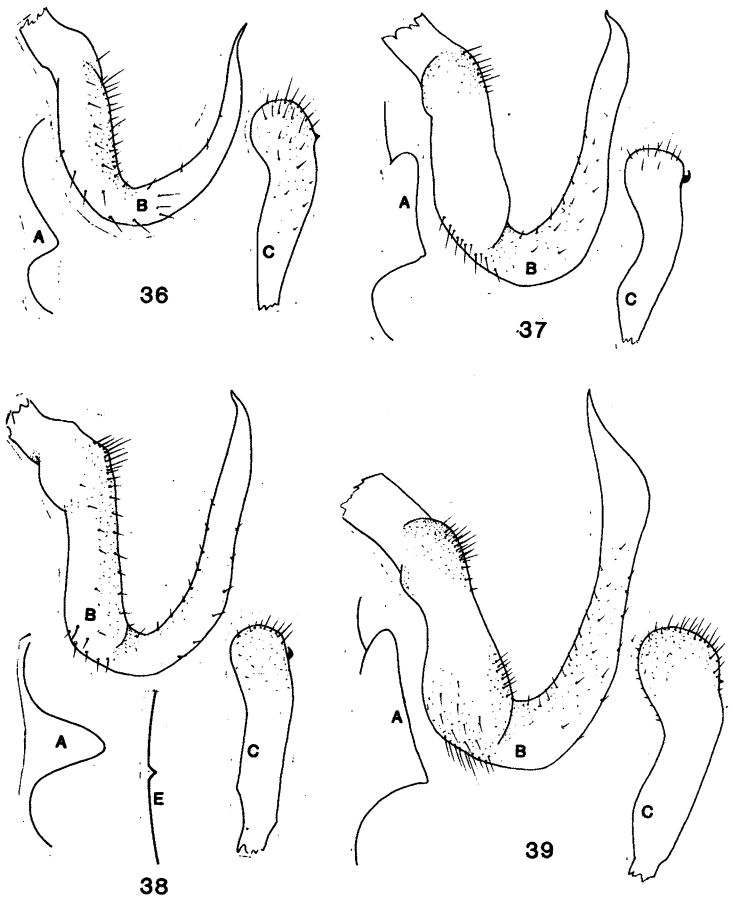
Teratocoris discolor Uhler

Fig. 36; Map 11

Teratocoris discolor Uhler, 1887:68.

Length 4.20–5.95 mm; width 1.19–1.75 mm. Head and pronotum mostly black, hemelytra green, black along inner margins. Ventral surface black, legs reddish, hind tibia strongly pilose.

Remarks. This species is distinguished by the black head and pronotum, by the green hemelytra with black inner margins, and by the pilose hind tibia. The genital structures (Fig. 36) are distinctive.



Figs. 36–39. Genitalia of *Teratocoris* spp. 36, *discolor*; 37, *paludum*; 38, *saundersi*; 39, *caricis*.

Habitat. Collected on *Carex* spp.

Distribution. Northeastern and Central States, British Columbia, Ontario, Quebec; Prairie Provinces (Map 11).

Teratocoris paludum Sahlberg

Fig. 37; Map 11

Teratocoris paludum Sahlberg, 1870:291.

Length 4.97–6.30 mm; width 1.22–1.47 mm. Green. First and second antennal segments reddish. Hind tibia reddish and strongly pilose.

Remarks. The reddish first and second antennal segments, the reddish hind tibia, and the genital structure (Fig. 37) readily distinguish the species.

Habitat. Collected on *Carex* spp.

Distribution. Alaska, New York, Central States, California, Yukon, British Columbia, Ontario, Quebec, Newfoundland; Prairie Provinces (Map 11).

Teratocoris saundersi Douglas & Scott

Fig. 38; Map 12

Teratocoris saundersi Douglas & Scott, 1869:260.
Teratocoris herbaticus Uhler, 1887*b*:67.
Teratocoris longicornis Uhler, 1895:29

Length 4.55–6.30 mm; width 1.22–1.68 mm. Pale green; median longitudinal line on head and pronotum, collar, and scutellum often black. Hind tibia pilose. Left margin of genital segment with slender process (Fig. 38A). Fifth abdominal segment of female with small, median process (Fig. 38E).

Remarks. This species is distinguished by the characters given in the key.

Habitat. Collected on *Scirpus* spp., *Carex* spp., and *Calamagrostis* spp.

Distribution. Alaska, Colorado, northern Canada, British Columbia, Newfoundland; Prairie Provinces (Map 12).

Teratocoris caricis Kirkaldy

Fig. 39; Map 12

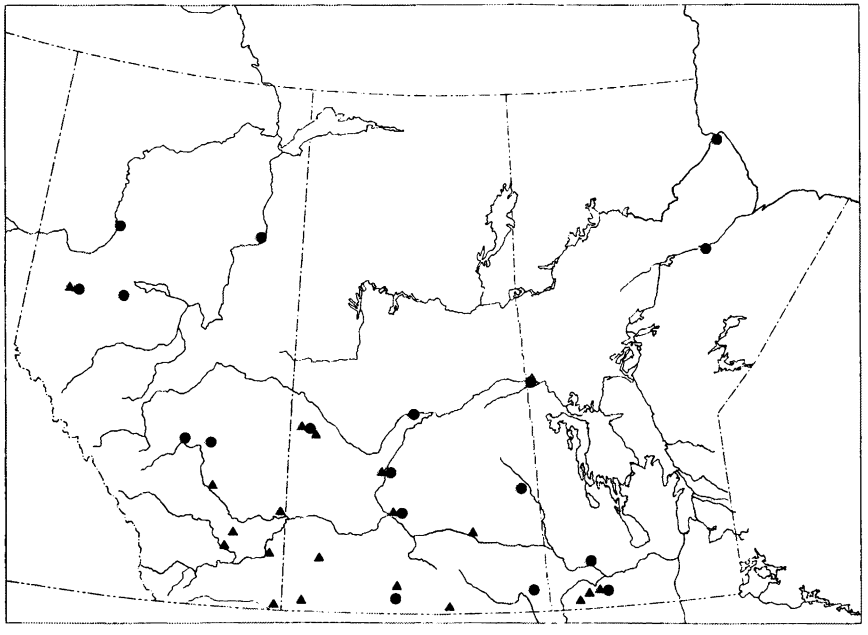
Teratocoris caricis Kirkaldy, 1909:390.

Length 4.69–6.79 mm; width 1.33–1.89 mm. Pale green, median longitudinal line on head and pronotum, collar and scutellum often black. Hind tibia pilose.

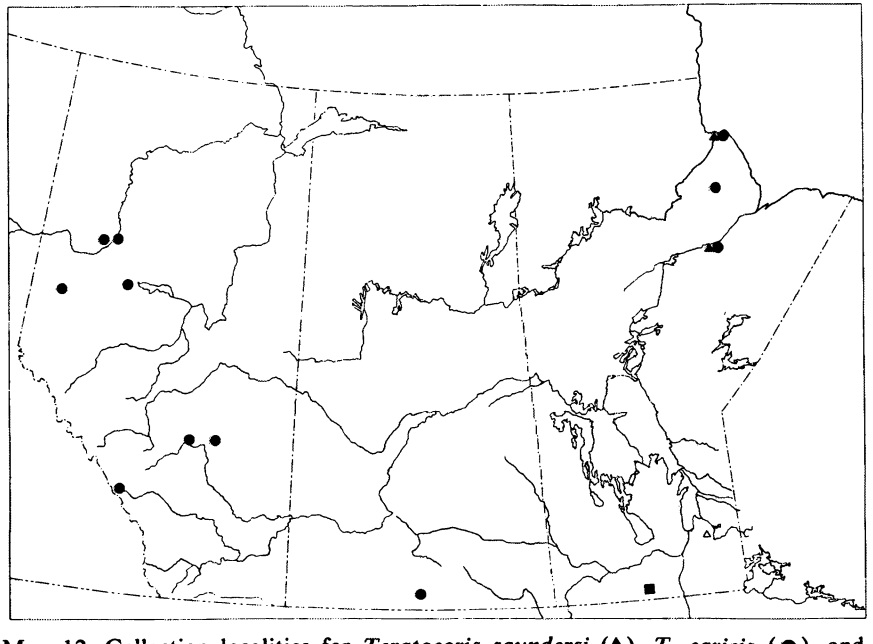
Remarks. This species is similar to *saundersi* in color and appearance, but the process on the genital segment is broad (Fig. 39A).

Habitat. Collected on *Carex* spp.

Distribution. Alaska, Wyoming, Colorado, California, British Columbia, Newfoundland; Prairie Provinces (Map 12).



Map 11. Collection localities for *Teratocoris discolor* (▲) and *T. paludum* (●).



Map 12. Collection localities for *Teratocoris saundersi* (▲), *T. caricis* (●), and *Opistheurista clandestina* (■).

Tribe Resthenini

In the Prairie Provinces the tribe is represented as two genera and eight species.

Key to genera of Resthenini

1. Stricture of pronotal collar not interrupted at side (Fig. 15) ..... ***Opistheurista*** **Carvalho** (p. 48)
   Stricture of pronotal collar interrupted at side (Fig. 16) ..... ***Prepops*** **Reuter** (p. 48)

Genus *Opistheurista* Carvalho

Elongate, velvety, black and orange and red species. Head vertical, short. Pronotum trapeziform, lateral margins rounded, collar prominent, stricture of collar not interrupted at side. Osteolar peritreme small, indistinct. Head, pronotum, and hemelytra velvety.

This Nearctic genus is monobasic.

Opistheurista clandestina (Van Duzee)

Fig. 16; Map 12

Opistheuria clandestina Van Duzee, 1915:110.
Opistheurista clandestina: Carvalho, 1959:347.

Length 6.30–7.70 mm; width 2.52–3.22 mm. Head black, jugum orange, antennae black. Pronotum black, collar and side margins orange or red. Scutellum black. Hemelytra black, costal margin and cuneus orange or red; pubescence short. Ventral surface mostly black with some orange, legs black, pilose.

Remarks. Carvalho (1959) transferred this species to the present genus. It is similar to those of *Prepops* in texture and appearance, but the collar stricture is not interrupted at the side (Fig. 16)

Habitat. Collected on *Vicia* spp.

Distribution. New York, Florida, Central States, Ontario; now known to occur in Manitoba (Map 12).

Genus *Prepops* Reuter

Elongate, velvety, black, or black and red species. Head vertical, short. Pronotum trapeziform, lateral margins rounded, collar prominent, stricture

of collar interrupted at side. Osteolar peritreme small, indistinct. Head, pronotum, and hemelytra velvety.

Approximately 35 species are known from North America, seven occur in the Prairie Provinces.

Key to species of *Prepops*

1. Large species 8.54–9.45 mm ..... ***fraternus* (Knight)** (p. 49)
   Smaller species less than 8.0 mm 2
2. Costal margins of hemelytra red (Fig. 40) ..... ***zonatus* (Knight)** (p. 50)
   Hemelytra black 3
3. Second antennal segment short, only 1.3 times longer than head width ..... ***eremicola* (Knight)** (p. 51)
   Second antennal segment over 1.5 times longer than head width 4
4. Rostrum over 2.10 mm long; second antennal segment 1.6 times head width or longer 5
   Rostrum 2.10 mm or shorter; second antennal segment 1.5 times head width or shorter 6
5. Pubescence on red areas of pronotum black ..... ***nigripilus* (Knight)** (p. 52)
   Pubescence on red areas of pronotum pale ..... ***rubellicollis* (Knight)** (p. 52)
6. Pronotum and scutellum black ..... ***borealis* (Knight)** (p. 53)
   Median line on pronotum and scutellum red ..... ***bivittis* (Stål)** (p. 54)

Prepops fraternus (Knight)

Map 13

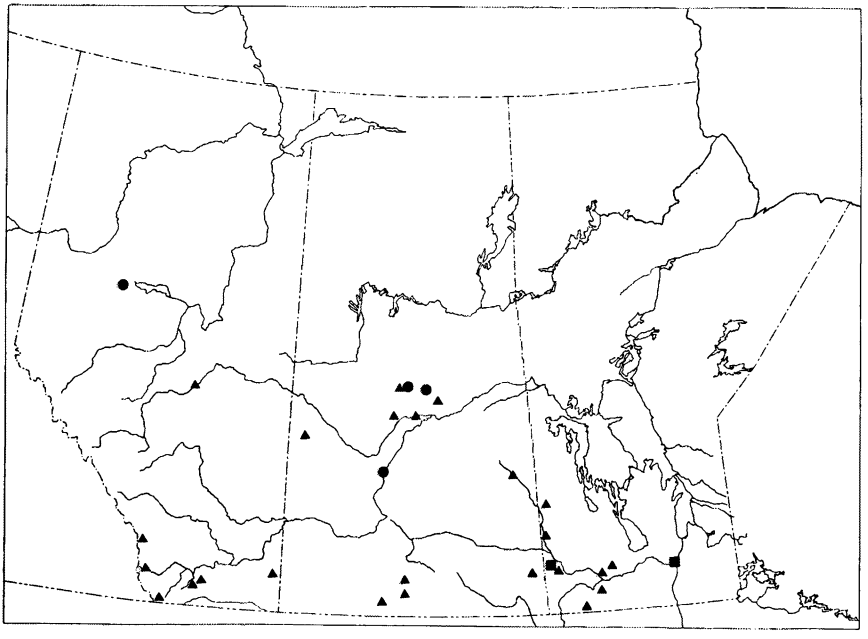
Platytylellus fraternus Knight, 1923*b*:557.
Prepops fraternus: Carvalho, 1959:335.

Length 8.54–9.45 mm; width 3.08–3.71 mm. Head red, clypeus and frons black. Antennae black. Pronotum black along wide median line, lateral margins red. Scutellum black. Hemelytra black along median line, costal margins red. Ventral surface mostly red, legs black, pilose. Male genital segment with two prominent tubercles.

Remarks. This species varies considerably in color, and many color combinations have been given varietal names. The color form in the Prairie Provinces is *rubromarginatus* Knight.

Habitat. Collected on *Quercus macrocarpa.*

Distribution. Eastern States; now known to occur in Manitoba (Map 13).



Map 13. Collection localities for *Prepops fraternus* (■), *P. zonatus* (●), and *P. eremicola* (▲).

Prepops zonatus (Knight)

Fig. 40; Map 13

Platytylellus zonatus Knight, 1926*c*:254.
Prepops zonatus: Carvalho, 1959:343.

Length 5.60–6.30 mm; width 2.38–2.66 mm. Head orange red, clypeus and frons black. Antennae black. Pronotum red, calli and wide rays behind them black. Scutellum red, basal angles black. Hemelytra black, narrow median line and costal margins red. Ventral surface black to orange, legs mostly orange.

Remarks. This species is distinguished by the red costal margin on the hemelytra (Fig. 40), and by the orange legs.

Habitat. Collected on herbaceous plants.

Distribution. North Central States; now known to occur in Alberta and Saskatchewan (Map 13).

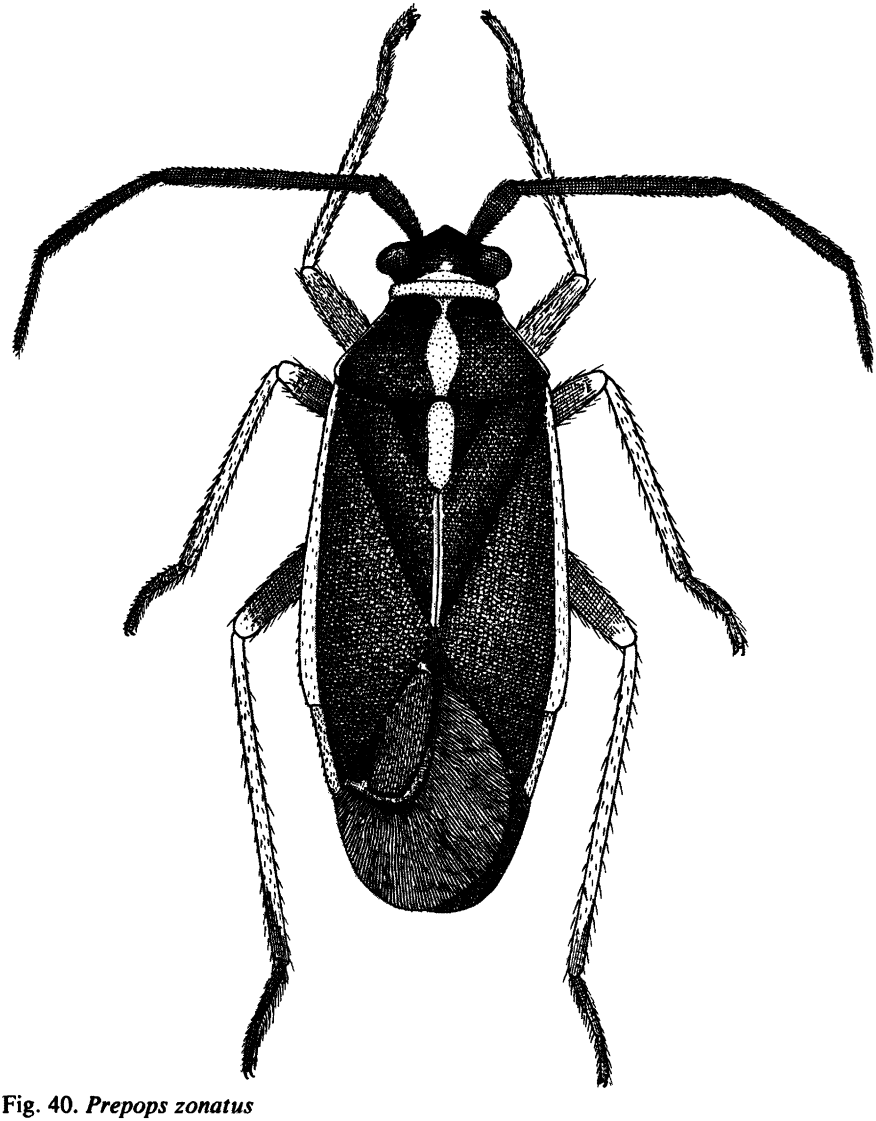


Fig. 40. *Prepops zonatus*

Prepops eremicola (Knight)

Map 13

Platytylellus eremicola Knight, 1929*b*:189.
Prepops eremicola: Carvalho, 1959:335.

Length 6.16–7.00 mm; width 2.24–2.80 mm. Head black, base red. Pronotum black, sometimes collar, side margins, and median line red.

Scutellum black, median line red. Hemelytra black. Ventral surface black, side margins red; legs black.

Remarks. This species is distinguished by the relatively short second antennal segment, otherwise it is similar in color and appearance to *bivittis* and *rubellicollis*.

Habitat. Collected on herbaceous plants.

Distribution. Northwestern States, New Mexico; Alberta, now known to occur in Saskatchewan and Manitoba (Map 13).

Prepops nigripilus (Knight)

Map 13

Platytylellus nigripilus Knight, 1929*b*:189.
Prepops nigripilus: Carvalho, 1959:339.

Length 6.23–7.42 mm; width 2.10–2.80 mm. Head black, base reddish. Pronotum black, collar with black hairs, lateral margins and longitudinal median line red. Scutellum red, basal angles black. Hemelytra black. Ventral surface black and red; legs black.

Remarks. This species is distinguished by the black hairs on the collar and by the red median line on the pronotum.

Habitat. Unknown.

Distribution. Northeastern States; Alberta (Map 13).

Prepops rubellicollis (Knight)

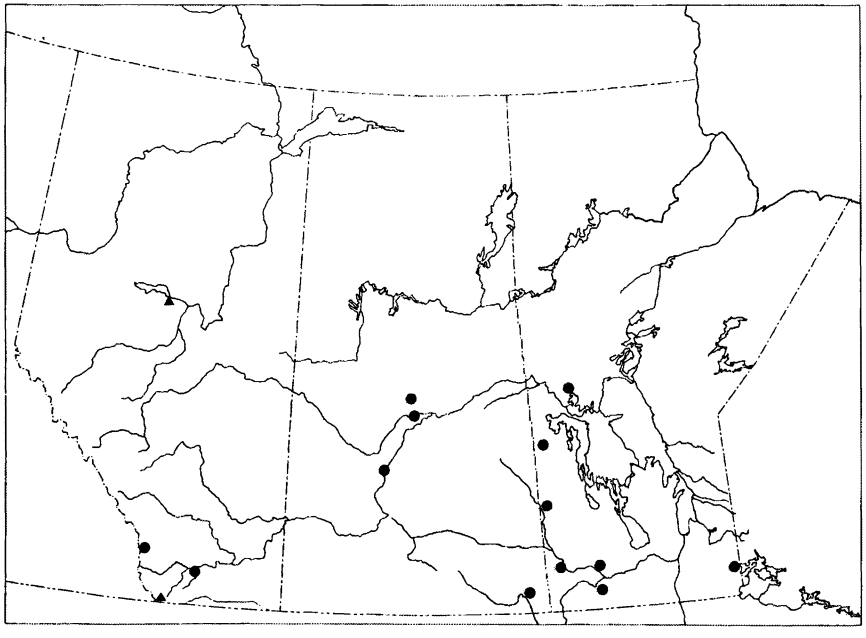
Map 14

Platytylellus rubellicollis Knight, 1923*b*:555.
Prepops rubellicollis: Carvalho, 1959:341.

Length 6.65–7.77 mm; width 2.38–2.94 mm. Head black, base often reddish. Pronotum black, collar and side margins red, longitudinal median line often red; pubescence on red areas pale. Scutellum black, often red. Hemelytra black. Ventral surface black and red; legs black.

Remarks. This is the largest species encountered with completely black hemelytra. It is similar to *nigripilus* in appearance, but the hairs on the red markings of the pronotum are pale.

Habitat. Collected on herbaceous plants.



Map 14. Collection localities for *Prepops nigripilus* (▲) and *P. rubellicollis* (●).

Distribution. Northeastern States, Nebraska, British Columbia; now known to occur in the Prairie Provinces (Map 14).

Prepops borealis (Knight)

Map 14

Platytylellus borealis Knight, 1923*b*:551.
Prepops borealis: Carvalho, 1959:332.

Length 5.60–6.65 mm; width 2.10–2.73 mm. Head black, base often red. Pronotum black, collar and side margins often red. Scutellum and hemelytra black. Ventral surface black with red; legs black.

Remarks. This species is distinguished by the black scutellum and black hemelytra.

Habitat. Collected on herbaceous plants.

Distribution. Northeastern States, Ontario, Manitoba; Alberta, now known to occur in Saskatchewan (Map 14).

Prepops bivittis (Stål)

Map 15

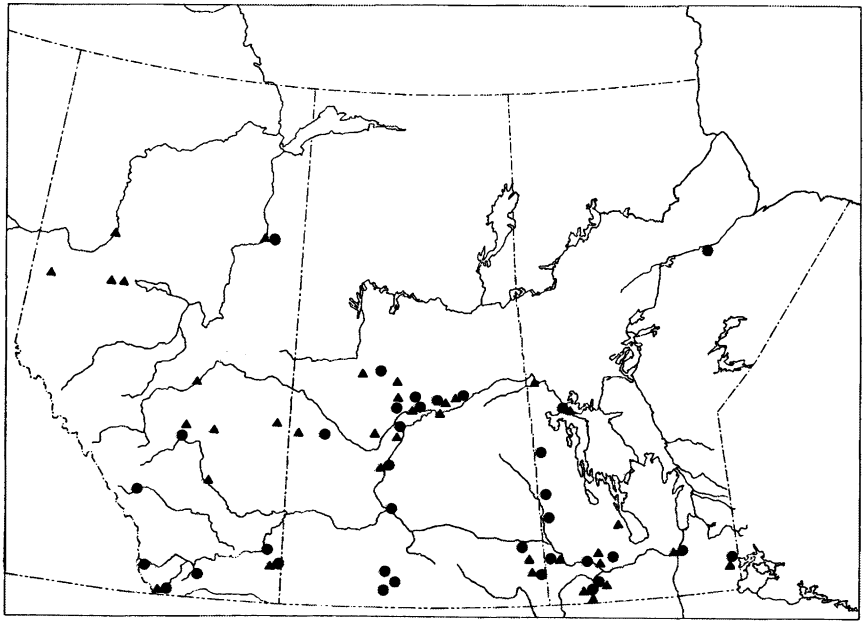
Resthenia bivittis Stål, 1862:318.
Platytylellus basivittis Van Duzee, 1914:25.
Prepops bivittis: Carvalho, 1959:332.

Length 5.95–6.30 mm; width 2.10–2.80 mm. Head black, base often red. Pronotum black, collar, calli, side margins, and longitudinal median line often red. Scutellum red, basal angles black. Hemelytra black. Ventral surface black and red.

Remarks. This species is distinguished by the red markings on the pronotum and scutellum. The smaller size and shorter second antennal segments separate it from *rubellicollis* and *nigripilus*.

Habitat. Collected on herbaceous plants.

Distribution. Mexico, California, southeastern and northwestern States; Alberta, now known to occur in Saskatchewan and Manitoba (Map 15).



Map 15. Collection localities for *Prepops borealis* (▲) and *P. bivittis* (●).

Tribe Mirini

In the Prairie Provinces the tribe is represented by 23 genera and 103 species.

Key to genera of Mirini

1. First antennal segment with numerous flattened hairs (Fig. 41) ..... ***Neurocolpus*** **Reuter** (p. 56)
   First antennal segment without flattened hairs 2
2. Pronotum with depressed black spot behind each callus (Fig. 42) ..... ***Taedia*** **Distant** (p. 57)
   Pronotum without depressed black spots 3
3. Pronotum punctate between callus and collar (Fig. 43) 4
   Pronotum not punctate between callus and collar 5
4. Frons smooth ..... ***Tropidosteptes*** **Uhler** (p. 60)
   Frons striate or grooved (Fig. 44) ..... ***Neoborella*** **Knight** (p. 76)
5. Species with four longitudinal black lines on dorsal surface (Fig. 53) ..... ***Poecilocapsus*** **Reuter** (p. 78)
   Species without four black lines 6
6. Second antennal segment shorter than head width ..... ***Agnocoris*** **Reuter** (p. 80)
   Second antennal segment longer than head width 7
7. Species black and densely pubescent 8
   Species not black, if black nearly glabrous 9
8. Second antennal segment clavate; carina absent ..... ***Capsus*** **Fabricius** (p. 82)
   Second antennal segment linear; carina present ..... ***Irbisia*** **Reuter** (p. 83)
9. Carina between eyes present 10
   Carina between eyes absent 19
10. Eyes nearly spherical, ventral margin of eye not extending below antennal socket (Fig. 45) ..... ***Lygidea*** **Reuter** (p. 86)
    Eyes elliptical, ventral margin extending below antennal socket (Fig. 46) 11
11. Species with woolly pubescence (Fig. 54) ..... ***Polymerus*** **Hahn** (p. 88)
    Species without woolly pubescence 12
12. Pronotum roughly rugose; tarsal claws sharply angled ..... ***Plesiocoris*** **Fieber** (p. 97)
    Pronotum punctate, or finely rugose; tarsal claws rounded 13
13. Frons with median longitudinal groove (Fig. 55) ..... ***Salignus*** **Kelton** (p. 99)
    Frons without median groove 14
14. Head nearly vertical (Fig. 46) ..... ***Orthops*** **Fieber** (p. 99)
    Head oblique (Fig. 47) 15
15. Pronotum coarsely punctate, punctures deep and wide apart 16
    Pronotum finely punctate, punctures shallow and close together 17
16. Scutellum deeply punctate ..... ***Lygus*** **Hahn** (p. 100)
    Scutellum not punctate ..... ***Platylygus*** **Van Duzee** (p. 135)
17. Reddish brown species with contrasting white collar ..... ***Pinalitus*** **Kelton** (p. 139)
    Greenish species without contrasting collar 18
18. Base of head concave, eyes overlapping anterior angles of pronotum; (Fig. 64) on conifers ..... ***Dichrooscytus*** **Fieber** (p. 141)

Base of head nearly straight, mostly on deciduous trees .....
..... ***Lygocoris*** **Reuter** (p. 146)

19. Dorsal surface highly polished; glabrous .....
..... ***Metriorrhynchomiris*** **Kirkaldy** (p. 162)
Dorsal surface not highly polished; pubescent 20
20. First segment of hind tarsus longer than second ..... ***Stenotus*** **Jakovlev** (p. 163)
First segment of hind tarsus shorter than second 21
21. Jugal suture extending well below antennal socket; lorum tumid .....
..... ***Phytocoris*** **Fallén** (p. 165)
Jugal suture extending directly to antennal socket; lorum not tumid 22
22. Vertex with shallow longitudinal groove ..... ***Adelphocoris*** **Reuter** (p. 184)
Vertex without longitudinal groove, often with rounded depression .....
.....***Calocoris*** **Fieber** (p. 187)

Genus *Neurocolpus* Reuter

Elongate, robust species. Head oblique, frons elevated and separated from clypeus by deep notch; eyes large, carina between them absent. First antennal segment stout with flattened hairs. Pronotum subcampanulate, smooth. Hemelytra smooth; pubescence golden, long, dense. Legs strongly pilose.

Approximately eight species occur in North America, one occurs in the Prairie Provinces.

Neurocolpus nubilus (Say)

Fig. 41; Map 16

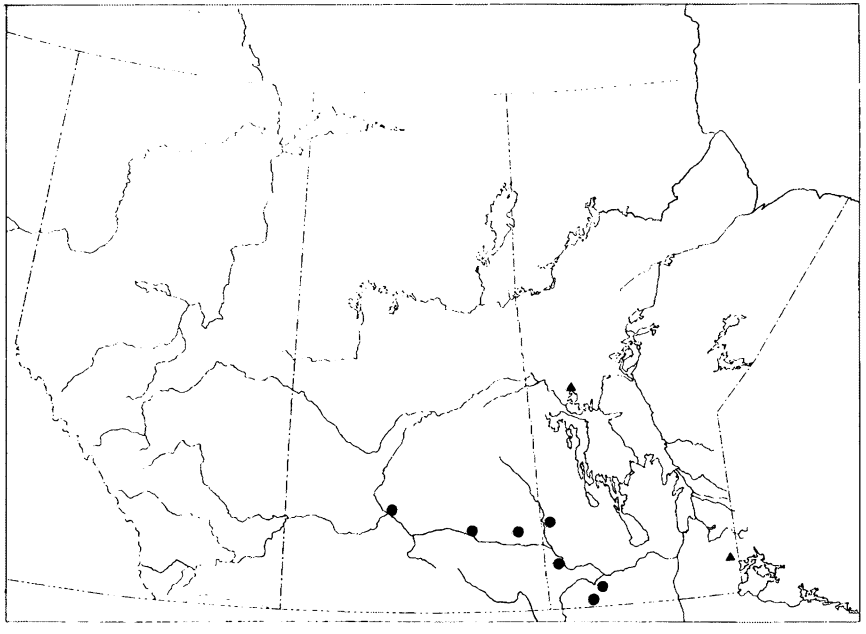
Capsus nubilus Say, 1832:22.
Neurocolpus nubilus: Reuter, 1875*d*:70.

Length 7.00–7.70 mm; width 2.52–2.80 mm. Head light brown, frons often marked with oblique, black bars. Rostrum extending to hind coxae. Pronotum yellowish brown with tufts of black, erect hairs, intermixed with golden, erect hairs; side margins rounded. Hemelytra mottled beige marked with dark brown.

Remarks. The flattened, black hairs on the first antennal segment are distinctive (Fig. 41).

Habitat. Collected on *Rhus typhina.*

Distribution. Mexico, widespread in USA, Ontario, Quebec; now known to occur in Manitoba (Map 16).



Map 16. Collection localities for *Neurocolpus nubilus* (▲) and *Taedia pallidula* (●).

Genus *Taedia* Distant

Elongate, robust species. Head oblique, eyes large, carina between them absent. Pronotum subcampanulate with black spot behind each callus. Hemelytra finely punctate; pubescence long, dense. Legs long, slender.

Approximately 30 species occur in North America, one is found in the Prairie Provinces. The genus was formerly known as *Paracalocoris*.

Taedia pallidula (McAtee)

Fig. 42; Map 16

Paracalocoris hawleyi var. *pallidulus* McAtee, 1916:380.
Paracalocoris pallidulus: Knight, 1930*c*:822.
Taedia pallidulus: Carvalho, 1959:262.

Length 6.30–7.00 mm; width 2.38–2.66 mm. Head brown, clypeus darker, frons often marked with oblique black bars. Rostrum 2.38–2.52 mm long. Pronotum mottled brown, velvety spots behind calli black; lateral

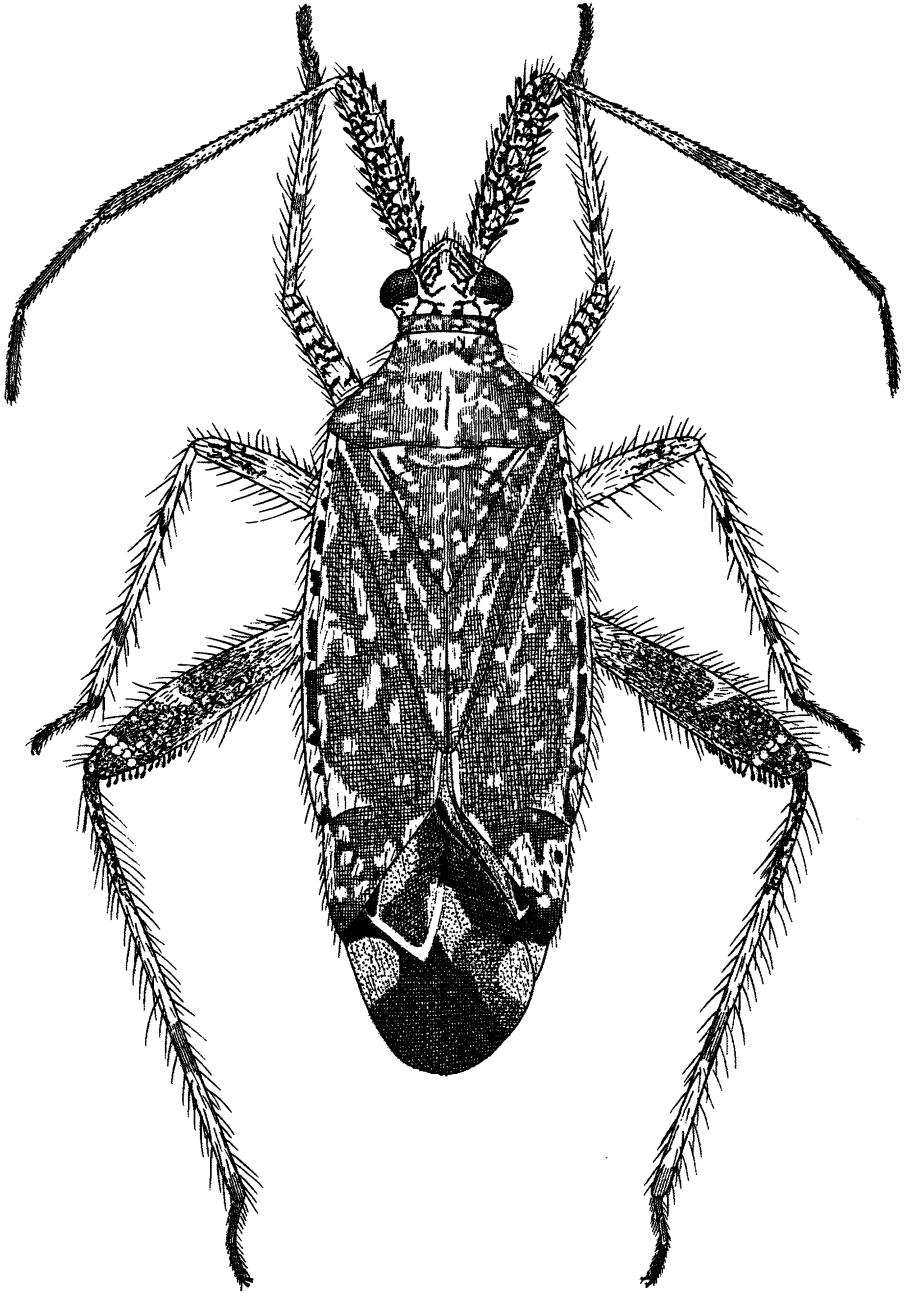


Fig. 41. *Neurocolpus nubilus*

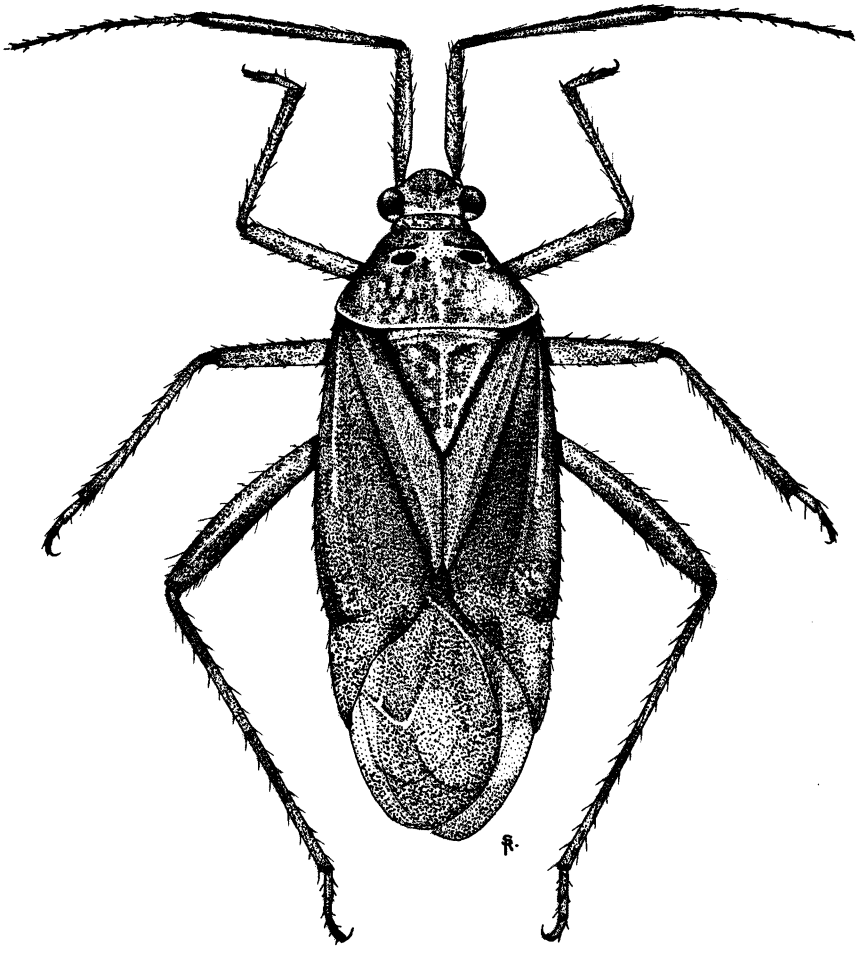


Fig. 42. *Taedia pallidula*

margins rounded. Scutellum brown, longitudinal median line yellow. Hemelytra mottled brown and yellow. Legs yellow marked with red, tibiae banded.

Remarks. The black, velvety spots behind the calli readily distinguish this species (Fig. 42).

Habitat. Collected on *Cornus stolonifera.*

Distribution. New York, North Central States, Ohio, Ontario; now known to occur in Manitoba and Saskatchewan (Map 16).

Genus *Tropidosteptes* Uhler

Pale green, green and red, or black and brown species. Head vertical, short, frons smooth or punctate, carina between eyes distinct. Pronotum trapeziform, strongly punctate, lateral margins rounded or carinate; collar prominent, calli smooth, area between calli and collar punctate. Hemelytra glabrous or pubescent. Osteolar peritreme large.

There are approximately 36 species of *Tropidosteptes* in North America, nine species occur in the Prairie Provinces. Species formerly included in the genera *Neoborus* Distant and *Xenoborus* Reuter are now placed in the genus *Tropidosteptes* (see Carvalho 1954, Akingbohungbe et al. 1972, and Kelton 1978*a*).

Key to species of *Tropidosteptes*

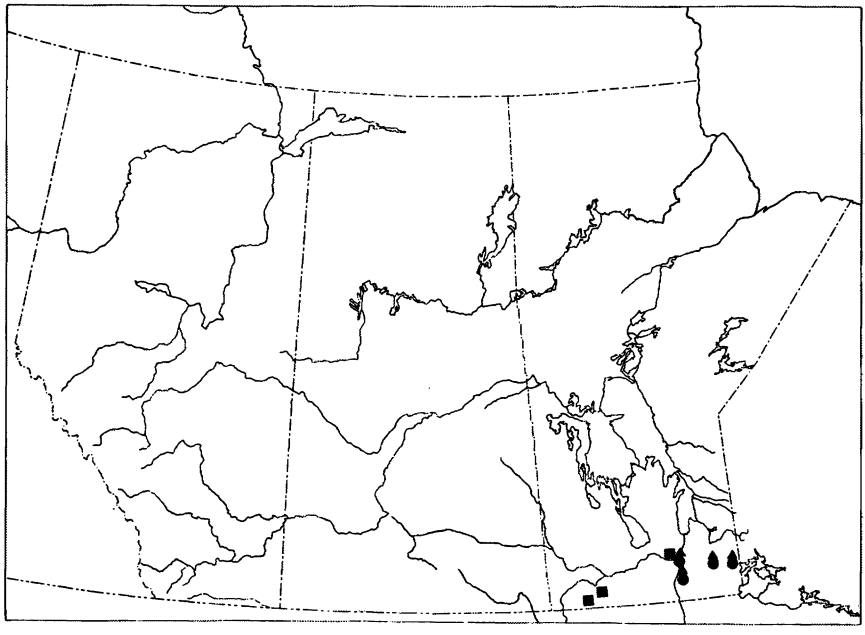
1. First antennal segment black 2
   First antennal segment pale 5
2. Pronotum all black ..... ***pettiti* Reuter** (p. 60)
   Pronotum not all black 3
3. Head and pronotum without black markings .... ***commissuralis* (Reuter)** (p. 61)
   Head and pronotum with black markings 4
4. First antennal segment as long as width of vertex .....
   ..... ***canadensis* Van Duzee** (p. 64)
   First antennal segment as long as width of vertex plus an eye .....
   ..... ***plagifer* Reuter** (p. 68)
5. Rostrum 1.54 mm or longer ..... ***palmeri* (Reuter)** (p. 70)
   Rostrum shorter 6
6. Scutellum black each side of pale median line ..... ***glaber* (Knight)** (p. 71)
   Scutellum yellowish green 7
7. Clypeus and jugum green ..... ***brooksi* Kelton** (p. 71)
   Clypeus and jugum marked with red or black 8
8. Pronotum and hemelytra densely pubescent ..... ***pubescens* (Knight)** (p. 72)
   Pronotum and hemelytra almost glabrous ..... ***amoenus* Reuter** (p. 74)

Tropidosteptes pettiti Reuter

Fig. 56; Map 17

Trichia punctulata Provancher, 1887:133.
Tropidosteptes pettiti Reuter, 1909:50.
Xenoborus pettiti: Knight, 1917*c*:82.

Length 5.46–5.74 mm; width 1.96–2.17 mm. Head and antennae black. Pronotum black, lateral margins carinate on anterior half. Hemelytra black. Scutellum pale. Ventral surface black, osteolar peritreme and legs pale.



Map 17. Collection localities for *Tropidosteptes pettiti* (●), *T. commissuralis* (▲), and *T. canadensis* (■).

Remarks. The black hemelytra and the pale scutellum readily distinguish this species (Fig. 56).

Habitat. Collected on *Fraxinus pennsylvanica.*

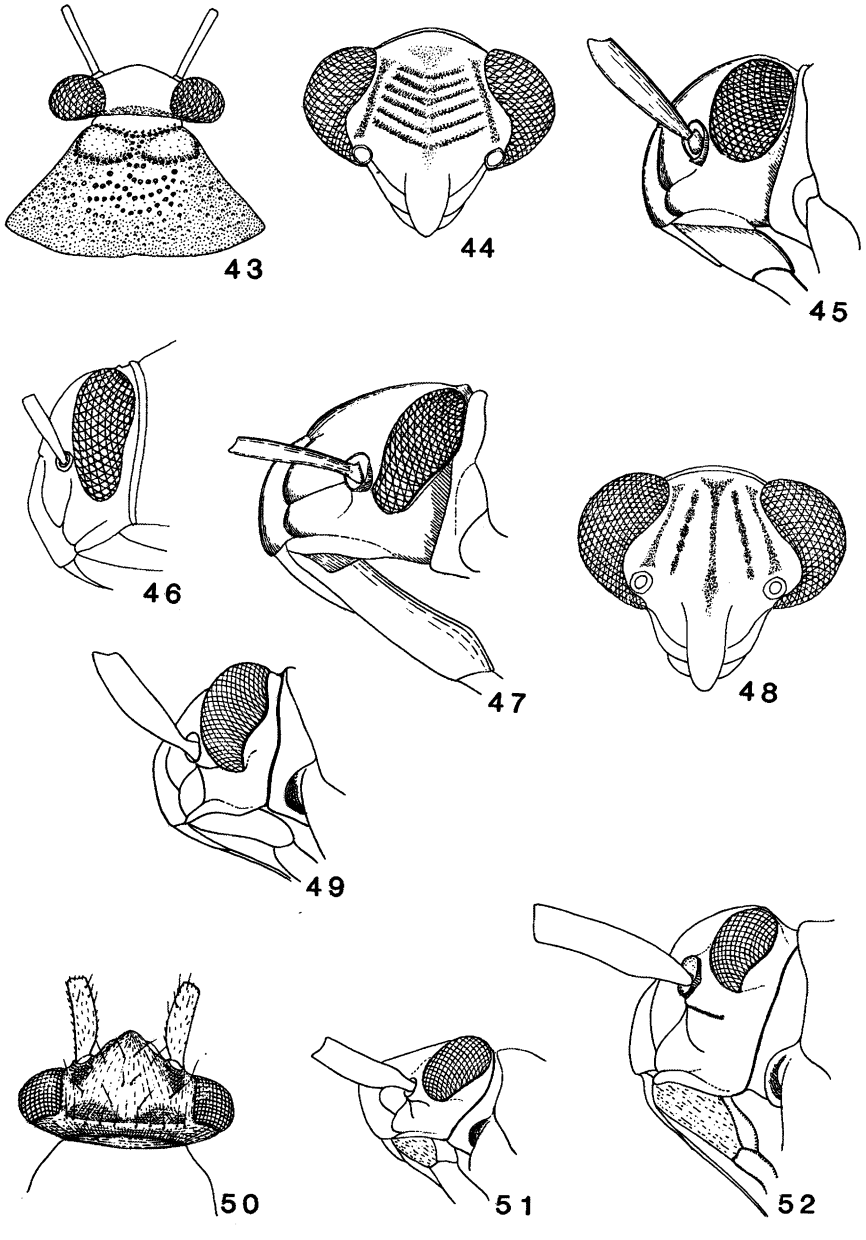
Distribution. Northeastern States, Kansas, Missouri, Ontario, Quebec; now known to occur in Manitoba (Map 17).

Tropidosteptes commissuralis (Reuter)

Fig. 57; Map 17

Sthenarops chloris Provancher, 1887:134.
Neoborus (Xenoborus) commissuralis Reuter, 1908:112.
Tropidosteptes commissuralis Reuter, 1909:51.
Xenoborus commissuralis: Knight, 1917*c*:82.

Length 6.02–6.51 mm; width 2.10–2.40 mm. Head pale green; antennae black; pronotum pale green, lateral margins rounded. Hemelytra pale green, commissure black. Ventral surface and legs pale green.



Figs. 43–52. Pronotum and heads of Mirini and Orthotylini. 43, *Tropidosteptes* and *Neoborella* spp.; 44, *Neoborella* spp.; 45, *Lygidea* spp.; 46, *Orthops* sp.; 47, *Platylygus* spp.; 48, *Lygus lineolaris*; 49, 50, *Hadronema* spp.; 51, *Lopidea* spp.; 52, *Labopidea* spp.

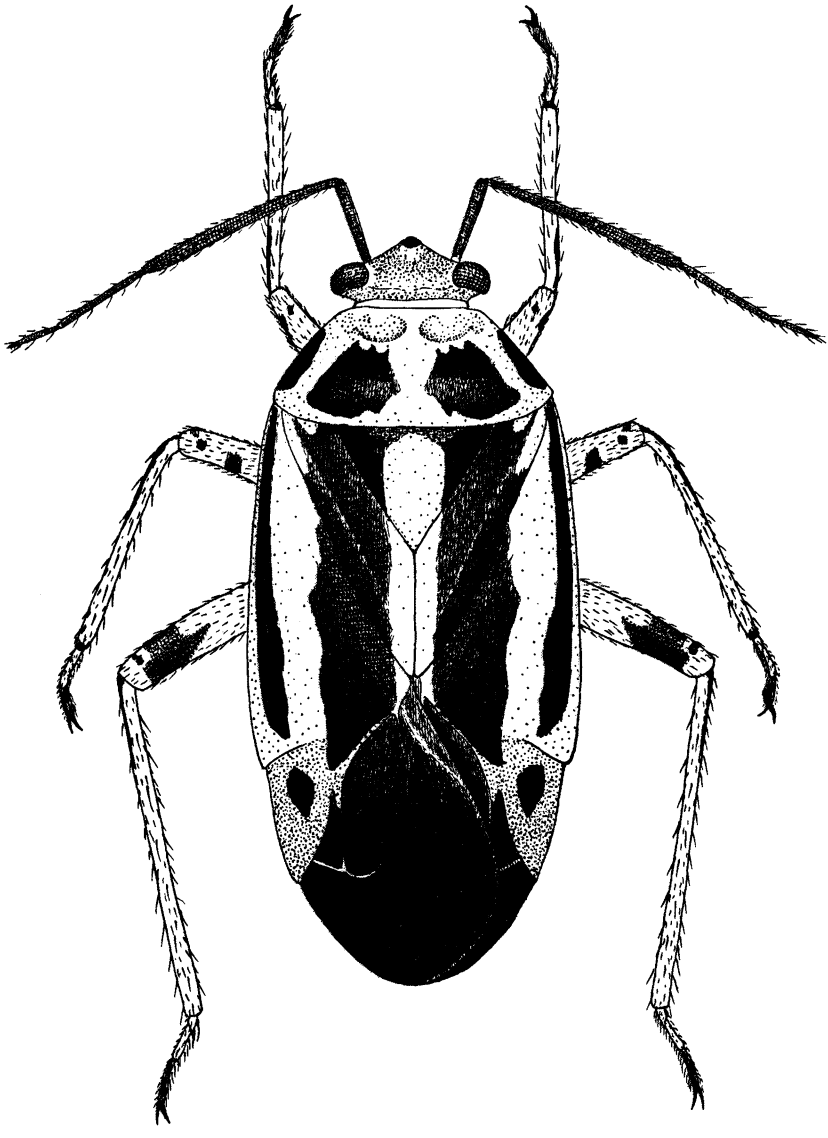


Fig. 53. *Poecilocapsus lineatus*

Remarks. The long and slender form, the pale green color, the black antennae, and the black commissure readily distinguish the species (Fig. 57).

Habitat. Collected on *Fraxinus pennsylvanica.*

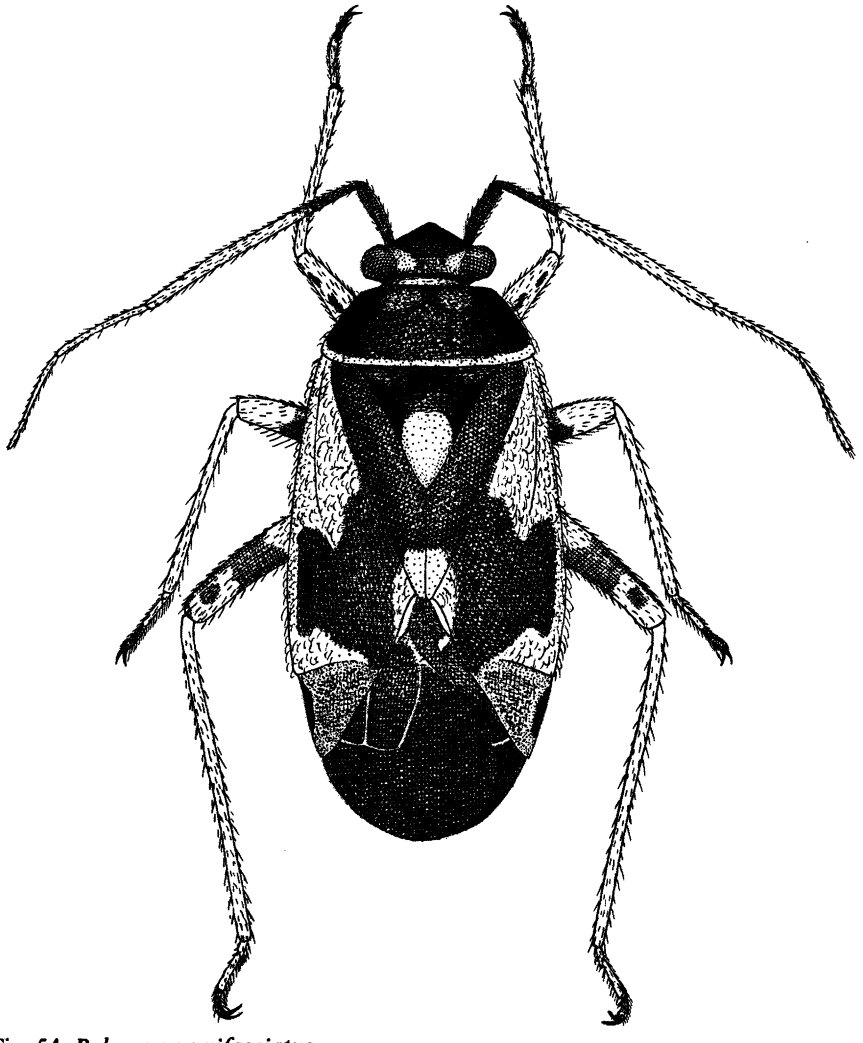


Fig. 54. *Polymerus unifasciatus*

Distribution. New York, North Central States, Ontario, Quebec, Nova Scotia; now known to occur in Manitoba (Map 17).

Tropidosteptes canadensis Van Duzee

Map 17

Tropidosteptes canadensis Van Duzee, 1912:486.
Neoborus canadensis: Van Duzee, 1917:351.

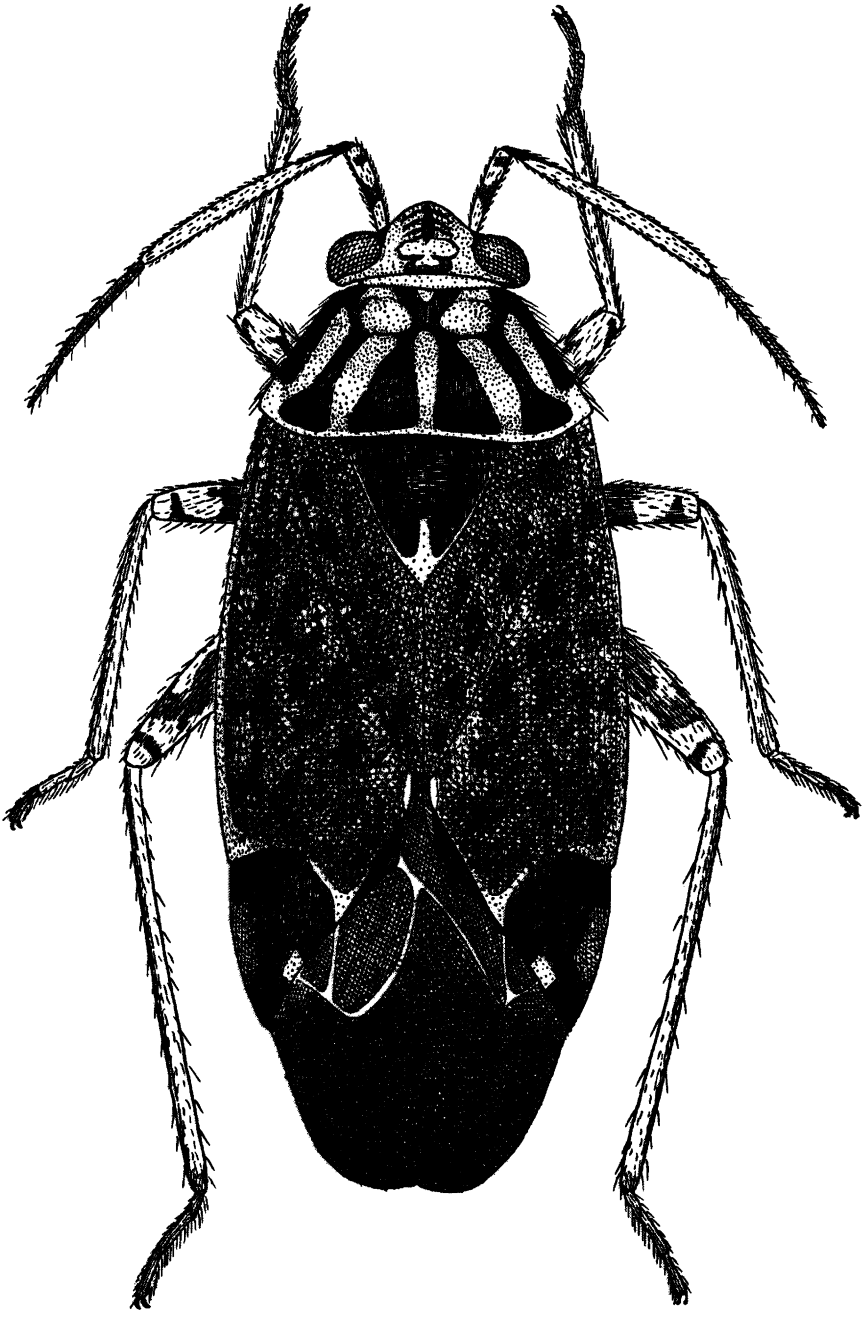


Fig. 55. *Salignus distinguendus*

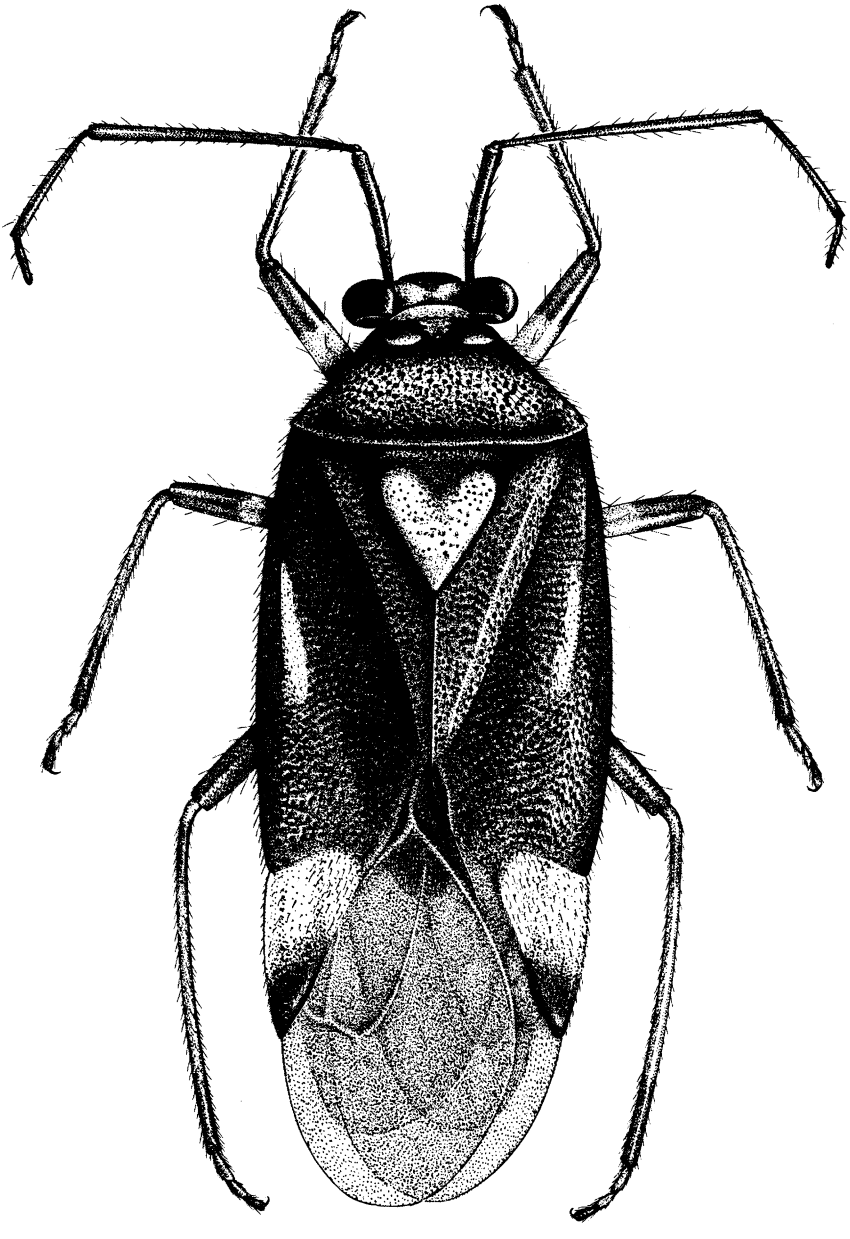


Fig. 56. *Tropidosteptes pettiti*

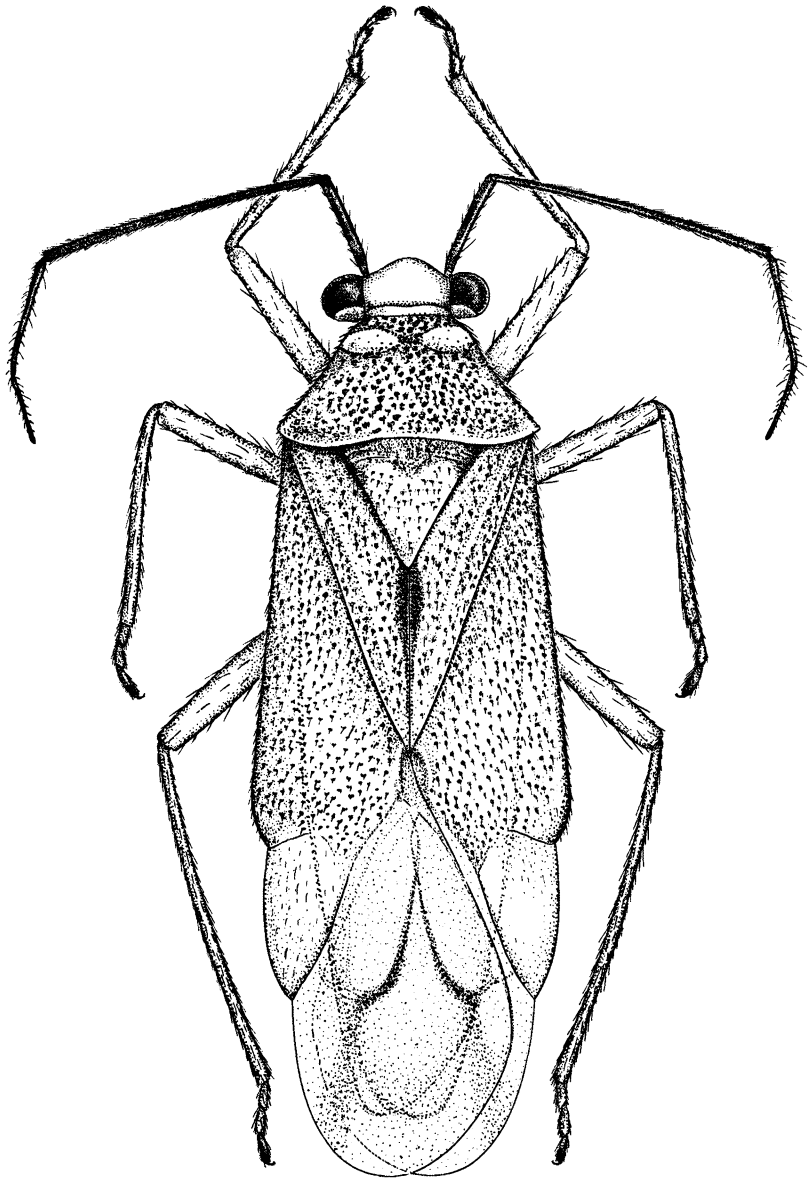


Fig. 57. *Tropidosteptes commissuralis*

Length 4.69–5.46 mm; width 1.96–2.38 mm. Head brown, clypeus black; first antennal segment black. Pronotum light brown, lateral margins angular. Scutellum light brown. Hemelytra light brown, clavus and apical portion of corium dark brown; pubescence long, dense. Ventral surface yellowish green; legs pale.

Remarks. This species is distinguished by the black clypeus, by the black first antennal segment, and by the pubescent hemelytra.

Habitat. Collected on *Fraxinus pennsylvanica.*

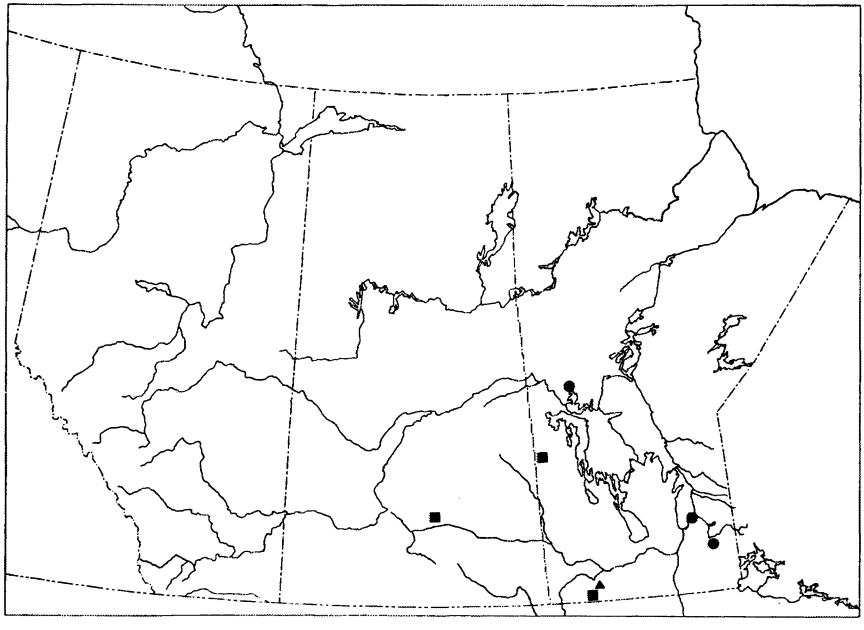
Distribution. Northeastern and Central States, Ontario, Quebec; now known to occur in Manitoba (Map 17).

Tropidosteptes plagifer Reuter

Fig. 58; Map 18

Tropidosteptes plagifer Reuter, 1909:51.
Xenoborus plagifer: Knight, 1917*c*:82.

Length 5.04–5.95 mm; width 1.82–2.24 mm. Head greenish yellow, clypeus and jugum black, frons marked with reddish tinge; antennae black. Pronotum pale green, callus and usually large triangular spot behind black; lateral margins rounded. Scutellum pale green. Hemelytra pale green, clavus and large spot on apical half of corium black. Ventral surface green; pleura and side of abdomen often black; legs pale.



Map 18. Collection localities for *Tropidosteptes plagifer* (●), *T. palmeri* (■), and *T. glaber* (▲).

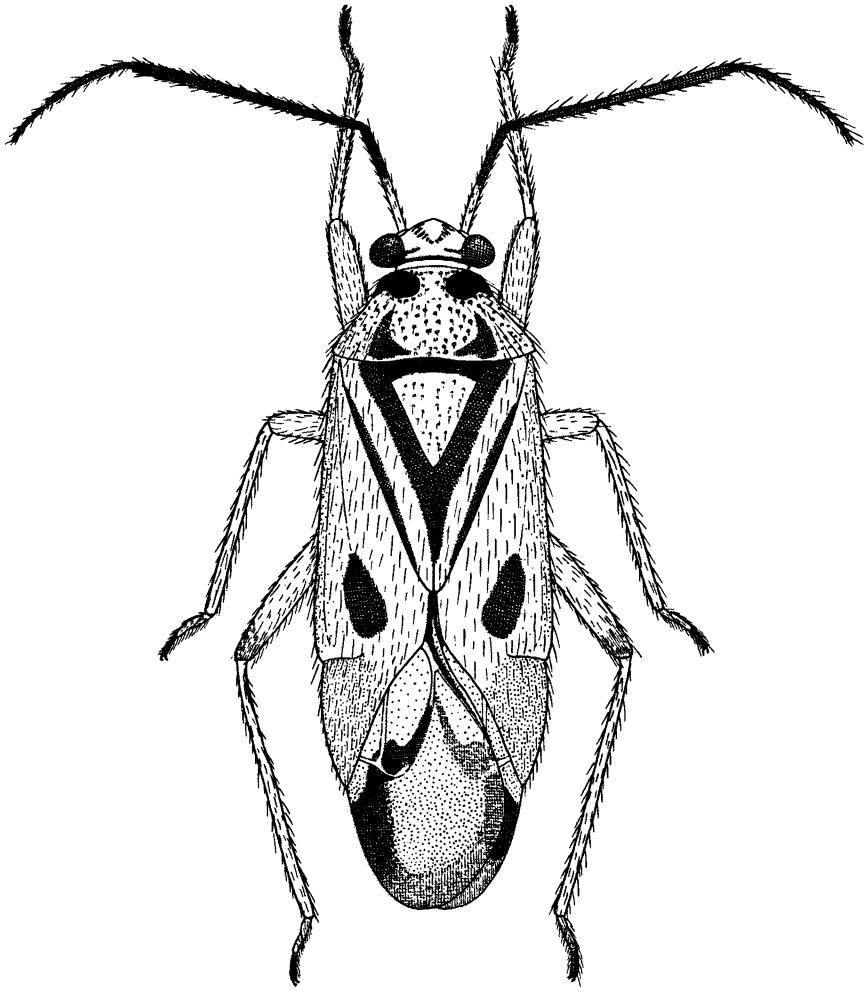


Fig. 58. *Tropidosteptes plagifer*

Remarks. This species is distinguished by the black antennal segments, by the black calli, and by the rounded lateral margins of the pronotum (Fig. 58).

Habitat. Collected on *Fraxinus nigra.*

Distribution. New York, North Central States, Ontario; now known to occur in Manitoba (Map 18).

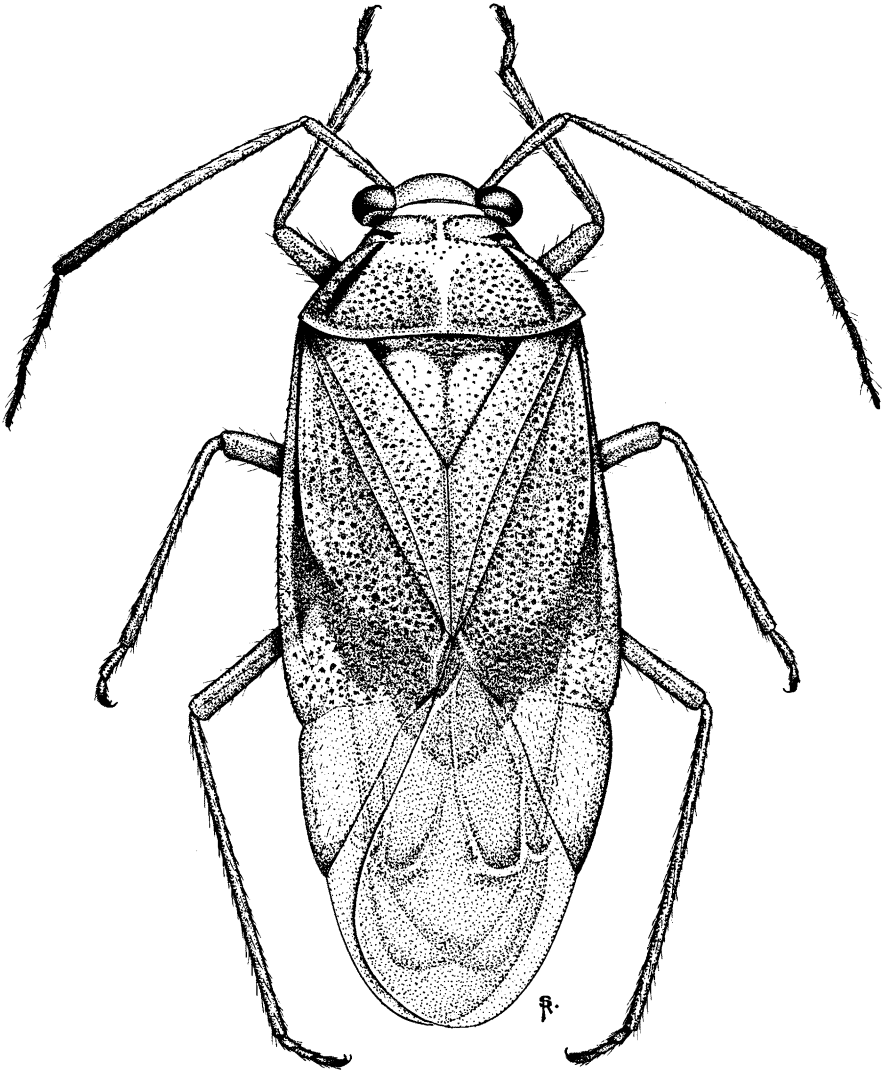


Fig. 59. *Tropidosteptes palmeri*

Tropidosteptes palmeri (Reuter)

Fig. 59; Map 18

Neoborus amoenus var. *palmeri* Reuter, 1908:112.
Tropidosteptes palmeri: Reuter, 1909:49.

Length 5.04–6.30 mm; width 1.33–2.80 mm. Head yellowish brown, clypeus and jugum often black; first antennal segment pale. Pronotum light

yellowish brown, line above lateral margin, spot on callus, and line behind callus black in male; black markings absent in female; lateral margins carinate. Scutellum pale yellow. Hemelytra light yellowish brown, line along radial vein black or brown; glabrous. Ventral surface light brown with pleura darker; legs light yellowish brown.

Remarks. This species is distinguished by the glabrous hemelytra (Fig. 59).

Habitat. Collected on *Fraxinus pennsylvanica.*

Distribution. Northeastern and North Central States, Quebec; now known to occur in Manitoba and Saskatchewan (Map 18).

Tropidosteptes glaber (Knight)

Map 18

Neoborus glaber Knight, 1923:563.
Tropidosteptes glaber: Carvalho, 1959:271.

Length 4.48–4.68 mm; width 1.89–2.24 mm. Head light yellowish brown, clypeus and diagonal bars on frons black. Pronotum yellowish brown, callus and wide ray extending to posterior margin black. Scutellum yellowish green, longitudinal ray each side of median line black. Hemelytra light yellowish brown; glabrous clavus, costal margin, large spot on apical half of corium, and inner margin of cuneus dark brown. Ventral surface pale yellowish green; pleura and lateral line on abdomen dark brown; legs pale green.

Remarks. This species is distinguished by the black lines on the scutellum and by the glabrous hemelytra.

Habitat. Collected on *Fraxinus pennsylvanica.*

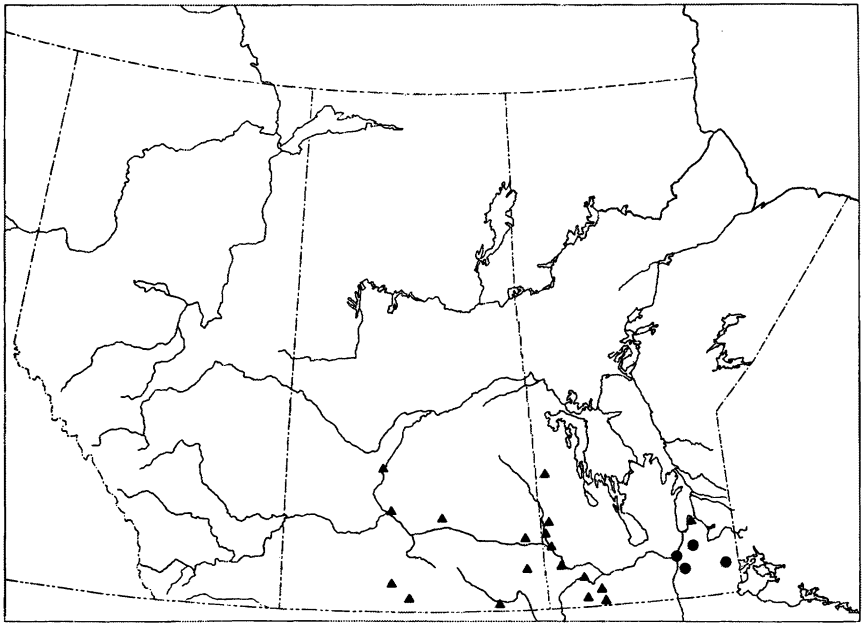
Distribution. Northeastern and Central States, Texas, Ontario; now known to occur in Manitoba and Saskatchewan (Map 18).

Tropidosteptes brooksi Kelton

Fig. 60; Map 19

Tropidosteptes brooksi Kelton, 1978:471.

Length 4.90–5.60 mm; width 1.96–2.24 mm. Head pale green, often red on vertex, clypeus and jugum pale green; eyes large in male, extending above vertex. Pronotum pale green, lateral margins carinate; callus and



Map 19. Collection localities for *Tropidosteptes brooksi* (▲) and *T. pubescens* (●).

broad area behind often red. Scutellum pale green. Hemelytra pale green, apical area of clavus and corium often red in male. Ventral surface and legs pale green.

Remarks. This species is distinguished by the pale green clypeus and jugum, and by the overall green or green and red color (Fig. 60).

Habitat. Collected on *Fraxinus pennsylvanica.*

Distribution. Ontario, Quebec; Saskatchewan, Manitoba (Map 19).

Tropidosteptes pubescens (Knight)

Fig. 61; Map 19

Neoborus pubescens Knight, 1917*b*:81.
Tropidosteptes pubescens: Carvalho, 1959:272.

Length 4.55–4.83 mm; width 1.68–2.03 mm. Head pale green marked with reddish brown. Pronotum pale green, lateral margins carinate on anterior half; calli marked with black, two rays behind callus and ray along lateral margin black. Scutellum pale green, black at middle of base.

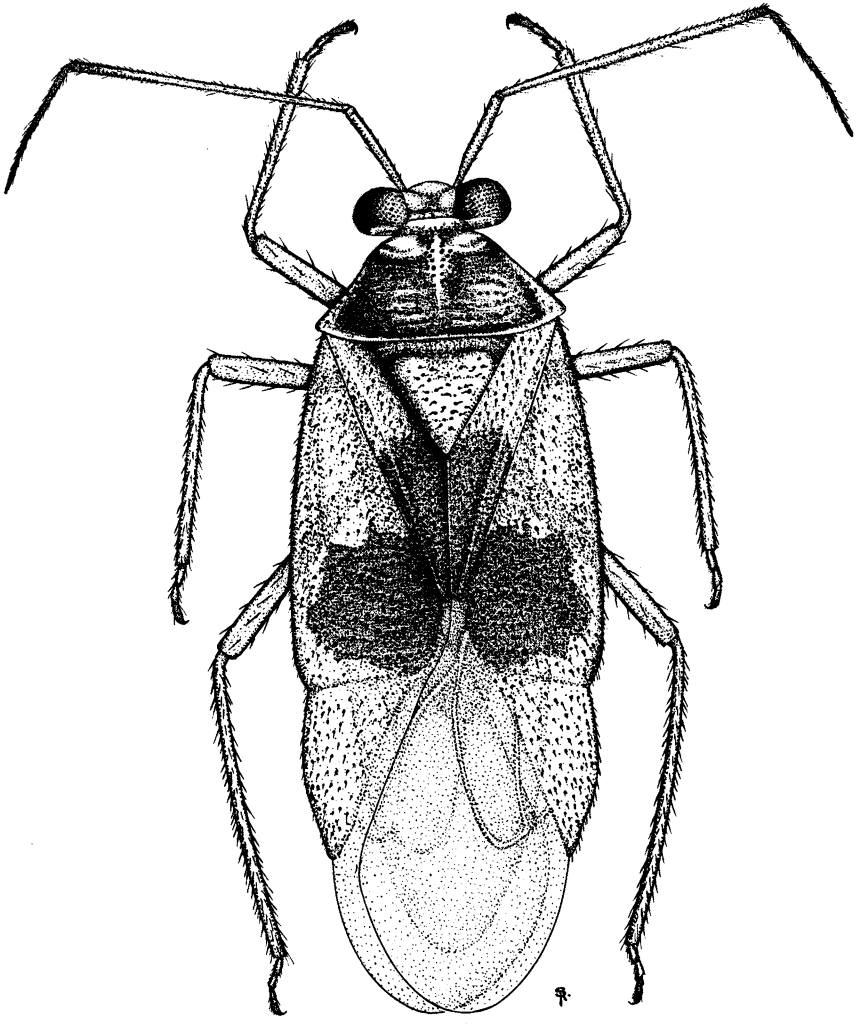


Fig. 60. *Tropidosteptes brooksi*

Hemelytra pale green, inner clavus, claval suture, costal margin, and apical corium black; pubescence long, dense. Ventral surface green marked with black; legs pale.

Remarks. This species is distinguished by the dark color markings and by the dense pubescence on the hemelytra (Fig. 61).

Habitat. Collected on *Fraxinus pennsylvanica.*

Distribution. Northeastern States, Ontario, Quebec; now known to occur in Manitoba (Map 19).

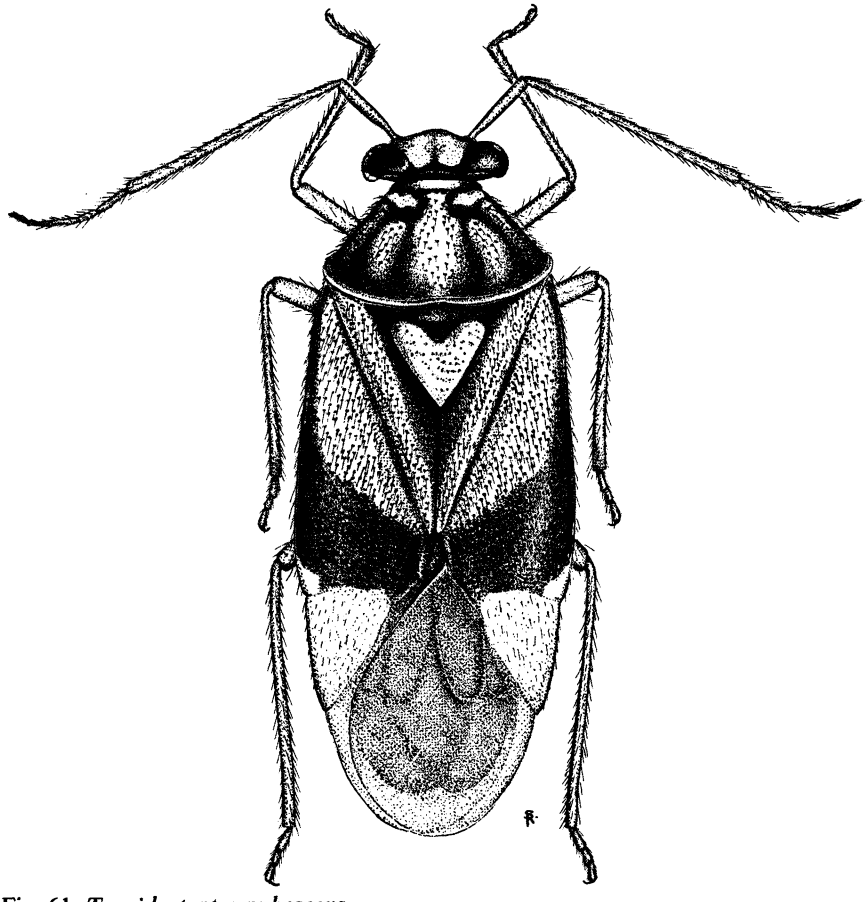


Fig. 61. *Tropidosteptes pubescens*

Tropidosteptes amoenus Reuter

Fig. 62; Map 20

Neoborus saxeus Uhler, 1894:264.
Tropidosteptes amoenus Reuter, 1909:48.

Length 4.20–5.04 mm; width 1.68–2.24 mm. Head yellow, clypeus and jugum marked with red or black, frons often marked with diagonal red bars. Pronotum green marked with red, or almost completely black. Hemelytra green with diagonal red bar near apex on corium, or nearly all black; glabrous. Ventral surface green or black; legs pale.

Remarks. This species varies greatly in color from green with red markings to almost black. The green frons resemble *brooksi,* but are separated from it by the black or red markings on the head and pronotum (Fig. 62).

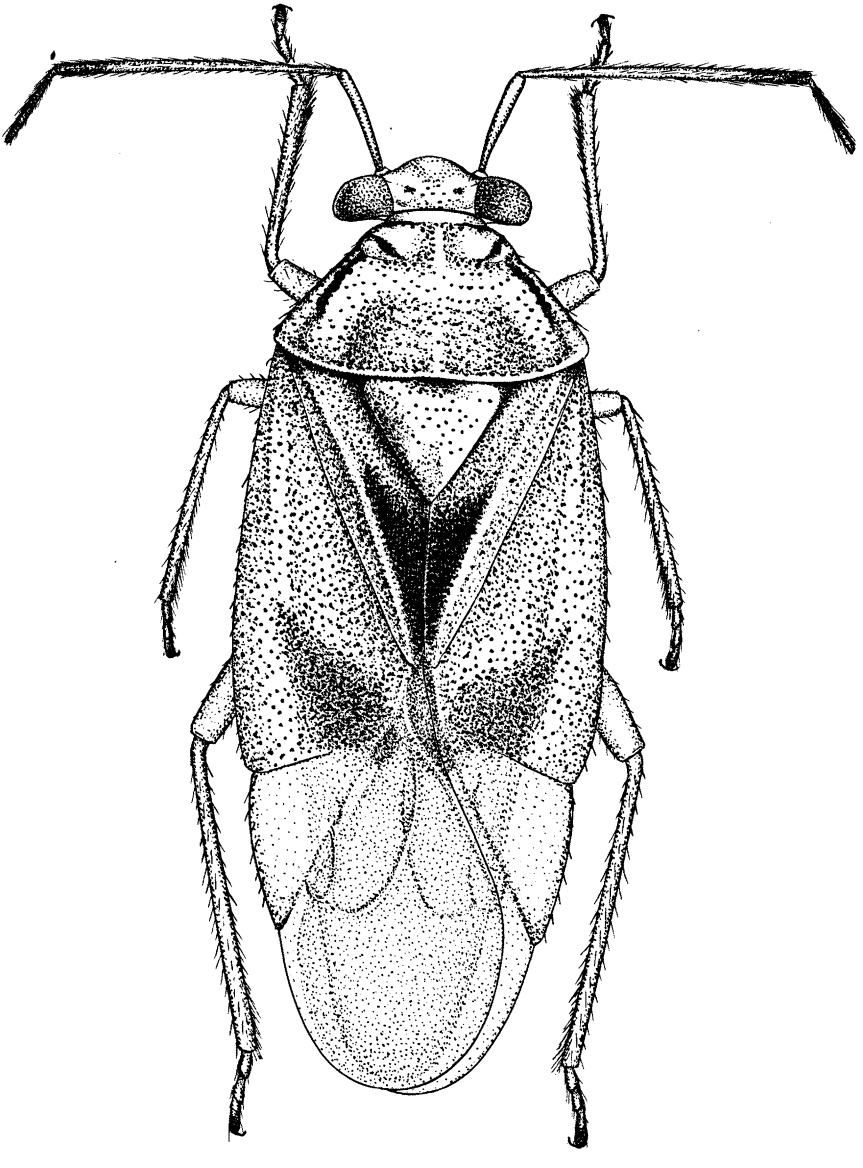


Fig. 62. *Tropidosteptes amoenus*

Habitat. Collected on *Fraxinus pennsylvanica.*

Distribution. Northeastern and Central States, Texas, British Columbia, Ontario, Quebec; now known to occur in the Prairie Provinces (Map 20).

Genus *Neoborella* Knight

Small, oblong, brown species. Head vertical, short, frons grooved and transversely striate; carina between eyes distinct. Pronotum trapeziform, strongly punctate, calli smooth, lateral margins rounded; area between calli and collar punctate. Scutellum tumid. Hemelytra finely pubescent. Osteolar peritreme large.

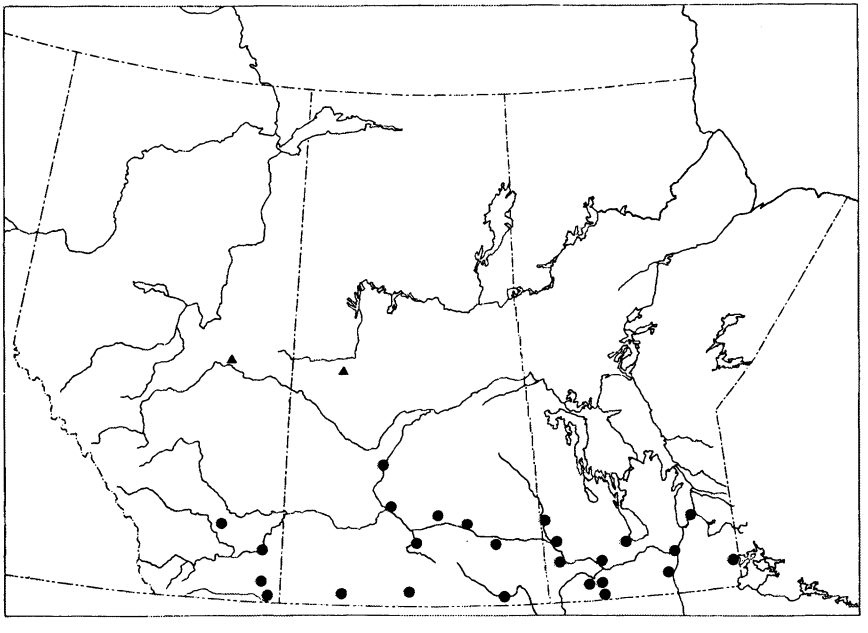
Kelton and Herring (1978) published a key to North American species of *Neoborella*; one species occurs in the Prairie Provinces.

Neoborella canadensis Kelton & Herring

Fig. 63; Map 20

Neoborella canadensis Kelton & Herring, 1978:779.

Length 4.20–4.76 mm; width 1.96–2.24 mm. Head light brown, punctate; frons with longitudinal median groove and several transverse grooves; first antennal segment light brown. Pronotum light brown, lateral margins



Map 20. Collection localities for *Tropidosteptes amoenus* (●) and *Neoborella canadensis* (▲).

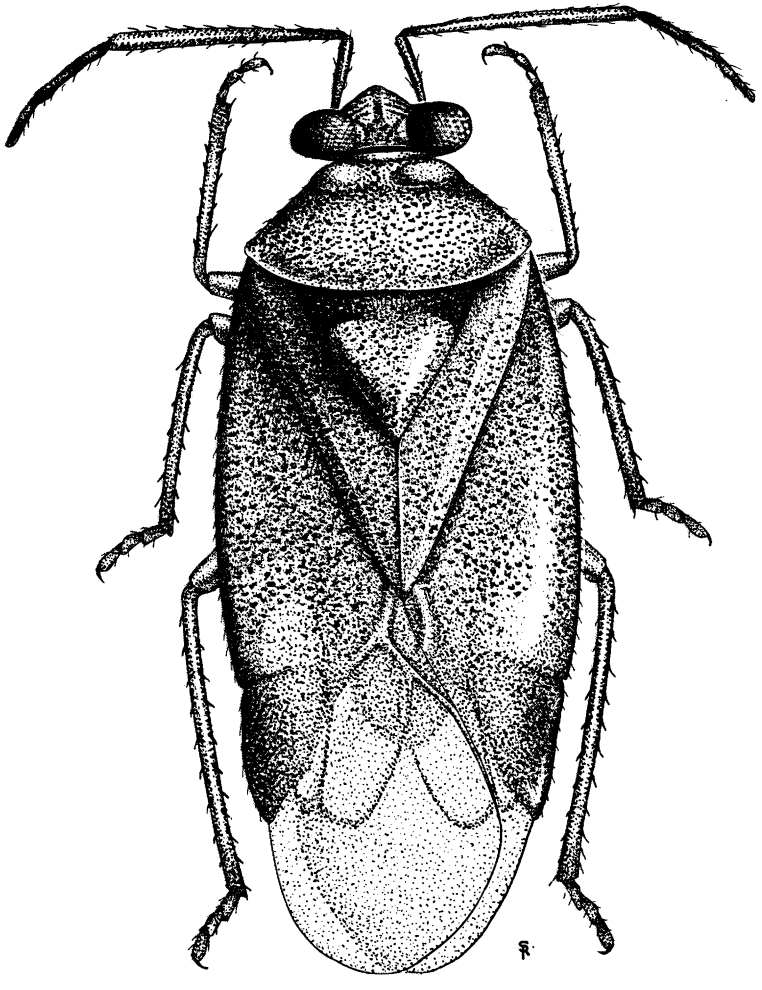


Fig. 63. *Neoborella canadensis*

rounded; callus often marked with transverse black bar. Scutellum brown. Hemelytra brown, shiny with bluish sheen; practically glabrous (Fig. 59). Ventral surface yellowish green; pleura and side margin of abdomen brown; legs mostly pale.

Remarks. This species resembles *xanthenes* in color and pubescence, but is larger and the eyes in the male are bulging.

Habitat. Collected on mistletoe growing on *Pinus banksiana.*

Distribution Alberta, Saskatchewan (Map 20).

Genus *Poecilocapsus* Reuter

Glabrous, green with longitudinal black lines. Head vertical, short, carina between eyes absent. Pronotum impunctate, lateral margins angular. Hemelytra impunctate, shiny.

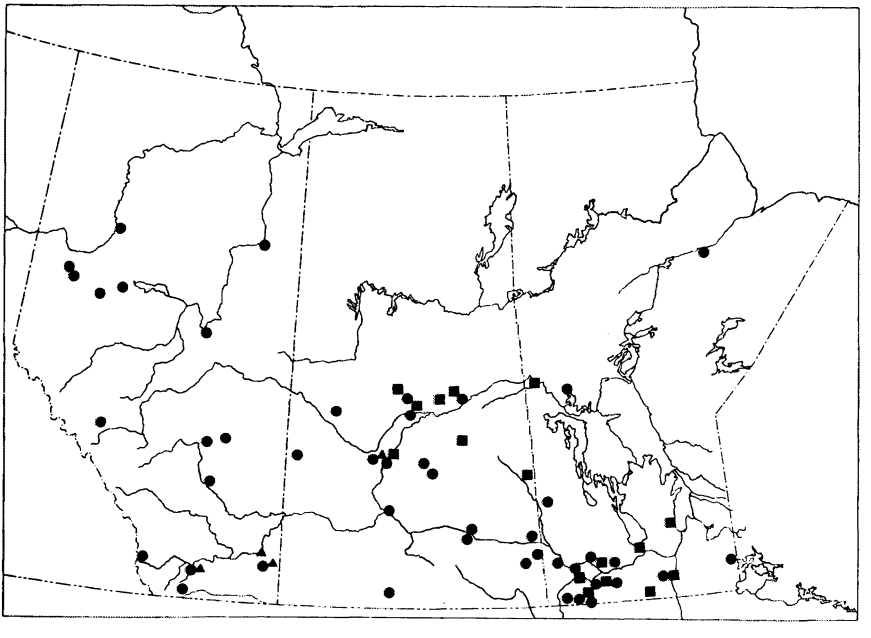
Five species are known from North America, one occurs in the Prairie Provinces.

Poecilocapsus lineatus (Fabricius)

Fig. 53; Map 21

Lygaeus lineatus Fabricius, 1798:451.
Capsus quadrivittatus Say, 1832:20.
Phytocoris bellus Emmons, 1854:30.
Poecilocapsus lineatus: Reuter, 1875*d*:74.

Length 7.00–7.50 mm; width 2.80–3.50 mm. Head brown, clypeus and antennae black. Pronotum and hemelytra yellowish green with four black lines. Legs green.



Map 21. Collection localities for *Poecilocapsus lineatus* (■), *Agnocoris rubicundus* (●), and *A. pulverulentus* (▲).