

# **Palearctic Plant Bugs (Hemiptera, Miridae) in Newfoundland, Canada: First North American Records for *Phytocoris longipennis* FLOR and *Pilophorus cinnamopterus* (KIRSCHBAUM), New Records of Eight Other Species, and Review of Previously Reported Species<sup>1</sup>**

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**Abstract:** *Phytocoris longipennis* FLOR and *Pilophorus cinnamopterus* (KIRSCHBAUM) are reported from Newfoundland, Canada, as the first Nearctic records of these Palearctic mirids. Diagnoses and descriptions are provided to facilitate their recognition in the North American fauna. Also reported as new to Newfoundland are eight Palearctic mirids recorded from other Canadian provinces: *Atractotomus mali* (MEYER-DÜR), *Melanotrichus flavosparvus* (C.R. SAHLBERG), *Phytocoris populi* LINNAEUS, *P. ulmi* LINNAEUS, *Pilophorus clavatus* (LINNAEUS), *Pinalitus rubricatus* (FALLÉN), *Plagiognathus vitellinus* (SCHOLTZ), and *Psallus lepidus* FIEBER. We review for all 10 species their distribution, host plants, and seasonal history in the Palearctic Region; for each of the eight species known previously from North America, we cite the first Nearctic record and summarize the North American distribution and information on biology. We also list the 33 Palearctic species recorded previously from the island and include the earliest record from Newfoundland and distributional status – that is, whether a species has been accidentally introduced or is naturally Holarctic. The addition of 10 mirid species considered to have been introduced with commerce gives Newfoundland the highest proportion of non-native plant bugs (28.6 % of 91 spp.) of any Canadian province.

**Key words:** Heteroptera, host plants, Insecta, immigrant insects, new records.

## **Introduction**

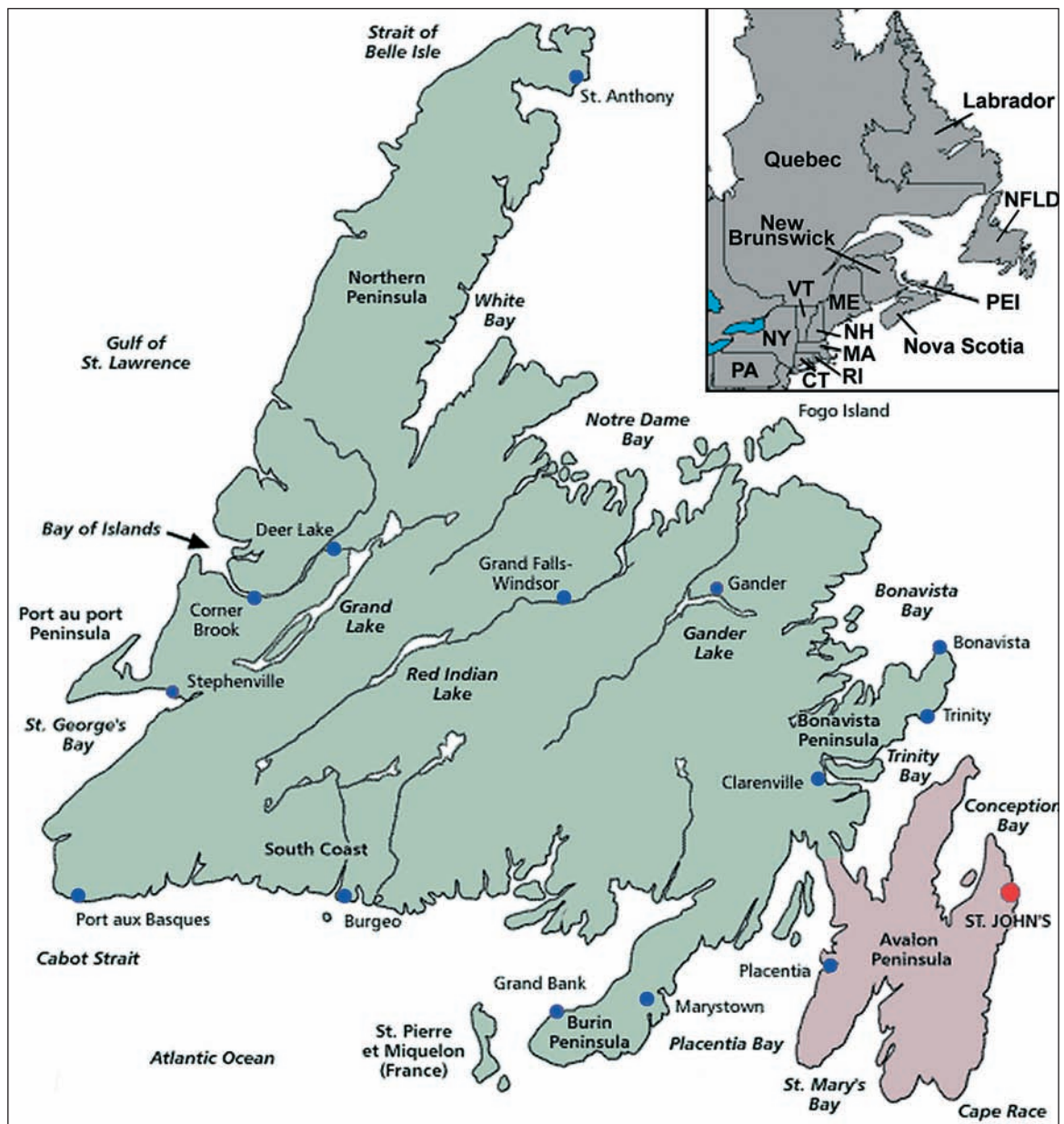
Newfoundland is an island of about 106,000 km<sup>2</sup> in the North Atlantic at the mouth of the Gulf of St. Lawrence. It lies at the same latitude as northern France and represents the easternmost extension of North America. Politically, it became, with Labrador, Canada's tenth province in 1949 (SOUTH 1983). The provincial name officially became Newfoundland and Labrador in December 2001.

The island of Newfoundland formed during the Paleozoic from continental drift

and collision (ROGERSON 1983). Because it lies in a region crucial to an understanding of biotic relationships between Europe and North America, the island is of biogeographic interest. Its original biota was mostly eradicated during the Pleistocene glaciations (SOUTH 1983), although some species survived in Late Wisconsin coastal refugia, or ice-free areas (LINDROTH 1957; MATTHEWS 1979; PIELOU 1991). An analysis of the leafhopper faunas of Newfoundland and Cape Breton Island, Nova Scotia, suggests that an offshore refugium on the St. Pierre banks (near St. Pierre and Miquelon)

<sup>1</sup>We are pleased to be part of the Ernst Heiss Festschrift and dedicate this paper to him in honor of his contributions to our knowledge of Palearctic Heteroptera, especially systematics of the Aradidae.

**Fig. 1:** Map of Newfoundland with Avalon Peninsula highlighted. Inset shows Newfoundland and Labrador in relation to Quebec and the other Atlantic Provinces of Canada (New Brunswick, Nova Scotia, and Prince Edward Island) and a portion of the northeastern United States (Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont).



provided an invasion route for the colonization of Newfoundland (HAMILTON & LANGOR 1987). The present biota is composed of species that arrived either through colonization or accidental or intentional introductions (SOUTH 1983). The terrestrial insect fauna is characterized by postglacial immigrants from the mainland, including a Holarctic element, with certain species exhibiting a circumpolar distribution, as well as a striking preponderance of European species that have been accidentally introduced (LINDROTH 1957; LINDBERG 1958; MORRIS 1983; LANGOR 2004). The Palearctic element is concentrated on the eastern Avalon Peninsula in the southeast, especially in and near the port city of St. John's

(LINDROTH 1957, 1963; LARSON & LANGOR 1982; MORRIS 1983; HAMILTON & LANGOR 1987; WHEELER & HOEBEKE 2005).

From the seventeenth to the late nineteenth century, litter- and soil-inhabiting arthropods, such as centipeds, millipeds, isopods, and carabids, became inadvertent immigrants with ballast aboard ships sailing to North America from European ports, especially those in southwestern England. Ballast material, consisting of soil, gravel, sand, bricks, and mortar, was needed to stabilize ships that could not be fully loaded with goods, owing to the small populations in Newfoundland, elsewhere in Atlantic Canada, and the northeastern United States (LINDROTH 1957; SAILER 1978, 1983).

During the era of sailing ships, the introduction of insects with plant material was a relatively unimportant pathway of entry into North America. In the 1840s, however, the advent of steam ships decreased travel times and allowed growing, rather than dormant, plants to survive long sea voyages (SAILER 1978, 1983; WHEELER & HENRY 1992). A few years earlier, development of the Wardian case, essentially a miniature greenhouse or terrarium, also facilitated the movement of living plants (LEMMON 1968; ETTER 1973). Tens of millions of seedlings and other types of plant material, often of inferior quality and insect infested, arrived at North American ports (WHEELER & HOEBEKE 2001). Even after Canada (1910) and the United States (1912) adopted legislation restricting the free movement of plants (HOWARD 1930; RIEGERT 1980), scale insects (Coccoidea), aphids (Aphididae), leafhoppers (Cicadellidae), plant bugs (Miridae), moths (particularly Lymantriidae), and insects of certain other groups continued to be introduced with nursery stock and become established in North America (e.g., MARLATT 1911; SAILER 1978, 1983; HAMILTON 1983; WHEELER & HOEBEKE 2001).

Since the 1970s, we have been interested in the detection, identification, and spread of Eurasian insects in North America. Two of us (E.R.H. and A.G.W.), since 1993, have made nine trips to the Atlantic Provinces of Canada to detect non-native insects not recorded previously from North America or those of limited known North American distribution. We have collected mainly in and around the principal ports of Halifax, Nova Scotia, and St. John's, Newfoundland, through which numerous Palearctic insects have entered (BROWN 1940, 1950, 1967; LINDROTH 1957; HAMILTON 1983; MAJKA & KLIMASZEWSKI 2004; WHEELER & HOEBEKE 2004, 2005). Our collecting complements the activities of the Biological Survey of Canada, which, since 1977, has supported an inventory of the insect fauna of Newfoundland. Since 1998, the documentation of terrestrial species has been emphasized (LANGOR 2004).

We report herein ten species of Palearctic Miridae, or plant bugs, not previously known from Newfoundland, emphasizing two species – *Phytocoris longipennis* FLOR and *Pilophorus cinnamopterus* (KIRSCHBAUM) – that represent new records for North America. We also give records of eight additional mirids that are new to the Newfoundland fauna and list the Palearctic mirids previously reported from the island.

## Terminology

**Holarctic:** The word Holarctic has been used to refer to species present in the Palearctic and Nearctic Regions as the result of either a natural distribution pattern or an intentional or unintentional introduction with commerce. Holarctic in the latter sense was used by BENSON (1962) in discussing sawfly distributions and WHEELER & HENRY (1992) in treating the Miridae common to the Palearctic and Nearctic Regions. Biogeographers, however, often restrict the term to species that are genuinely or naturally Holarctic (SLATER 1993). In the present paper, we use Holarctic in this more restrictive sense.

**Non-Native:** Terminology pertaining to the concept of “not native” has not been standardized. Species not native to a region have been termed adventive, alien, exotic, foreign, immigrant, invasive, non-indigenous, and non-native (WHEELER & HOEBEKE 2001). Numerous other adjectives also have been applied to species that are not native (COLAUTTI & MACISAAC 2004). Ecologists frequently misuse the various terms in studies of non-native species (BINGGELI 1994). COLAUTTI & MACISAAC (2004) argued for the adoption of neutral terminology to refer to “invasive” species, emphasizing that terms commonly used in the ecological literature are subjective and tend to cloud the consideration of theoretical issues. Here we use alien, introduced, and non-native synonymously to refer to mirids that are not native to Newfoundland. We acknowledge that the term introduced sometimes is reserved for species that are deliberately or intentionally introduced, for example, in biological control or for other purposes (FRANK & MCCOY 1990).



**Fig. 2:** *Phytocoris longipennis* FLOR.

## Material and Methods

We (E.R.H. & A.G.W.) collected plant bugs on the eastern Avalon Peninsula of Newfoundland (Fig. 1) from 9. to 15. July 2004 and 5. to 11. August 2005, concentrating on the St. John's area. Few adult mirids were present in mid-July 2004. All records of species new to Newfoundland are based on our August collections; adults of the few Palearctic mirids we collected in 2004 represented species previously reported from Newfoundland. The identity of *Phytocoris ulmi* LINNAEUS and *Psallus lepidus* FIEBER, whose larvae were observed in 2004, could not be confirmed until we collected adults of both species in 2005. Species not recorded in the most recent checklist of Canadian Hemiptera (MAW et al. 2000), additions by BARNES et al. (2000), or the updated list of Newfoundland Miridae (D.J. LARSON, personal communication, 2005) are considered new to the island.

Geographic coordinates for our collecting sites in Newfoundland are listed below and are not repeated under Material Examined:

Bay Bulls . . . . . 47°18.5'N, 52°48.5'W  
 Carbonear, College of the North Atlantic  
 campus . . . . . 47°44.2'N, 53°14.0'W  
 St. Johns  
 Bowring Park . . 47°31.6'N, 52°45.3'W  
 Elizabeth Street at Freshwater  
 Street . . . . . 47°33.8'N, 52°44.4'W  
 Harbour Drive . 47°33.7'N, 52°42.6'W  
 Memorial University  
 campus . . . . . 47°34.4'N, 52°43.8'W  
 Quidi Vidi Park . 47°35.1'N, 52°40.8'W  
 Thorburn Road . 47°33.9'N, 52°45.8'W

Mirids were collected by beating the branches of trees and shrubs over a shallow insect net or using the net to sweep herbaceous vegetation. Specimens were hand-picked from the net with plastic vials or collected into killing bottles charged with ethyl acetate. All Miridae were determined by T.J.H. Voucher material is deposited in the Canadian National Collection, Ottawa, Ontario; Cornell University Insect Collection, Ithaca, New York; and National Museum of Natural History, Smithsonian Institution, Washington, D.C.

For the two species new to North America, we include a taxonomic diagnosis and

description, and summary of the biology. The eight species that represent new records for Newfoundland were discussed in a review of Holarctic Miridae or Old World mirids accidentally introduced into North America (WHEELER & HENRY 1992). Background information provided for the eight additional species includes a summary of the Palearctic range, first Nearctic record, subsequent North American records, and overview of the biology. Palearctic Miridae previously recorded from Newfoundland (33 species), both unintentionally introduced (16) and naturally Holarctic (17), are listed in a table that also includes the 10 newly detected species. Complete lists of synonymy and other taxonomic literature are in the catalogs by CARVALHO (1958, 1959), SCHUH (1995), and KERZHNER & JOSIFOV (1999).

## Species New to North America

### *Phytocoris longipennis* FLOR 1861 (Mirinae) (Fig. 2)

**Diagnosis:** *Phytocoris longipennis* is distinguished from all other North American species of *Phytocoris* by the elongate, slender body (length about 4 times basal width of pronotum); mostly pale lower half of the head; black bar across the middle of the clypeus; three to four transverse dark lines across the frons; dark pronotum with only the calli pale; the second and third antennal segments having only a narrow pale annulus at the base of each; conspurcate hemelytral membrane; the male genital capsule lacking a tubercle; and male parameres and sclerotized process of the vesica with parallel serrate edges limited to the distal half (See WAGNER 1974a: 171, figs 131a, b).

In the North American literature, it keys to *Phytocoris* Species Group I in KNIGHT's (1923) "Miridae of Connecticut" based on the conspurcate hemelytral membrane, and roughly to the Palearctic *P. dimidiatus* KIRSCHBAUM based on the slender first antennal segment, the chiefly white lower half of the head, the dark bar across the middle of the clypeus, the dark second and third antennal segments with a pale annulus at the base of each, the lack of a longitudinal black vitta on the hemelytron, and the genital capsule lacking an erect tubercle above the



left paramere (*P. longipennis* has a flattened, somewhat recurved tubercle well above the left paramere). If “lower half of head blackish without clearly marked white areas...” in couplet 11 is chosen, it will run to *P. corticevivenis* KNIGHT. It is distinguished from *P. corticevivenis* and *P. dimidiatus* by the more slender body, lack of a pale band through the middle of antennal segment II, distinctly pale quadrate area around the calli, and shape of the sclerotized process of the vesica.

In STONEDAHL (1988), *P. longipennis* would key to his *P. tiliae* group containing the Palearctic *P. dimidiatus*, *P. populi* (LINNAEUS), and *P. tiliae* (FABRICIUS) if it had a pale median annulus on antennal segment II. Instead, however, it keys to the *P. junceus* group, containing 17 indigenous North American species.

**Description:** **Male** (n= 10): Length 6.66-6.72 mm, width 1.84-2.08 mm. **Head:** Width across eyes 1.00-1.08 mm, width of vertex 0.22-0.24 mm; pale yellowish brown, with three to four narrow transverse dark lines on frons, ventral surface mostly white or yellowish white with buccula, a wide band through lorum, and base and bar through middle of clypeus dark brown; with relatively long, erect and suberect, pale, simple setae. **Labium:** Length 2.52-2.60 mm, extending beyond hind coxae to third or fourth abdominal segment. **Antenna:** Segment I, length 1.40-1.52 mm, dark with numerous pale spots; II 2.88-3.12 mm, dark brown, becoming more fuscous distally, with a narrow white band at base; III 1.60-1.72 mm, fuscous, with a narrow white band at base; IV 1.24-1.28 mm, uniformly fuscous. **Pronotum:** Length 0.88-0.96 mm, basal width 1.56-1.72 mm; dark brown to fuscous, with narrow posterior edge and calli pale yellowish brown, subposterior margin scalloped with fuscous, especially noticeable on paler specimens; with semierect pale or white simple setae, intermixed with semi-erect, black, nearly bristlelike setae. **Meso-scutum:** Largely pale brown to pale yellowish brown, with a dark brown spot at lateral angles. **Scutellum:** Equilateral, largely pale brown to pale yellowish brown, distal half with an elongate dark spot on either side of pale median line. **Hemelytron:** Pale brown, heavily mottled with dark brown, apical half

with a dark angled spot and a large pale blotch beyond; cuneus pale on basal third, mottled dark brown distally; membrane pale, translucent, yellowish brown, veins brown, conspurcate or with scattered fine brown spots, especially around margins and inside cells (areoles). **Ventral surface:** Thoracic pleura dark brown, white on lower third, sometimes with a pale line through middle of upper two thirds, thoracic sterna largely whitish or pale yellowish brown, ostiolar auricle whitish; abdomen dark brown. **Legs:** Coxae whitish or pale yellowish brown; femora pale yellowish brown, heavily mottled with dark brown on distal two third to three quarters; fore and middle tibiae pale with three dark bands and two pale bands, hind tibia pale with dark mottling forming three indistinct dark bands.

**Female** (n=5): Length 6.32-6.64 mm, width 2.20-2.40 mm. **Head:** Width across eyes 0.98-1.04 mm, vertex width 0.38-0.40 mm. **Labium:** Length 2.80-2.84 mm, extending nearly to base of ovipositor. **Antenna:** Segment I, length 1.48-1.56 mm; II 2.88-3.20 mm; III 1.56-1.84 mm; IV 1.04-1.16 mm. **Pronotum:** Length 0.96-1.06 mm, basal width 1.72-1.84 mm. Similar to male in size and coloration, with only a proportionally broader width across the hemelytra and vertex.

**Distribution:** This mirine plant bug, widely distributed in the Palearctic Region (EHANNO 1987b; KERZHNER & JOSIFOV 1999), is reported here from Newfoundland as the first record for the Nearctic Region.

**Palearctic Range:** In Europe, *P. longipennis* ranges from Great Britain, Fennoscandia, and Russia (Central, North, and South European Territories) south to Spain, Italy, and Bulgaria (KERZHNER & JOSIFOV 1999). In the Mediterranean Region, it is found mostly in the mountains (WAGNER 1974a). Its Asian distribution includes China (Northern and Northwestern Territories), Japan, Korea, and Russia (East Siberia and Far East) (KERZHNER & JOSIFOV 1999).

**Host Plants and Habits:** Like many other species of *Phytocoris*, *P. longipennis* is arboreal and predacious on small arthropods (WAGNER & WEBER 1964; WAGNER 1974a; STONEDAHL 1988; WHEELER 2001).



**Fig. 3:** *Pilophorus cinnamopterus* (KIRSCHBAUM).

**Paleartic Observations:** Larvae and adults are found on the branches and trunks of deciduous trees and shrubs. In Great Britain, *P. longipennis* lives mainly on species of *Corylus*, *Crataegus*, and *Quercus* (BUTLER 1923; SOUTHWOOD & LESTON 1959). Other host genera include *Acer*, *Alnus*, *Betula*, *Fagus*, *Fraxinus*, *Malus*, *Platanus*, *Populus*, *Prunus*, *Salix*, and *Tilia* (e.g., BUTLER 1923; SOUTHWOOD & LESTON 1959; EHANNO 1987a; TODO & YASUNAGA 1996; FRIESS 2000). Collections of adults from conifers likely represent incidental occurrences; REUTER (1909) did not include *P. longipennis* among Heteroptera characteristic of Palearctic conifers. Adults are present from mid-July to October in the British Isles (SOUTHWOOD & LESTON 1959) and early July to mid-October in France, where the overwintered eggs of this univoltine bug hatch in late June or early July (EHANNO 1987a). The relatively few prey records for *P. longipennis* include predatory mites (Phytoseiidae) on apple trees (KRÄMER 1961).

**Nearctic Observations:** Most European arboreal insects that become established in North America colonize the same Holarctic genera that they feed on in Europe (MATTSON et al. 1994; NIEMELÄ & MATTSON 1996). Such is true for the predacious *P. longipennis* in Newfoundland, where we collected it from species of *Acer*, *Fraxinus*, *Malus*, *Populus*, *Tilia*, and *Ulmus*, in addition to conifers (see Material Examined for specific hosts).

**Material Examined:** Canada: Newfoundland, St. John's, Bowring Park, 6. & 9. Aug. 2005, 2♂♂, 1 ♀ ex *Acer rubrum*; 2♂♂, 1 ♀ ex *Fraxinus excelsior*; 2♂♂, 1 ♀ ex *Picea pungens*; 1♂ ex *Populus tremuloides*; 1♂ ex *Tilia* sp.; 2♂♂, 1 ♀ ex *Ulmus glabra*; 2♂♂, 5 ♀♀ (no host). St. John's, Memorial University campus, 7. & 10. Aug. 2005, 2♂♂, 1 ♀ ex *Malus* sp.; 1♂ ex *Pinus sylvestris*; 1♂, 1 ♀ (no host).

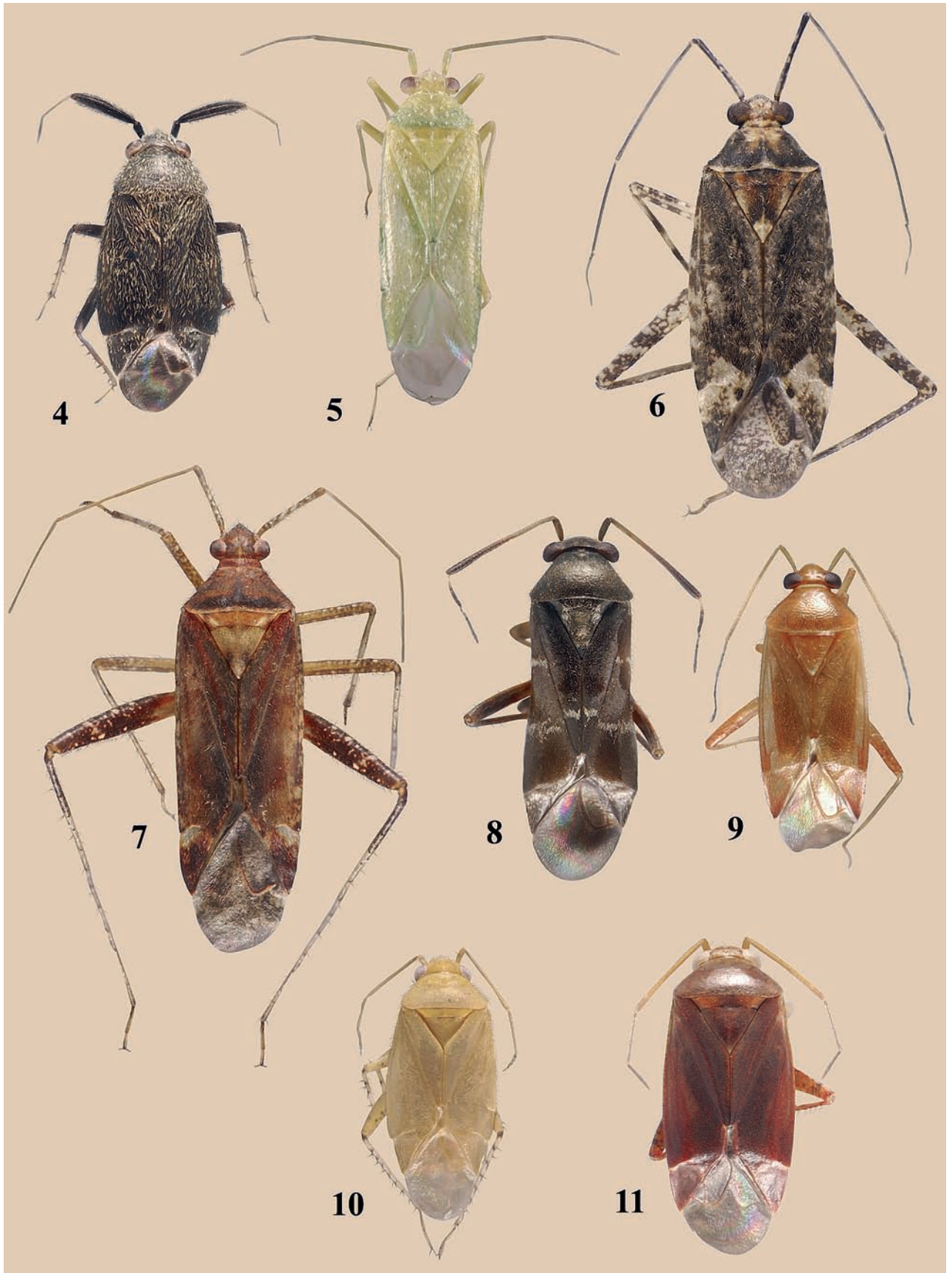
***Pilophorus cinnamopterus***  
(KIRSCHBAUM 1856) (Phylinae) (Fig. 3)

**Diagnosis:** *Pilophorus cinnamopterus* is distinguished from all other North American species of *Pilophorus* by the dark cinnamon-brown hemelytron polished over entire width behind the posterior band of white scalelike setae; the lack of erect, black, bristlelike setae on the corium; and the fuscous third antennal segment with only a narrow reddish-brown band at base.

This species keys to *Pilophorus cinnamopterus* in KNIGHT's (1923) "Miridae of Connecticut" based on the polished posterior area of the dark cinnamon-brown hemelytron, lack of bristlelike setae on the corium, and dark third antennal segment. Apparently, KNIGHT (1923) included *P. cinnamopterus* in his key based only on comparison with Palearctic specimens because he neither included a description in the text nor gave any specific records as he did for other included species of *Pilophorus*.

In SCHUH & SCHWARTZ's (1988) revision, *P. cinnamopterus* keys to *P. tibialis* VAN DUZEE if the third antennal segment is interpreted as uniformly dark, or to *P. americanus* POPPIUS, if the third antennal segment is considered pale proximally and dark distally. It can be distinguished from either of these two western U. S. species by the lack of black bristlelike setae on the corium. In addition, the vesica differs from either species in being generally more slender, especially the distal process. The vesical spine is similar to one of three figured by SCHUH & SCHWARTZ (1988: fig.13d) for *P. americanus*. The vesica of our specimens is more similar to that figured by WAGNER (1974b, fig. 558h), although our material clearly possesses a lateral vesical spine (omitted in WAGNER's illustration).

**Description:** **Male** (n=2): Length 4.20-4.28 mm, width 1.62-1.70 mm. **Head:** Width across eyes 1.06-1.10 mm, width of vertex 0.50-0.52 mm; fuscous to black, with a few scattered pale, recumbent, simple setae. **Labium:** Length 1.68-1.74 mm, extending to bases of hind coxae. **Antenna:** Segment I length 0.34-0.36 mm, pale brown to pale reddish brown; II 1.54-1.62 mm, dark reddish brown, becoming fuscous on distal third, gradually swollen to apex; III 0.56 mm (one missing), fuscous, with a narrow reddish-brown band at base; IV 0.50 mm (one missing), whitish, with apex fuscous. **Pronotum:** Length 0.80-0.84 mm, basal width 1.44-1.46 mm; uniformly semishiny black, surface shagreened, with a few short, scattered, recumbent, golden, simple setae. **Mesoscutum:** Black. **Scutellum:** Black, with a patch of white, scalelike setae at each basal angle and a narrow band of white scalelike setae across apex. **Hemelytron:**



Ma- **Figs 4-11:** (4) *Atractotomus mali* (MEYER-DÜR); (5) *Melanotrachus flavosparsus* (C.R. SAHLBERG); (6) *Phytocoris populi* LINNAEUS; (7) *Phytocoris ulmi* LINNAEUS; (8) *Pilophorus clavatus* (LINNAEUS); (9) *Pinalitus rubricatus* (FALLÉN); (10) *Plagiognathus vitellinus* (SCHOLTZ); (11) *Psallus lepidus* FIEBER.



Uniformly dark cinnamon brown, with a straight band of white, scalelike setae across basal third of corium level with apex of scutellum and another continuous across corium and apical one fourth of clavus; area in front of posterior band of scalelike setae dull, area behind band shiny. **Ventral surface:** Uniformly dark shiny brown to fuscous. **Legs:** Coxa pale brown at base to uniformly reddish brown; femora, tibiae, and tarsi reddish brown.

**Female** (n=3): Length 3.88-4.08 mm, width 1.60-1.62 mm. **Head:** Width across eyes 1.10-1.12 mm, width of vertex 0.56-0.58 mm. **Labium:** Length 1.64-1.80 mm, extending to bases of hind coxae. **Antenna:** Segment I, length 0.34-0.36 mm; II 1.46-1.52 mm; III 0.56-0.58 mm; IV 0.52-0.54 mm. **Pronotum:** Length 0.74-0.76 mm, basal width 1.30-1.38 mm. Similar to male in shape and coloration.

**Distribution:** *Pilophorus cinnamopterus*, belonging to the phyline tribe Pilophorini, is widely distributed in the Palearctic Region (EHANNO 1987b; KERZHNER & JOSIFOV 1999). Records from Newfoundland are the first for the Nearctic Region, all previous North American records having been based on misidentifications (KNIGHT 1927).

**Palearctic Range:** The European range extends from Great Britain, Fennoscandia, and Russia (Central, North, and South European Territories) south to Spain, Italy, Malta, Turkey, and Cyprus. The Asian distribution of *P. cinnamopterus* includes Azerbaijan, Turkey, and Russia (East Siberia) (KERZHNER & JOSIFOV 1999).

**Nearctic Range:** We here report *P. cinnamopterus* from St. John's, Newfoundland, Canada, as the first authentic Nearctic record. The first putative record from North America (as *P. bifasciatus* (FABRICIUS)) was that of UHLER (1886) from the "northern states," which was followed by OSBORN's (1900) record from Ohio. VAN DUZEE (1917) listed the Ohio record for *P. cinnamopterus* in his catalog of North American Hemiptera, as did BLATCHLEY (1926) in his manual of North American Heteroptera. Despite KNIGHT's (1927) opinion that Nearctic records of *P. cinnamopterus* were not valid, CARVALHO (1958) retained the

Ohio record in his catalog of world Miridae. The species thus is considered Holarctic in certain European publications (e.g., BUTLER 1923; WAGNER & WEBER 1964; WAGNER 1974b; VINOKUROV 1979). SCHUH & SCHWARTZ (1988), however, did not include *P. cinnamopterus* in their revision of the New World Pilophorini, HENRY & WHEELER (1988) excluded the species from the catalog of North American Miridae, WHEELER & HENRY (1992) excluded it from their treatment of Old World mirids known from North America, and SCHUH (1995) listed it only from the Palearctic Region in his world catalog of the Miridae.

**Host Plants and Habits:** *P. cinnamopterus* belongs to a mostly predacious genus whose species feed on aphids and other small arthropods (WHEELER 2001). The larvae develop exclusively (or nearly so) on pines (*Pinus* spp.), especially *P. sylvestris* L. (REUTER 1909; BUTLER 1923; KULLENBERG 1944; SOUTHWOOD & LESTON 1959; EHANNO 1987a). Records of this species from deciduous trees (e.g., STICHEL 1933) likely are based on misidentifications of *P. perplexus* (DOUGLAS & SCOTT) or other species of the genus, or represent the incidental occurrence of adults (REUTER 1909; KULLENBERG 1944).

**Palearctic Observations:** Eggs of this univoltine plant bug overwinter, and in France begin to hatch in late June, with adults appearing by late July (EHANNO 1987a). Adults are found in Sweden from mid-July to early September (KULLENBERG 1944) and in England from mid- or late July to late September or October (SOUTHWOOD & LESTON 1959). This omnivore, or zoophytophage, feeds on aphids (e.g., cinarines), as well as on buds, needles, and resin from wounds on host pines (KULLENBERG 1944; SOUTHWOOD & LESTON 1959; STRAWIŃSKY 1964). The antlike or myrmecomorphic larvae often are found among ants (e.g., formicines) on pine branches and trunks (REUTER 1909; BUTLER 1923; KULLENBERG 1944; SOUTHWOOD & LESTON 1959). This bug not only resembles syntopic ants in its shape and color but also in its behavior, which enhances the presumed ant mimicry (BUTLER 1923; KULLENBERG 1944).

**Nearctic Observations:** We collected fifth instars and adults in Newfoundland on an Old World pine, *P. nigra* ARNOLD.



al Examined: Canada: Newfoundland, St. John's, Bowring Park, 6. Aug. 2005, 1♂ (no host). St. John's, Memorial University campus, 5-10 Aug. 2005, 3♂♂, 4♀♀ ex *Pinus nigra*; 1♂, 1♀ (no host).

## Species New to Newfoundland

### *Atractotomus mali* (MEYER-DÜR 1843) (Phylinae) (Fig. 4)

Note: STONEDAHL (1990), noting that *A. mali* is not congeneric with the type species *A. magnicornis* FALLÉN, considered its status incertae sedis. Its proper generic placement remains in question (KERZHNER & JOSIFOV 1999). SCHWARTZ & STONEDAHL (2004) suggested *A. mali* and three other European Phylini form a monophyletic group of species which could be accommodated by a new generic group taxon. *Atractotomus mali* was misidentified from Nova Scotian apple orchards as *Criocoris saliens* (REUTER), as clarified by KELTON (1983b).

This common Eurasian plant bug ranges from Great Britain, Fennoscandia, and Russia south to Spain, Italy, Turkey, and Israel (KERZHNER & JOSIFOV 1999). The first record of *A. mali* in North America, where it is considered accidentally introduced (WHEELER & HENRY 1992), was from Nova Scotia (KNIGHT 1924). Subsequent Canadian records are from British Columbia, New Brunswick, and Prince Edward Island (MAW et al. 2000). The first U.S. record – Connecticut (LEONARD 1965) – was followed by records from Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Vermont, and Virginia (WHEELER & HENRY 1992).

*Atractotomus mali* overwinters as eggs, and larvae develop on rosaceous trees and shrubs such as species of *Crataegus*, *Malus*, *Prunus*, *Pyracantha*, and *Pyrus*. On apple, depending on the season, prey availability, cultivar, and other factors, *A. mali* can be a pest of the fruit. This omnivore, however, also can be a useful predator in apple and pear orchards. Its prey include spider mites, aphids, psyllids, and lepidopteran larvae and pupae (e.g., FINTESCU 1914; KULLENBERG 1944; SOUTHWOOD & LESTON 1959; SANFORD 1964; STRAWIŃSKI 1964; JONSSON 1987; WHEELER & HENRY 1992; WHEELER

2000, 2001). In Newfoundland, we observed *A. mali* on ornamental crabapple (*Malus* sp.) and hawthorn (*Crataegus* sp.) infested with the Palearctic *Cacopsylla peregrina* (FOERSTER), a psyllid recently reported as new to eastern North America (WHEELER & HOEBEKE 2004). Adults of this univoltine mirid are found from late June until early August in Britain (SOUTHWOOD & LESTON 1959).

Material Examined: Canada: Newfoundland, St. John's, Bowring Park, 9. Aug. 2005, 1♂, 1♀ ex *Crataegus* sp. St. John's, Elizabeth Street at Freshwater Street, 1♀ ex *Fraxinus excelsior*. St. John's, Memorial University campus, 7. Aug. 2005, 7♂♂, 17♀♀ ex *Malus* sp., 1♀ (no host).

### *Melanotrichus flavosparsus* (C.R. SAHLBERG 1841) (Orthotylinae) (Fig. 5)

Note: The name *Orthotylus flavosparsus* has been used in the European literature, including the most recent Palearctic catalog (KERZHNER & JOSIFOV 1999), and in SCHUH's (1995) world catalog. Because *flavosparsus* (and other species of subgenus *Melanotrichus*) is not congeneric with the type species *O. nassatus* FABRICIUS 1787, we consider *Melanotrichus* generically distinct and use the name *M. flavosparsus*.

This orthotyline plant bug, widespread in Europe, Asia, and northern Africa, also is found in North and South America as the result of unintentional introductions (WHEELER & HENRY 1992; KERZHNER & JOSIFOV 1999). The first North American record was that of PROVANCHER (1872) (as *Lygus unicolor*) from Quebec, and *M. flavosparsus* since has been recorded in Canada from British Columbia and Northwest Territories east to the Atlantic Provinces (except for Newfoundland) (MAW et al. 2000). WIRTNER's (1904) record from Pennsylvania (as *Macrocoleus coagulator*) was the first for the United States. It now is known from Maine south to Georgia and west to California (WHEELER & HENRY 1992).

*Melanotrichus flavosparsus* develops on chenopods of the genera *Atriplex* and *Chenopodium*, especially *C. album* L. (KULLENBERG 1944; SOUTHWOOD & LESTON 1959; EHANNO 1987a). Its collection from a polygonaceous plant (*Rumex* sp.) (EHANNO 1987a) probably should be considered inci-

dental. North American hosts, in addition to *C. album*, include beet (*Beta vulgaris* L.) and the introduced Eurasian weed *Kochia scoparia* (L.) ROTH (WHEELER & HENRY 1992; HENRY et al. 2005). In Britain, first-generation adults of this bivoltine species appear by mid- to late June, with second-generation adults present from late August into September (SOUTHWOOD & LESTON 1959). Overwintering occurs as eggs inserted into stems of host chenopods (KULLENBERG 1944; SOUTHWOOD & LESTON 1959).

Material Examined: Canada: Newfoundland, St. John's, Bowring Park, 6. & 9. Aug. 2005, 3♂♂, 11 ♀♀, ex *Chenopodium album*.

### *Phytocoris populi* LINNAEUS 1758 (Mirinae) (Fig. 6)

*Phytocoris populi* is widespread in Europe, ranging from Great Britain, Fennoscandia, and Russia (Central, North, and South European Territories) south to Spain, Italy, and Greece. The only Asian records are from China (Northern Territory) and Russia (East and West Siberia and Far East) (KERZHNER & JOSIFOV 1999). STONEDAHL's (1983) records from the Pacific Northwest – British Columbia and Washington – were the first published for *P. populi* in North America, although BARNES et al. (2000) later discovered material collected in Ontario in 1918. Subsequent records, which are limited to Canada, include Manitoba and Nova Scotia (BARNES et al. 2000; MAW et al. 2000).

In the Palearctic Region, *P. populi* lives on the bark of deciduous trees, such as species of *Acer*, *Alnus*, *Fraxinus*, *Populus*, *Pyrus*, *Quercus*, *Salix*, *Tilia*, and *Ulmus* (BUTLER 1923; SOUTHWOOD & LESTON 1959; STONEDAHL 1983; EHANNO 1987a). Larvae and adults feed on small insects such as aphids, psocids, and psyllids (SOUTHWOOD & LESTON 1959; WAGNER & WEBER 1964). We collected this plant bug mainly from deciduous trees and shrubs in Newfoundland (see Material Examined); late instars and adults (>25 individuals observed, plus exuviae) were most numerous on the main branches and trunk of a red maple (*Acer rubrum* L.) that had been severely defoliated by a native geometrid, the elm spanworm (*Ennomos subsignaria* (HÜBNER)). Eggs of this univoltine mirid overwinter and hatch

in late spring; adults are found mainly from late July to October in Britain (BUTLER 1923; SOUTHWOOD & LESTON 1959; STONEDAHL 1983).

Material Examined: Canada: Newfoundland, St. John's, Bowring Park, 6. Aug. 2005, 9♂♂, 11 ♀♀ ex *Acer rubrum*; 1♂ ex *Picea pungens*; 1 ♀ sweeping herbs; 2 ♀♀ (no host). St. John's, Memorial University campus, 6. Aug. 2005, 1♂, 1 ♀ ex *Betula populifolia*; 2♂♂, 1 ♀ ex *Malus* sp.; 2 ♀♀ beating base of shrubs; 1 ♀ (no host). St. John's, Thorburn Road, 6. Aug. 2005, 1 ♀ ex *Abies balsamea*.

### *Phytocoris ulmi* LINNAEUS 1758 (Mirinae) (Fig. 7)

*Phytocoris ulmi* is known in Europe from Great Britain, Fennoscandia, and Russia (Central, North, and South European Territories) south to Spain, Italy, and Bulgaria, and in Asia from Armenia, Azerbaijan, and Iraq. A northern African record (Algeria) is invalid (KERZHNER & JOSIFOV 1999). In North America, this plant bug was known only from a female collected in Nova Scotia (Yarmouth) in 1914 until WHEELER & HOEBEKE (2004) reported it from four additional localities in Nova Scotia. Prior to the recent collections from Nova Scotia, the establishment of *P. ulmi* in North America was in doubt (WHEELER & HENRY 1992).

Larvae and adults are found mainly on deciduous trees and shrubs, especially hawthorns (*Crataegus* spp.), but they also can be collected from herbs (BUTLER 1923; KULLENBERG 1944; SOUTHWOOD & LESTON 1959; WAGNER & WEBER 1964; POLLARD 1968; EHANNO 1987a). We collected adults in Newfoundland on various trees, and adults and a few fifth instars from the lower branches of shrubs such as *Caragana arborescens* LAM. and *Dasiphora floribunda* (PURSH) KARTESZ (= *Potentilla fruticosa* auct. non L.) (see Material Examined for other hosts). An omnivore, *P. ulmi* preys on mites, aphids, and other small arthropods in addition to feeding on buds, unripe fruits, and leaves of host plants. The overwintered eggs hatch in May, and adults of this univoltine species are present from late June to October (BUTLER 1923; KULLENBERG 1944; SOUTHWOOD & LESTON 1959; STRAWIŃSKI 1964; EHANNO 1987a).

Material Examined: Canada: Newfoundland, Carbonear, College of the North Atlantic campus, 8.

Aug. 2005, 6♂♂, 4♀♀ ex *Caragana arborescens*. St. John's, Bowring Park, 6. & 9. Aug. 2005, 2♂♂, 10♀♀ ex *C. arborescens*; 1♀ ex *Lonicera* sp.; 2♂♂, 5♀♀ (no host). St. John's, Elizabeth Street at Freshwater Street, 5. Aug. 2005, 5♀♀ ex *Ame-lanchier* sp. St. John's, Memorial University campus, 5. & 7. Aug. 2005, 3♂♂ ex *Cornus* sp.; 1♂, 4♀♀ ex *Dasiphora floribunda*; 3♀♀ ex *Rhus* sp.; 1♂, 1♀ (no host). St. John's, Quidi Vidi Park, 9. Aug. 2005, 1♂, 2♀♀ ex *Salix* sp.

***Pilophorus clavatus* (LINNAEUS 1767)  
(Phylinae) (Fig. 8)**

Found in Europe from Great Britain, Fennoscandia, and Russia (Central, North, and South European Territories) south to Spain, Italy, and Turkey, this pilophorine mirid also is widespread in Asia. Asian records include Armenia, Azerbaijan, China (Northern Territory), Georgia, Mongolia, Russia (East and West Siberia and Far East), Syria, and Turkey (KERZHNER & JOSIFOV 1999). Most records of *P. clavatus* from the Nearctic Region are considered misidentifications of the Nearctic *P. neoclavatus* SCHUH & SCHWARTZ or other species of the genus (SCHUH & SCHWARTZ 1988). FITCH (1858) has been credited (e.g., WHEELER & HENRY 1992) with the first Nearctic record of *P. clavatus*, listing it as *Capsus clavatus* from New York. FITCH's (1858) record, however, could not be verified by SCHUH & SCHWARTZ (1988) in their revision of the New World Pilophorini. The first Canadian record, that of PROVANCHER (1887) from Quebec (as *P. bifasciatus*), also was not verified by SCHUH & SCHWARTZ (1988). Based on an examination of about 9,000 specimens, SCHUH & SCHWARTZ (1988) found that only 26 represented *P. clavatus*; included was material from Manitoba and Nova Scotia in Canada and Colorado, Illinois, Minnesota, Montana, and New York in the United States. The foregoing also are the only North American records of *P. clavatus* that SCHUH (1995) listed in his world catalog of the Miridae. MAW et al. (2000), however, listed *P. clavatus* from additional Canadian provinces: Alberta, British Columbia, Ontario, Quebec, and Saskatchewan.

In Britain and continental Europe, *P. clavatus* is found on deciduous trees, including species of *Alnus*, *Betula*, *Corylus*, *Populus*, *Quercus*, *Salix*, and *Tilia* (BUTLER 1923;

SOUTHWOOD & LESTON 1959; STRAWIŃSKI 1964; WAGNER & WEBER 1964; EHANNO 1987a). Willows (*Salix* spp.) are the most common hosts in Great Britain (SOUTHWOOD & LESTON 1959), and our only collections in Newfoundland were from *Salix*. An omnivore, *P. clavatus* feeds on its host plants and on aphids, scale insects, and other small arthropods (ZSCHOKKE 1922; STRAWIŃSKI 1964; WHEELER 2001). The eggs of this univoltine species overwinter on host trees, larvae are found during June and July, and adults are present from July to September (SOUTHWOOD & LESTON 1959; EHANNO 1987a).

Material Examined: Canada: Newfoundland, St. John's, Quidi Vidi Park, 8. & 10. Aug. 2005, 3♂♂ ex *Salix* sp.

***Pinalitus rubricatus* (FALLÉN 1807)  
(Mirinae) (Fig. 9)**

This Palearctic mirine is found in Europe from Great Britain, Fennoscandia, and Russia (Central and North European Territories) south to Portugal, Italy, and Bulgaria. *P. rubricatus* is known in northern Africa from Algeria and in Asia from Kazakhstan and Russia (East and West Siberia and Far East) (KERZHNER & JOSIFOV 1999). The first North American record (as *Orthops rubricatus*) of this accidentally introduced bug (WHEELER & HENRY 1992) was from Pennsylvania (HENRY & WHEELER 1974). The only other U.S. record is from New York (WHEELER 1979; WHEELER & HENRY 1992), and the only previous Canadian record is from Nova Scotia (KELTON 1977; MAW et al. 2000).

A conifer specialist and apparently strict phytophage, *P. rubricatus* develops mainly on spruces (*Picea* spp.) in Britain and continental Europe, although it also has been reported from firs (*Abies* spp.) and Scots pine (*Pinus sylvestris*) (KULLENBERG 1944; SOUTHWOOD & LESTON 1959; WAGNER & WEBER 1964; EHANNO 1987a). North American hosts are spruces such as *P. abies* (L.) H. KARST. and *P. glauca* (MOENCH) VOSS, as well as balsam fir (*A. balsamea* (L.) MILL.) and Scots pine (WHEELER & HENRY 1992). Our collections in Newfoundland were from white spruce, *P. glauca*. Overwintering occurs as eggs inserted into the needles of conifers, larvae are found during May



and June, and adults are present from late June or early July through September in Britain (SOUTHWOOD & LESTON 1959); adults do not appear in Sweden until mid-to late July (KULLENBERG 1944). EHANNO (1987a) suggested that *P. rubricatus* might be bivoltine in France, but it apparently is univoltine in Sweden and England (KULLENBERG 1944; SOUTHWOOD & LESTON 1959).

Material Examined: Canada: Newfoundland, Bay Bulls, 10. Aug. 2005, 1♂, 4♀♀ ex *Picea glauca*. Carbonear, College of the North Atlantic campus, 8. Aug. 2005, 6♂♂, 11♀♀ ex *P. glauca*. St. John's, Memorial University campus, 5. Aug. 2005, 17♂♂, 21♀♀ ex *P. glauca*.

***Plagiognathus vitellinus* (SCHOLTZ 1847) (Phylinae) (Fig. 10)**

Note: This species was placed in the genus *Parapsallus* WAGNER in the Palearctic catalog (KERZHNER & JOSIFOV 1999) but was returned to *Plagiognathus* FIEBER by SCHUH (2001) in his revision of New World *Plagiognathus*.

*Plagiognathus vitellinus* is known in Europe from Great Britain, Finland, Sweden, and Russia (North European Territory) south to Italy and Bulgaria. Its Asian distribution is limited to Korea and Russia (East Siberia and Far East). The record from northern Africa (Algeria) is erroneous (KERZHNER & JOSIFOV 1999). It has been introduced into North America with conifer nursery stock (WHEELER & HENRY 1992). Since its detection in Pennsylvania (HENRY & WHEELER 1973), *P. vitellinus* has been recorded from Maine south to Virginia and West Virginia (WHEELER & HENRY 1992) and west to Iowa (SCHUH 2001). The first published Canadian record – Ontario (HENRY & WHEELER 1979) – was followed by records from Nova Scotia and Quebec (BARNES et al. 2000, MAW et al. 2000). BARNES et al. (2000), based on an examination of Canadian insect collections, reported an earlier collection from Ontario, dating from 1961.

In Great Britain, this phylina is found most often on spruces (*Picea* spp.) and less commonly on larches (*Larix* spp.) (SOUTHWOOD & LESTON 1959). EHANNO (1987a) also listed it from fir (*Abies* sp.) and pine (*Pinus* sp.) in France. *P. vitellinus* has been

found on Douglas fir (*Pseudotsuga menziesii* (MIRB.) FRANCO) in the United States, in addition to species of *Abies*, *Larix*, and *Picea* (WHEELER & HENRY 1992; SCHUH 2001). The eggs overwinter, and adults of this univoltine bug are present from late June until early August in Britain (SOUTHWOOD & LESTON 1959).

Material Examined: Canada: Newfoundland, St. John's, Memorial University campus, 5. & 7. Aug. 2005, 2♂♂, 8♀♀ ex *Picea glauca*; 3♀♀ (no host). St. John's, Thorburn Road., 6. Aug. 2005, 8♂♂, 10♀♀ ex *Picea glauca*.

***Psallus lepidus* FIEBER 1858 (Phylinae) (Fig. 11)**

*Psallus lepidus* is widespread in Europe, ranging from Great Britain, Fennoscandia, and Russia (North and South European Territories) south to Spain, Italy, and Turkey. In Asia, it is known from Armenia and Azerbaijan (KERZHNER & JOSIFOV 1999). KELTON (1983a) gave Nova Scotia and Prince Edward Island as the first North American records; Massachusetts was the first U.S. record (WHEELER & HOEBEKE 1990). No further North American records have been published.

European ash (*Fraxinus excelsior* L.) is the principal European and North American host (BUTLER 1923; SOUTHWOOD & LESTON 1959; KELTON 1983a; WHEELER & HOEBEKE 1990). *Fraxinus angustifolia* VAHL has been recorded as a host plant in France (EHANNO 1987a) and the United States, where another European species, *F. pallisae* WILLM., also was a host (WHEELER & HOEBEKE 1990). Larval feeding can result in the discoloration of ash fruits, or samaras, which typically also become spotted with the bugs' dark excrement (WHEELER & HOEBEKE 1990; WHEELER 2001: pl. 16). This phytophagous mirid probably is an ash specialist, with collections from other plant genera representing incidental adult occurrences (BUTLER 1923, WHEELER & HOEBEKE 1990). Eggs overwinter on host trees, and, in England, adults are present from mid-May to September (BUTLER 1923; SOUTHWOOD & LESTON 1959). Although the possibility of bivoltinism was suggested for *P. lepidus* in England (SOUTHWOOD & LESTON 1959), this phylina plant bug appears to be univoltine (EHANNO 1987a; WHEELER & HOEBEKE 1990).

**Tab. 1:** Palearctic Miridae in Newfoundland, including species recorded previously and the 10 species listed herein (boldface type) as new records. Species are listed alphabetically by subfamily and tribe, with the names of higher taxa also arranged alphabetically. The spelling of certain names (e.g., *Closterotomus norvegicus*, rather than *C. norvegicus*) follows WHEELER (2001: Tab. 2.1).

Material Examined: Canada: Newfoundland, St. John's, Bowring Park, 6. & 9. Aug. 2005, 6♂♂, 13♀♀ ex *Fraxinus excelsior*. St. John's, Elizabeth Street at Freshwater Street, 5. Aug. 2005, 7♂♂, 14♀♀ ex *Fraxinus excelsior*. St. John's, Harbour Drive, 7. Aug. 2005, 3♂♂, 5♀♀ ex *Fraxinus excelsior*.

## Species Reported Previously from Newfoundland

Table 1 lists the 43 Palearctic Miridae now known to occur in Newfoundland: 33 species reported previously, plus the 10 species we report as new to the island.

*Chlamydatus pullus* (REUTER), recorded from Newfoundland and elsewhere in Canada by KELTON (1965) and retained in the checklist of Canadian Hemiptera (MAW et al. 2000), is excluded from Table 1. SCHUH & SCHWARTZ (2005) considered most, and perhaps all, of KELTON's (1965) records of this phylina to be based on misidentifications; they recorded true *C. pullus* only from Quebec, Saskatchewan, and Yukon Territory in Canada. The Nearctic status of the Palearctic *C. pulicarius* (FALLÉN) also has been uncertain. KELTON (1980) doubted the validity of North American records, and

Miridae Species	Distributional status <sup>2</sup>	First record <sup>3</sup>	Reference
<b>Subfamily Mirinae</b>			
<b>Tribe Mirini</b>			
<i>Adelphocoris lineolatus</i> (GOEZE)	I	"2000"	MAW et al. 2000
<i>Capsus ater</i> (LINNAEUS)	I	1949	LINDBERG 1958
<i>Closterotomus norvegicus</i> (GMELIN)	I	1930	WHEELER & HENRY 1992
<i>Lygocoris pabulinus</i> (LINNAEUS)	H?	1949	LINDBERG 1958
<i>Lygocoris rugicollis</i> (FALLÉN)	I?	"2000"	MAW et al. 2000
<i>Lygus punctatus</i> (ZETTERSTEDT)	H	"1998"	SCHWARTZ & FOOTITT 1998
<i>Neolygus contaminatus</i> (FALLÉN)	I?	"1971"	KELTON 1971b
<b><i>Phytocoris longipennis</i> FLOR</b>	I	2005	Present paper
<b><i>Phytocoris populi</i> (LINNAEUS)</b>	I	2005	Present paper
<b><i>Phytocoris ulmi</i> (LINNAEUS)</b>	I	2005	Present paper
<b><i>Pinalitus rubricatus</i> (FALLÉN)</b>	I	2005	Present paper
<i>Polymerus unifasciatus</i> (FABRICIUS)	H	1980	SCHWARTZ et al. 1991
<i>Stenotus binotatus</i> (FABRICIUS)	I	"2000"	MAW et al. 2000
<b>Tribe Stenodemini</b>			
<i>Leptopterna dolabrata</i> (LINNAEUS)	I	1930 <sup>4</sup>	LINDBERG 1958
<i>Megaloceroea recticornis</i> (GEOFFROY)	I	1967	WHEELER & HENRY 1992
<i>Pithanus maerkelii</i> (HERRICH-SCHAEFFER)	I	1951	LINDBERG 1958
<i>Stenodema trispinosa</i> REUTER	H	1949	LINDBERG 1958
<i>Teratocoris caricis</i> KIRKALDY	H	"1966"	KELTON 1966
<i>Teratocoris paludum</i> J. SAHLBERG	H	1949	LINDBERG 1958
<i>Teratocoris saundersi</i> DOUGLAS & SCOTT	H	1951	LINDBERG 1958
<i>Trigonotylus caelestialium</i> (KIRKALDY)	H?	"2000"	MAW et al. 2000
<i>Trigonotylus viridis</i> (PROVANCHER) <sup>5</sup>	H	"1971"	KELTON 1971a
<b>Subfamily Orthotylinae</b>			
<b>Tribe Halticini</b>			
<i>Halticus apterus</i> (LINNAEUS)	I	1985	BARNES et al. 2000
<i>Orthocephalus coriaceus</i> (FABRICIUS)	I	1985	BARNES et al. 2000
<i>Orthocephalus saltator</i> (HAHN)	I	1925	BARNES et al. 2000
<b>Tribe Orthotylini</b>			
<i>Blepharidopterus angulatus</i> (FALLÉN)	I	1984	BARNES et al. 2000
<i>Cyrtorhinus caricis</i> (FALLÉN)	H	1949	LINDBERG 1958
<b><i>Melanotrachus flavosparsus</i> (C.R. SAHLBERG)</b>	I	2005	Present paper
<b>Subfamily Phylinae</b>			
<b>Tribe Leucophoropterini</b>			
<i>Tytthus pygmaeus</i> (ZETTERSTEDT)	H	"1980"	KELTON 1980
<b>Tribe Phylini</b>			
<i>Atractotomus magnicornis</i> (FALLÉN)	I	1980	BARNES et al. 2000
<b><i>"Atractotomus" mali</i> (MEYER-DÜR)</b>	I	2005	Present paper
<i>Chlamydatus pulicarius</i> (FALLÉN) <sup>6</sup>	H	1949	SCHUH & SCHWARTZ 2005
<i>Chlamydatus wilkinsoni</i> (DOUGLAS & SCOTT)	H	1979	SCHUH & SCHWARTZ 2005
<i>Lopus decolor</i> (FALLÉN)	I	1984	BARNES et al. 2000
<i>Megalocoleus molliculus</i> (FALLÉN)	I	1980	BARNES et al. 2000
<i>Monosynnum bohemanni</i> (FALLÉN)	H	"1917"	KNIGHT 1917
<i>Plagiognathus arbustorum</i> (FABRICIUS)	I	1982	BARNES et al. 2000
<i>Plagiognathus chrysanthemi</i> (WOLFF)	I	1925 <sup>7</sup>	BARNES et al. 2000
<b><i>Plagiognathus vitellinus</i> (SCHOLTZ)</b>	I	2005	Present paper
<i>Psallus aethiops</i> (ZETTERSTEDT) <sup>8</sup>	H	1954	SCHWARTZ & KELTON 1990
<b><i>Psallus lepidus</i> FIEBER</b>	I	2005	Present paper
<b>Tribe Pilophorini</b>			
<b><i>Pilophorus cinnamopterus</i> (KIRSCHBAUM)</b>	I	2005	Present paper
<b><i>Pilophorus clavatus</i> (LINNAEUS)</b>	I	2005	Present paper

<sup>2</sup>H: naturally Holarctic; I: accidentally introduced.

<sup>3</sup>When an earlier collection has been published subsequent to the first published record, a reference to the original publication is provided in a footnote; a year in quotation marks is the year of publication when an actual date is not given.

<sup>4</sup>WHEELER & HENRY (1992) overlooked LINDBERG's (1958) record.

<sup>5</sup>WHEELER & HENRY (1992) discussed the identity of this species in North America and its confusion with *T. ruficornis* (GEOFFROY).

<sup>6</sup>On the basis of KELTON (1980), WHEELER & HENRY (1992) excluded this species from their treatment of Palearctic Miridae known from North America; see SCHUH & SCHWARTZ (2005) for taxonomic clarification.

<sup>7</sup>LINDBERG (1958) recorded a 1949 collection from St. John's.

<sup>8</sup>*Psallus drakei* KNIGHT 1923, described from New York and Alberta, is considered a synonym (SCHWARTZ & KELTON 1990).

WHEELER & HENRY (1992) thus omitted *C. pulicarius* from their treatment of Old World Miridae known from North America. In their generic review, SCHUH & SCHWARTZ (2005) considered *C. pulicarius* to be widely distributed in North America and included records from Newfoundland. All specimens of *Chlamydatus* that we collected in Newfoundland were those of *C. pulicarius*. We, therefore, include this species in Table 1.

## Discussion

Our records of *Phytocoris longipennis*, *P. populi*, and *P. ulmi* increase the number of *Phytocoris* species known from Newfoundland from two (MAW et al. 2000; SCUDDER & FOOTTIT 2006) to five. *Phytocoris*, with about 650 described species worldwide (SCHUH 1995; SCHUH & SLATER 1995), is by far the largest mirid genus. Our records of *Pilophorus cinnamopterus* and *P. clavatus* are the first species for Newfoundland in this Holarctic phyline genus. Of the 16 Palearctic Miridae recorded previously from Newfoundland as aliens, the only species in eastern Canada apparently restricted to the island is *Plagiognathus arbustorum*; it probably was introduced separately to the Pacific Northwest and Newfoundland (SCUDDER & FOOTTIT 2006). SCHUH (2001), noting that the Nearctic distribution of *P. arbustorum* has not been extended substantially since its detection in British Columbia by KELTON (1982), provided the first U.S. records based on collections from the Seattle, Washington, area. The record from Newfoundland (Pippy Park in St. John's) given by BARNES et al. (2000) likely was published after SCHUH (2001) had submitted his manuscript for publication. We can confirm the establishment of *P. arbustorum* in St. John's based on our 2005 collections from *Dasiphora floribunda* and *Malva* sp. in flower gardens on the Memorial University campus, *Urtica dioica* L. at the university's Botanical Garden, and mixed herbaceous ornamentals in Bowring Park.

The restricted distribution of *P. arbustorum* in Canada contrasts with that of another introduced mirid, the orthotyline *Melanotrichus flavosparsus*. Newfoundland can be added to the range of the latter species, which SCUDDER & FOOTTIT (2006) noted had become essentially transcontinental in Canada.

On the basis of the MAW et al. (2000) checklist and D.J. Larson's unpublished additions, SCUDDER & FOOTTIT (2006) pointed out that the percentage of alien or non-native Miridae in Newfoundland was 19.8 % (16 of 81 spp.), which was the same percentage that alien mirids represent in the Nova Scotian fauna (39 of 197 spp.). Prince Edward Island, with 23.3 % of its Miridae considered non-native (21 of 90 spp.), had the highest percentage of aliens among Canadian provinces (SCUDDER & FOOTTIT 2006). The addition of the 10 species reported herein, all of which appear to have been accidentally introduced, now gives Newfoundland the highest percentage – 28.6 % (26 of 91 spp.) – of non-native mirids. The percentage would be even higher (30.8 %) if the two species listed in Tab. 1 as questionably introduced are considered non-native. Newfoundland already has been shown to harbor the world's largest proportion (17 %) of non-native leafhoppers, or Cicadellidae (HAMILTON & LANGOR 1987). More than any other area of North America, Newfoundland has the largest element of introduced European plants and animals (LINDROTH 1957).

## Acknowledgements

We thank Murray H. Colbo (Department of Biology, Memorial University of Newfoundland [MUN]) for his help and hospitality when E.R.H. and A.G.W. visited St. John's in 2004 and 2005, David J. Larson (Maple Creek, SK, Canada; Department of Biology, MUN, ret.) for sharing his unpublished list of Newfoundland Miridae, and Peter J. Scott (Department of Biology, MUN) for identifying several plants. We also are grateful to Michele A. Touchet (Systematic Entomology Laboratory [SEL], Agricultural Research Service, USDA, c/o National Museum of Natural History, Washington, D.C.) for the digital photographs of mirids, Kent E. Loeffler (Department of Plant Pathology, Cornell University) for preparing the maps, and Peter H. Adler (Department of Entomology, Soils, and Plant Sciences, Clemson University), John W. Brown, and Gary L. Miller (SEL) for suggestions that improved an early draft of the manuscript.



This research was supported, in part, by the Cornell University Agricultural Experiment Station federal formula funds, Project No. NYC-139413 to E.R.H., received from Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture.

## Zusammenfassung

Die beiden paläarktischen Weichwanzen *Phytocoris longipennis* FLOR und *Pilophorus cinnamopterus* (KIRSCHBAUM) werden zum ersten Mal in der Nearktis aus Neufundland, Kanada, gemeldet. Diagnosen und Beschreibungen beider Arten sollen ihre Identifizierung in der Nordamerikanischen Fauna ermöglichen. Acht weitere, paläarktische Weichwanzen werden erstmals für Neufundland gemeldet: *Atractotomus mali* (MEYER-DÜR), *Melanotrachus flavosparsus* (C.R. SAHLBERG), *Phytocoris populi* LINNAEUS, *P. ulmi* LINNAEUS, *Pilophorus clavatus* (LINNAEUS), *Pinalitus rubricatus* (FALLÉN), *Plagiognathus vitellinus* (SCHOLTZ) und *Psalus lepidus* FIEBER. Für diese acht Arten werden der erste Nachweis und die Verbreitung in Nordamerika sowie ihre Biologie zusammengefasst. Verbreitung, Nahrungspflanzen und Phänologie aller zehn Arten in der Paläarktis werden zusammengefasst. Jene 33 paläarktischen Weichwanzen, die bisher von Neufundland bekannt sind, werden mit ihrem ersten Nachweis und dem Status (verschleppt oder "natürlich holarktisch") aufgelistet. Mit den zusätzlichen zehn, vermutlich verschleppten, Arten, besitzt Neufundland den höchsten Anteil nicht heimischer Weichwanzen (28,6 % von 91 Arten) im Vergleich mit allen kanadischen Provinzen.

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Artikel/Article: [Palearctic Plant Bugs \(Hemiptera, Miridae\) in Newfoundland, Canada: First North American Records for Phytocoris longipennis FLOR and Pilophorus cinnamopterus \(KIRSCHBAUM\), New Records of Eight Other Species, and Review of Previously Reported Species 997-1014](#)