

Leafhoppers of ornamental and fruit trees in Canada



Agriculture
Canada

Publication 1779/E



630.4
C212
P 1779
1985
OOAg
c.3

Canada

PUBLICATION 1779/E, available from
Communications Branch, Agriculture Canada,
Ottawa K1A 0C7

©Minister of Supply and Services Canada 1985
Cat. No. A53-1779/1985E ISBN: 0-662-13622-5
Printed 1985 2M-4:85

Également disponible en français sous le titre
*Cicadelles des arbres fruitiers et
ornementaux du Canada.*

Leafhoppers of ornamental and fruit trees in Canada

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Cover illustration. Nymph and male of *Oncopsis marilynae* Hamilton feeding on twigs and petioles of water birch (*Betula occidentalis*), while newly emerged female clings to a leaf midrib to dry her wings. Cover illustration and all color plates are original watercolors by K. G. A. Hamilton.

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HOW TO USE THIS BOOK

There are about 900 species of leafhoppers in Canada, many of which closely resemble one another. Identification of individual specimens is a task for a specialist. However, where leafhoppers are numerous on a tree, most can be identified by nonspecialists by reference to the host tree. Trees are listed in the text alphabetically by common name; major alternative names, including colloquial forms, are cross-indexed.

To identify the leafhopper, follow the procedure outlined below:

1. Collect a sample of the insect, preferably more than three specimens. Do not collect them on or immediately after a windy day, as leafhoppers are readily blown from tree to tree, making their host-association doubtful.
2. Verify that the insect is indeed a leafhopper (see Figs. 1-7).
3. Identify the host tree as accurately as possible (see Figs. 8-31).
4. Check the leafhopper under a hand lens or dissecting microscope against the descriptions of common general feeders (see p. 8).
5. If it is not one of the common general feeders, turn to that section of the text dealing with its host tree.
6. Identify the leafhopper by checking it against the description.
7. Verify the identification by checking time of occurrence, range, and illustration of the insect.
8. When in doubt, or where new records are found, suitably preserved specimens should be sent to the Biosystematics Research Institute, Ottawa, for identification by a specialist. Leafhoppers may be preserved dry in a small capsule or box filled with cotton wool, or may be dry-mounted using any standard technique described in either an amateur or a professional guide to insects. Quality preservation and the presence of males are often necessary to ensure an authoritative identification.

Notes on the text

Leafhoppers are grouped by host trees, with the most widespread species listed first. Subsequent listings are by range, east to west. To make identifications easier, underline the species that are likely to occur in your area before making identifications.

Ranges are given by province. As ornamental and fruit trees are seldom grown in the north, no listings are given for the territories, northern Ontario, northern Quebec, and Labrador. "Southern Ontario" refers to that part of the province south of Toronto. Similarly, "southern Manitoba" is south of Winnipeg. "Coastal British Columbia" is the west slope of the Coast Mountains range, including the lower Fraser River canyon. The rest of that province is listed as "inland British Columbia."

Size of leafhoppers is given to the nearest millimetre. Females are usually larger than males; therefore 4-5 mm, for example, usually means males 4 mm, females 5 mm.

Males and females can be distinguished by the end segment of the abdomen. This is shorter in males, not reaching the tips of the wings; females have a sword-shaped ovipositor that is usually sheathed in the very elongate terminal abdominal segment.

Time of occurrence of adults is indicated roughly by one-third months: early, mid, and late refer to the dates 1–10, 11–20, and 21–31, respectively. Citation of only the month indicates that little is known about the adults' exact time of occurrence.

Spp. means more than one species.

Leafhoppers

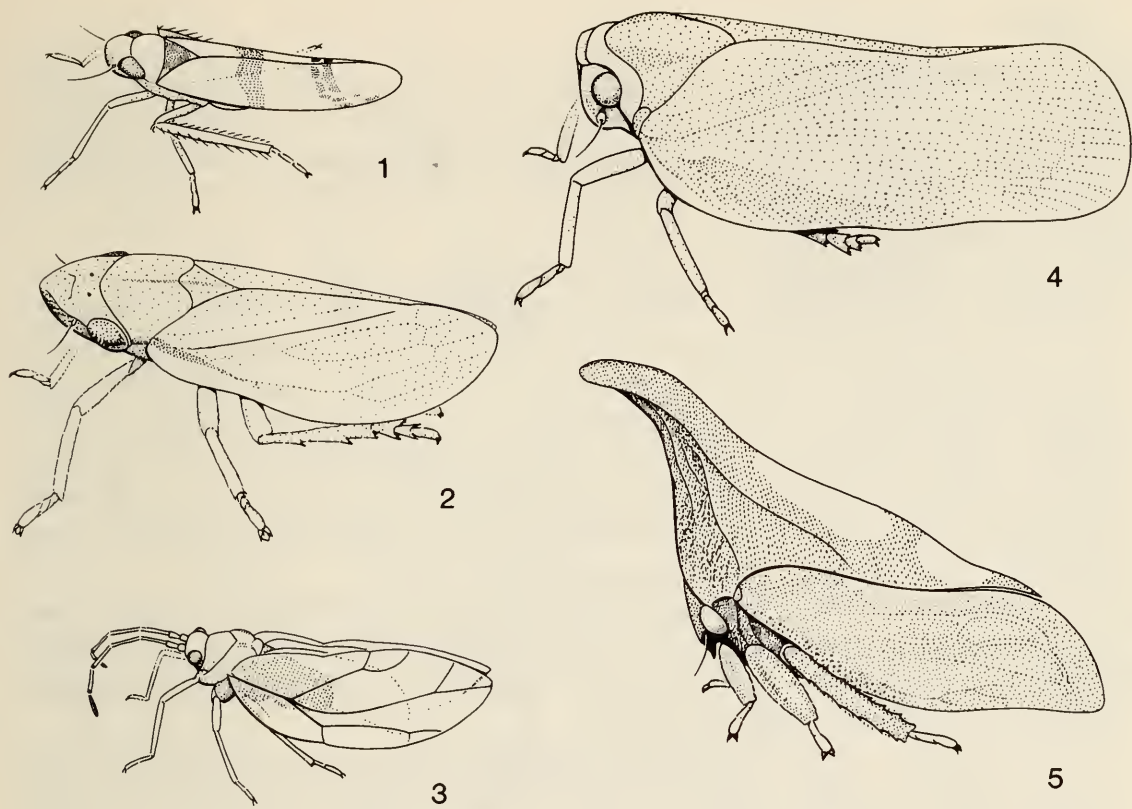
(Family Cicadellidae, Figs. 1, 32–191; Family Aetalionidae, Figs. 192, 193)

Leafhoppers are small, hard-bodied, true bugs that dodge and leap. They can be recognized by their beak, tiny antennae, and long hind legs fringed with hairs (Fig. 1). Look-alikes include spittlebugs (Fig. 2), jumping plant lice (Fig. 3), and planthoppers (Fig. 4), all of which have similar bodies and beaks but lack the fringe of hairs on the hind legs. Treehoppers (Fig. 5) have legs like leafhoppers, but their backs bear a capelike or thornlike projection, and their heads are bent down beneath the body.

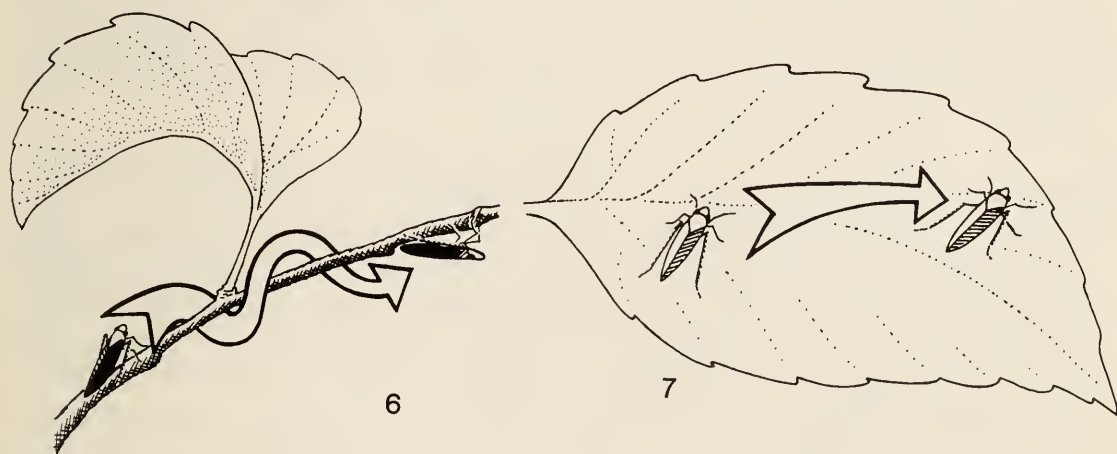
Leafhoppers can often be recognized by the way they run: unlike other insects, they usually run sideways. When disturbed on a leaf or twig, they dodge to the other side (Fig. 6); when on a flat surface, they run obliquely (Fig. 7).

Leafhoppers feed on many plants, inserting their needlelike mouthparts into the plant tissues, injecting saliva, and sucking up sap or cell contents. Sap-feeders feed on twigs and cause no noticeable damage to trees. Leaf-feeders, the smallest leafhoppers, dissolve the chlorophyll cells on the upper side of a leaf, and leave pale spots called hopperburn. Hopperburn can be distinguished from the feeding damage caused by lacebugs by the absence of noticeable damage on the lower side of a leaf. Other plant-feeding bugs may cause a leaf to crumple or curl, or they may produce a white, waxy fluff.

Some leafhoppers are capable of transmitting plant diseases. Because they leap readily from plant to plant between feeding periods, they can rapidly inoculate a large number of trees with viruses and fungus that affect fruit growth and tree form. How many diseases they carry, and which leafhoppers are vectors, are matters of significance requiring much research work.



Figs. 1-5. Leafhoppers and their relatives. 1, leafhopper (Cicadellidae); 2, spittlebug (Cercopidae); 3, jumping plant louse (Psyllidae); 4, planthopper (Fulgoroidea); 5, treehopper (Membracidae).



Figs. 6-7. Directions in which leafhoppers run. 6, on twigs; 7, on leaves.

Trees

The following is a general guide to the kinds of trees discussed in this text. A more detailed guide should also be consulted to confirm identifications. R. C. Hosie's *Native Trees of Canada*, published by Fitzhenry & Whiteside Ltd., in cooperation with the Canadian Forestry Service, 8th ed., 1979, is recommended.

Softwoods have needles (Figs. 8–14). Those of cedars are flat and scale-like (*Thuja* spp., Fig. 8), or prickly (*Juniperus* spp., Fig. 9). Pine (*Pinus* spp., Fig. 10), and larch, or tamarack (*Larix* spp., Fig. 11), have their needles in bunches, with pine having five, or fewer, per bunch. Spruce (*Picea* spp.) needles surround each twig, whereas those of hemlock (*Tsuga*, Fig. 12), fir (*Abies* spp.) and Douglas-fir (*Pseudotsuga menziesii*) (Fig. 13), and yew (*Taxus* spp., Fig. 14) arise on either side of each twig, in two rows. Fir needles are not stalked, like those of hemlock and yew, and yew needles are very broad. Yew also has a berry rather than a cone.

Hardwoods have leaves that may be simple (Figs. 25–31), lobed (Figs. 18–24), or compound, i.e., divided into leaflets (Figs. 15–17). Leaflets differ from leaves in being firmly attached, and cannot be individually removed without tearing the stem.

Trees with compound leaves include hoptree (three leaflets); horsechestnut (seven radiating leaflets); box-elder, or Manitoba maple (3–7 irregularly shaped leaflets); elder (5–9 toothed leaflets); mountain-ash and sumac (many toothed leaflets, those of sumac narrow and sharply pointed); tree-of-heaven, or Chinese-sumac (many large leaflets, each with one tooth at base); black-locust, honey-locust, and Kentucky-coffeetree (many small, rounded leaflets); and ash, walnut, and hickory (many large leaflets without teeth). Honey-locust may be distinguished by having two leaflets (rather than one) at the leaf tip, and black locust differs from Kentucky-coffeetree in having short thorns. Ash (*Fraxinus* spp., Fig. 15), walnut (*Juglans* spp., Fig. 16), and hickory (*Carya* spp., Fig. 17) differ most distinctly in their fruit, but they also have different leaflets.

Trees with lobed leaves include maple, mulberry, oak, sassafras, silver poplar, sycamore, and tuliptree. Their leaves are distinctive.

Trees with simple leaves are more difficult to identify. The gray bark of beech, the multicolored, peeling bark of arbutus, and the papery, peeling bark of birch are distinctive. The fruits of alder, apple, basswood, cherry, choke cherry, chestnut, hawthorn, hazel, hop-hornbeam, osage-orange, peach, plum, and sloe are distinctive and are the most reliable means of identifying these trees. The round leaves of aspen (Fig. 25), the triangular leaves of black poplar and cottonwood (Fig. 26), the fan-shaped leaves of ginkgo, or maidenhair tree (Fig. 30), the asymmetrical leaves of elm (Fig. 28) and hackberry (Fig. 29), and the large, spade-shaped leaves of catalpa are distinctive. The leaf veins curving to the leaf tip distinguish dogwood (Fig. 27) and willow (Fig. 31). Other trees with simple leaves cannot be identified readily, but these apparently do not harbor leafhoppers.

Trees not used as ornamentals include blue-beech (= ironwood, water-beech), *Carpinus caroliniana*; pawpaw (= custard-apple, false banana, jasmine), *Asimia triloba*; and serviceberry (= saskatoonberry), *Amelanchier* spp.



Figs. 8-31. Leaves of representative Canadian trees (15-17, with fruit); 8, white cedar or arborvitae (*Thuja* spp.); 9, red cedar or juniper (*Juniperus* spp.); 10, pine (*Pinus* spp.); 11, larch or tamarack (*Larix* spp.); 12, hemlock (*Tsuga*); 13, fir (*Abies* spp.), and Douglas-fir (*Pseudotsuga menziesii*); 14, yew (*Taxus* spp.); 15, ash (*Fraxinus* spp.); 16, walnut (*Juglans* spp.); 17, hickory (*Carya* spp.); 18, oak (*Quercus* spp.); 19, mulberry (*Morus* spp.); 20, tuliptree (*Liriodendron tulipifera*); 21, sassafras (*Sassafras albidum*); 22, maple (*Acer* spp.); 23, sycamore or planetree (*Platanus* spp.); 24, silver poplar (*Populus alba*); 25, aspen (*Populus tremuloides*); 26, black poplar or cottonwood (*Populus deltoides*); 27, dogwood (*Cornus* spp.); 28, elm (*Ulmus* spp.); 29, hackberry (*Celtis occidentalis*); 30, ginkgo or maidenhair tree (*Ginkgo biloba*); 31, willow (*Salix* spp.).

LEAFHOPPERS ON MANY TREES

Idiocerus spp. (Pl. V)

Adults: 4–8 mm; wedge-shaped. Feeding on aspen, cottonwood, poplar, and willow, and frequently spreading to nearby trees. Check adjacent trees for host.

Range: transcontinental.

Typhlocyba gillettei (Van Duzee) (Pl. III, Fig. 72)

Adults: 4 mm; white to pale yellow with two narrow brown bands across wings, the first occasionally pale or absent; similar to adults of *Typhlocyba apicata* (see hop-hornbeam), and of *Ossiannilssonola duplicata* (see hawthorn) but 1 mm larger. Banded adults of other *Typhlocyba* spp. have narrower bands (Pl. III, Fig. 75), or wider bands (Pl. III, Figs. 72, 73, 80). Late May to early October; feeding on red alder, birch, cherry, choke cherry, hickory, maple, oak, and willow.

Range: transcontinental.

Alnetoidia alneti (Dahlbom) (Pl. II, Fig. 62)

Adults: 4 mm; unmarked bright yellow; resembling *Alebra aurea* (Pl. II, Fig. 66), but with head rounded, not flattened between eyes; also resembling *Ossiannilssonola serrula* (Pl. II, Fig. 62), but not feeding on maples. August and September; feeding on linden, elm, beech, and horse-chestnut.

Range: currently restricted to Halifax, N.S., where it occurs in enormous numbers, especially on linden; introduced from Europe.

Empoasca fabae (Harris) (Pl. IV, Fig. 83) POTATO LEAFHOPPER

Adults: 3 mm; green; resembling adults of *Empoasca filamenta* and of *E. perlonga* (see pine) but differing in its range; also resembling adults of *E. pallida* (see hoptree) but not feeding on hoptree. Other adult *Empoasca* spp. may resemble *E. fabae* but are either longer or darker (Pl. IV, Figs. 83–92). Early June to late October; feeding on herbaceous plants as well as on alder, apple, aspen, basswood, beech, birch, black locust, cherry, choke cherry, cottonwood, elm, hawthorn, hickory, honey-locust, maple, osage-orange, pear, peach, plum, poplar, sassafras, tree-of-heaven, walnut, and willow.

Range: Nova Scotia to Ontario.

Aguriahana stellulata (Burmeister) (Pl. II, Fig. 64)

Adults: 4 mm; silver white with brown star near wing tips. Late June to late August; feeding on herbaceous plants and on basswood, cherry, elm, hickory, linden, maple, pear, plum, and probably other hardwood trees.

Range: Nova Scotia and southern Ontario; introduced from Europe.

Jikradia olitoria (Say) (Pl. XI, Fig. 191)

Adults: 7 mm; brown with contrasting yellow head; female with pale wing bands; eyes very close together. Mid-July to late September; feeding on herbaceous plants and shrubs as well as on apple, hawthorn, hickory, oak, peach, sassafras, willow, and probably other hardwood trees.

Range: Quebec and Ontario.

Scaphoideus intricatus Uhler (Pl. X, Fig. 162)

Adults: 5 mm; head and body yellow with contrasting gray brown wings. Mid-July to late September; feeding on herbaceous plants and shrubs as well as on apple, black locust, elm, hackberry, hawthorn, osage-orange, plum, and probably other hardwood trees and shrubs.

Range: Ontario and probably Quebec.

Orientus ishidae (Matsumura) (Pl. X, Fig. 171)

Adults: 5 mm; mottled brown, venter black, with orange legs and an orange band between eyes. Mid-July to mid-September; feeding on apple, birch, blue-beech, hawthorn, hop-hornbeam, maple, willow, and probably other trees.

Range: southern Ontario; introduced from Japan.

Alebra aurea (Walsh) (Pl. II, Fig. 66)

Adults: 4 mm; golden yellow; similar to yellow adults of *Ossiannilssonola* spp. (Pl. II, Fig. 62), and *Typhlocyba* spp., but with head flat rather than pointed between eyes. Late June to mid-August; feeding on dogwood shrubs as well as on basswood, beech, elm, hawthorn, hickory, hop-hornbeam, oak, and probably other hardwood trees.

Range: southern Ontario.

Xestocephalus brunneus Van Duzee (Pl. XI, Fig. 182)

Adults: 3 mm; dark brown, oval. Early June to late July, and September (probably double-brooded); feeding on black-locust, honey-locust, walnut, willow, and probably other hardwood trees.

Range: southern Ontario.

Dikrella spp. (two native species) (Pl. II, Fig. 51)

Adults: 2-3 mm; white with four orange dashes on wings; similar to *Arboridia* spp., but with shorter orange dashes. Late April to early October (probably overwintering); feeding on herbaceous plants and sometimes straying to any adjacent hardwood trees and shrubs.

Range: Quebec to Manitoba; British Columbia.

Fieberiella florii (Stål) (Pl. X, Fig. 176)

Adults: 7 mm; brown speckled with fine black dots; venter black, with contrasting yellow face and broad yellow bar on abdomen. Mid-July to late September; feeding on privet hedges (*Ligustrum* spp.), and straying to any nearby hardwood trees and shrubs.

Range: Ontario; inland British Columbia; introduced from Europe.

Empoasca filamenta DeLong (Pl. IV, Fig. 83)

Adults: 3 mm; green; resembling adults of *Empoasca fabae* and of *E. pallida* (see hoptree) but differing in its range; also resembling adults of *E. perlonga* (see pine) but not feeding on pine. Many other adult *Empoasca* spp. may resemble *E. filamenta* but are either longer or darker (Pl. IV, Figs. 84-93). Early June to late September; feeding on herbaceous plants and straying to any nearby hardwood trees and shrubs.

Range: Manitoba to inland British Columbia.

Typhlocyba quercus (Fabricius) (Pl. III, Fig. 82)

Adults: 3 mm; white mottled with brown, wings marked with a circle of orange spots, and sometimes with additional orange dashes. Mid-July to late August; feeding on alder, birch, cherry, oak, plum, willow, and probably other hardwood trees.

Range: Prince Edward Island and Nova Scotia; coastal British Columbia; introduced from Europe.

Fagocyba douglasi (Edwards) (Pl. II, Fig. 65)

Adults: 4 mm; yellow, bright yellow in male, with ivory white head. Early July to late August; feeding on birch, maple, rowan, and probably other hardwood trees as well; reported on alder, beech, elm, horse-chestnut, European hornbeam (*Carpinus betulus*), oak, and hazel shrubs (*Corylus* spp.) in Europe.

Range: Newfoundland; coastal British Columbia; introduced from Europe.

Empoasca elongella Metcalf (Pl. IV, Fig. 85)

Adults: 5 mm; green with darker stripe down middle. Mid-June to late November (probably overwintering); feeding on alder, oak, silver poplar, walnut, willow, and probably other hardwood trees.

Range: coastal British Columbia.

Allygus mixtus (Fabricius) (Pl. X, Fig. 170)

Adults: 6-7 mm; mottled brown; not wedge-shaped, like adults of *Idiocerus* spp., which also may be mottled brown (Pl. V, Figs. 101-104). Early July to mid-August; feeding on herbaceous plants and oak; also reported on alder, birch, elm, and hazel shrubs in Europe.

Range: coastal British Columbia; introduced from Europe.

LEAFHOPPERS BY HOST TREE

ACACIA (three-thorned): see honey-locust

ACACIA (false): see black-locust

ALDER (*Alnus* spp.)

Leaves broad, single, coarsely toothed, fruits dry, conelike capsules. Red alder and European black alder are the only tree-sized alders in Canada. These two species have unique leafhopper faunas.

1. Red alder (= western alder, Oregon alder), *A. rubra*: leaves pointed (occurs only in coastal British Columbia)

Typhlocyba ariadne McAtee (Pl. III, Fig. 68)

Adults: 4 mm; unmarked pale yellow. Late June to late September; feeding on red alder, birch, and native alder shrubs.

Range: transcontinental.

Typhlocyba latifasciata (Christian) (Pl. III, Fig. 76)

Adults: 4 mm; pale yellow with two broad brown bands across wings. Late June to early September; feeding on red alder and native alder shrubs.

Range: transcontinental.

Typhlocyba commissuralis Stål (Pl. III, Fig. 81)

Adults: 4–5 mm; white to pale yellow with a brown stripe down middle. Late June to late September; feeding on red alder, western flowering dogwood, and native alder shrubs.

Range: British Columbia

Oncopsis californica Van Duzee (Pl. IX, Fig. 157)

Adults: 5 mm; brightly colored in yellow, orange, and brown, or mottled in dark brown and pale yellow; most of face yellow. Early June to late July; feeding exclusively on red alder.

Range: coastal British Columbia.

Idiocerus couleanus Ball & Parker (Pl. V, Fig. 105)

Adults: 5–6 mm; mottled in dark brown and ivory white; most of face black. Early July to late August; feeding on willow but occasionally also on red alder.

Range: coastal British Columbia.

2. European black alder (*A. glutinosa*): leaves blunt-tipped, or notched, at end (widely planted ornamental)

Empoasca smaragdula (Fallén) (Pl. IV, Fig. 93)

Adults: 4 mm; green or pale orange striped with brown. July; feeding on European black alder and sitka alder shrubs (*A. crispa* var. *sinuata*).

Range: coastal British Columbia; possibly also Eastern Canada; introduced from Europe.

APPLE (*Malus* spp.)

Leaves single, finely or irregularly toothed, arising in bunches from short woody stems or branches; fruit large and fleshy with small hard seeds in core. Domestic apple (*Malus pumila*) and crab apples (*M. coronaria* and *M. diversifolia*) probably have similar leafhopper faunas.

Empoasca maligna (Walsh) (Pl. IV, Fig. 88) APPLE LEAFHOPPER

Adults: 4 mm; bright green, slender. Mid-June to late October; feeding on apple and sometimes on hawthorn.

Range: transcontinental.

Typhlocyba pomaria McAtee (Pl. III, Figs. 68, 69) WHITE APPLE LEAFHOPPER

Adults: 3-4 mm; unmarked ivory white; resembling adults of *Typhlocyba rosae* but apex of male abdomen bearing hooks. Mid-June to late October; feeding on apple and hawthorn, and also occasionally on alder, cherry, choke cherry, cottonwood, elm, hickory, poplar, and walnut.

Range: transcontinental.

Typhlocyba rosae (Linnaeus) (Pl. III, Fig. 68) ROSE LEAFHOPPER

Adults: 3-4 mm; unmarked ivory white; resembling adults of *Typhlocyba pomaria* but apex of male abdomen rounded. Mid-July to late September; feeding on rose (*Rosa* spp.) and bramble (*Rubus* spp.), and occasionally also on apple, cherry, mountain-ash, and pear.

Range: transcontinental; introduced from Europe.

Typhlocyba froggatti Baker (Pl. II, Fig. 62)

Adults: 4 mm; unmarked yellow. Mid-June to early November; feeding on domestic apple, cherry, and hawthorn.

Range: Ontario; British Columbia; probably transcontinental; introduced from Europe.

Balcanocerus provancheri (Van Duzee) (Pl. VI, Fig. 129)

Adults: 5-6 mm; brown to black with a bright yellow streak on each wing base. Mid-June to late September; feeding on herbaceous plants (chokeberry, *Aronia* spp.) and occasionally on apple and hawthorn.

Range: Nova Scotia to inland British Columbia.

Balcanocerus fitchi (Van Duzee) (Pl. VI, Fig. 128)

Adults: 5–6 mm; brown patterned with white. Early July to late September; feeding on hawthorn and occasionally on apple and pear.

Range: Nova Scotia to Ontario.

Gyponana mali DeLong (Pl. XI, Fig. 189)

Adults: 9 mm; green, oval. Late June to early September; feeding on domestic apple.

Range: Ontario.

Arboridia dorsalis (Gillette) (Pl. I, Fig. 47)

Adults: 3 mm; white with a dark red stripe down middle. Early August to late October, and May (overwintering); feeding on domestic apple.

Range: Ontario.

Arboridia dowelli (Beamer) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Late August to September, and early April to late May (overwintering); feeding on domestic apple.

Range: not yet found in Canada but collected in Ohio and Illinois and thus to be expected in southern Ontario.

Erythroneura hartii Gillette (Pl. I, Fig. 38)

Adults: 3 mm; white with bright red pattern on wings defining a white diamond at center. Mid-June to late September (overwintering in the southern USA); feeding on domestic apple.

Range: not yet found in Canada but collected in Vermont, New York, Ohio, Indiana, and Illinois and thus to be expected in southern Ontario.

Erythroneura consueta Beamer (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot near each wing tip and a red dot on outer edge of each wing, and wings usually also with orange dots. Late June to November, and May (overwintering); feeding on domestic apple.

Range: not yet found in Canada but reported from Ohio and thus to be expected in southern Ontario.

APRICOT (*Prunus armeniaca*): no leafhopper fauna

ARBORVITAE: see cedar

ARBUTUS, MANZANITA, or MADRONA (*Arbutus menziesii*): no leafhopper fauna

ASH (*Fraxinus* spp.): no leafhopper fauna

ASPEN, POPPLE, or WHITE POPLAR (*Populus* section *Leuce*)

Leaves nearly circular, with long stem (Fig. 25); fruits cottony. Trembling aspen and largetooth aspen each have a distinctive leafhopper fauna.

1. Trembling aspen (= quaking aspen, white poplar, smooth-barked poplar, popple), *P. tremuloides*: leaves nearly toothless (Fig. 25)

Idiocerus suturalis Fitch (Pl. VI, Fig. 122)

Adults: 5–6 mm; yellow with a brown stripe down middle. Late June to late September; feeding exclusively on trembling aspen.

Range: transcontinental.

Idiocerus lunaris Ball (Pl. VI, Fig. 121)

Adults: similar to those of *Idiocerus suturalis* but with a yellow spot in middle of brown stripe. Mid-June to late September; feeding exclusively on trembling aspen.

Range: transcontinental.

Idiocerus lachrymalis Fitch (Pl. V, Fig. 112)

Adults: 7 mm; gray patterned with black on head and body; venter pale yellow. Early July to late September; feeding exclusively on trembling aspen.

Range: transcontinental.

Idiocerus venosus Hamilton (Pl. V, Fig. 113)

Adults: 6 mm; gray patterned with black; venter pale yellow. Late June to early September; feeding exclusively on trembling aspen.

Range: transcontinental.

Macropsis basalis (Van Duzee) (Pl. VIII, Fig. 142)

Adults: 4–5 mm; male brown; female red brown with wings black at base, rest of wings usually transparent or banded; head pointed between eyes. Mid-June to mid-August; feeding exclusively on trembling aspen.

Range: transcontinental.

Macropsis bifasciata (Van Duzee) (Pl. VIII, Fig. 144)

Adults: 5 mm; gray, female usually with two irregular brown bands across wings; head pointed between eyes. Mid-June to mid-August; feeding on aspen.

Range: Nova Scotia to inland British Columbia.

Idiocerus formosus Ball (Pl. V, Fig. 114)

Adults: 5–6 mm; brown with white spots on wings; body usually paler than wings; venter yellow. Early July to late September; feeding exclusively on trembling aspen.

Range: Newfoundland and Nova Scotia to inland British Columbia.

Macropsis aurifera Breakey (Pl. VII, Fig. 140)

Adults: 5 mm; male brown; female green with golden brown wings; head pointed between eyes. Late June to early August; feeding exclusively on trembling aspen.

Range: New Brunswick to inland British Columbia.

Empoasca empusa Hamilton (Pl. IV, Fig. 91)

Adults: 4 mm; pale green; similar to *Empoasca rossi* but smaller. Late July to late August; feeding on trembling aspen.

Range: New Brunswick to inland British Columbia.

Empoasca coronata Hamilton (Pl. IV, Fig. 92)

Adults: 4 mm; green; male with dark abdomen showing through wings. Mid-June to mid-August; feeding on trembling aspen.

Range: Quebec to inland British Columbia.

Erythroneura rosa Robinson (Pl. I, Fig. 37)

Adults: 3 mm; patterned in white, pink, orange, and brown. Mid-July to mid-September, and April (probably overwintering); feeding on trembling aspen and shrub willow.

Range: Quebec and Ontario; Saskatchewan; British Columbia.

Empoasca copula DeLong (Pl. IV, Fig. 98)

Adults: 4 mm; green with brown band across wings and on back. Late June to late August; feeding exclusively on trembling aspen.

Range: Newfoundland; Ontario to inland British Columbia.

Idiocerus maximus Freytag (Pl. V, Fig. 111)

Adults: 6–7 mm; patterned in dark brown, black, and white; venter yellow. Late June to late August; feeding exclusively on trembling aspen.

Range: Alberta and inland British Columbia.

Empoasca rossi Hamilton (Pl. IV, Fig. 91)

Adults: 5 mm; pale green; similar to *Empoasca empusa* but larger. Late June to late July; feeding on trembling aspen.

Range: British Columbia.

2. Largetooth aspen (= bigtooth aspen), *P. grandidentata*: leaves with distinct teeth; restricted to Eastern Canada

Macropsis bifasciata (Van Duzee) (Pl. VIII, Fig. 144)

Adults: 5 mm; gray; female usually with two irregular brown bands across wings; head pointed between eyes. Mid-June to mid-August; feeding on aspen.

Range: Nova Scotia to inland British Columbia.

Macropsis confusa Breakey (Pl. VII, Fig. 137)

Adults: 4–5 mm; green, back and wings sometimes gray brown; head pointed between eyes. Late June to mid-August; feeding exclusively on largetooth aspen.

Range: Nova Scotia to Ontario.

Idiocerus stellaris DeLong & Caldwell (Pl. VI, Fig. 117)

Adults: 6 mm; male orange or brown with orange pattern; female pale green with faint brown pattern. Late June to early September; feeding exclusively on largetooth aspen.

Range: Nova Scotia to Ontario.

BALM OF BALM-OF-GILEAD: see black poplar

BASSWOOD, LINDEN, LIME, WHITEWOOD, or BEETREE (*Tilia* spp.)

Leaves heart-shaped, toothed around edge; fruits are nutlets suspended on slender, branching stalks from a seed wing. Basswood (*T. americana*), linden (*T. ×europaea*), small-leaved lime (*T. cordata*), and white lime (*T. tomentosa*) probably have similar leafhopper faunas.

Typhlocyba venusta McAtee (Pl. III, Fig. 73)

Adults: 4 mm; white to pale yellow with two brown bands across wings, or with brown patch at base or tip of wings in addition to a brown band; two-banded forms similar to adults of *Typhlocyba gillettei* (Pl. III, Fig. 72) but bands usually wider. Late May to mid-October; feeding on basswood and elm.

Range: Quebec to Manitoba.

Arboridia fumida (Gillette) (Pl. I, Fig. 44)

Adults: 3 mm; brown with two white spots on middle. Late July to late September, and May (probably overwintering); feeding on basswood.

Range: Quebec to Manitoba.

Typhlocyba arsinoe McAtee (Pl. III, Fig. 68)

Adults: 4 mm; unmarked pale yellow; similar to *Typhlocyba medleri* but larger. Mid-June to early September; feeding on basswood, linden, and lime.

Range: Quebec and Ontario.

Arboridia obliqua (Say) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Early June to early October; feeding on basswood and hop-hornbeam.

Range: Ontario.

Erythroneura separata (Beamer) (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot near each wing tip, and often also with orange dots. Late July to early September; feeding on basswood.

Range: Ontario.

Pediopsis tiliae (Germar) (Pl. VIII, Fig. 149)

Adults: 5-6 mm; head and body yellow green, wings brown. Mid-June to mid-August; feeding on basswood and linden.

Range: Ontario; introduced from Europe.

Typhlocyba transviridis Christian (Pl. III, Fig. 80)

Adults: 4 mm; white with a broad brown band across wings. Early July to early September; feeding on basswood.

Range: Ontario.

Typhlocyba medleri Christian (Pl. III, Fig. 68)

Adults: 3 mm; unmarked pale yellow; similar to *Typhlocyba arsinoe* but smaller. Late June to late July; feeding on basswood.

Range: southern Ontario.

Erythroneura affinis Fitch (Pl. I, Fig. 34)

Adults: 3 mm; yellow with large brown spots. Early August to late September; feeding on basswood.

Range: Manitoba; also collected in Illinois and Wisconsin and thus to be expected in southern Ontario.

BEECH (*Fagus* spp.)

Leaves spiny-edged; fruit in bristly husk; bark blue gray, smooth. American, or red, beech (*Fagus grandifolia*) is the most common species, and all the following records are from it. European beech (*F. sylvatica*) and copper beech (*F. sylvatica* var. *purpurea*) probably have similar leafhopper fauna.

Ribautiana foliosa (Knull) (Pl. II, Fig. 53)

Adults: 3 mm; ivory white with edges of wing tips dotted with black. Early June to early September; feeding on beech and on hazelnut shrubs (*Corylus* spp.).

Range: Nova Scotia to inland British Columbia.

Ossiannilssonola quadrata (DeLong & Johnson) (Pl. II, Fig. 57)

Adults: 3-4 mm; white with a row of brown spots across wing tips. Early June to early September; feeding on beech.

Range: Prince Edward Island and Nova Scotia to southern Ontario.

Typhlocyba saffrana McAtee (Pl. III, Fig. 79)

Adults: 4 mm; yellow with a row of brown dots across wing tips. Late June to mid-August; feeding on beech, elm, and hop-hornbeam.

Range: Quebec and Ontario.

Arboridia stolata (McAtee) (Pl. I, Fig. 48)

Adults: 3 mm; white with a brown stripe down middle. Late August to late October, and early May to late June (overwintering); feeding on beech.

Range: New Brunswick to Ontario.

Erythroneura haysensis Hepner (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot near each wing tip, and usually also with orange dots. Early April to mid-May (probably overwintering); feeding on beech.

Range: Ontario.

BEETREE: see basswood

BIRCH (*Betula* spp.)

Leaves finely toothed, usually in pairs on branches; bark white or brassy, peeling off in thin, papery layers; fruits in catkins of cross-shaped scales enclosing small winged seeds. Each species has a distinctive leafhopper fauna, although a few leafhoppers feed on most native species.

1. General on native birch

Oncopsis sobria (Walker) (Pl. VIII, Fig. 153)

Adults: 5 mm; brown or orange brown; male with violet sheen when live. Late May to early August; feeding on paper birch (*B. papyrifera*), water birch (*B. occidentalis*), yellow birch (*B. alleghaniensis*), and sometimes also on wire birch (*B. populifolia*).

Range: transcontinental.

Oncopsis citra Hamilton (Pl. IX, Fig. 158)

Adults: 5–6 mm; male mottled in brown and white; female patterned in brown and yellow. Mid-May to late July; feeding on paper birch, water birch, yellow birch, and sometimes also on wire birch.

Range: transcontinental.

Oncopsis abietis (Fitch) (Pl. VIII, Fig. 152)

Adults: 5 mm; black or brown with windowed areas on wings. Mid-June to late July, feeding on paper birch, water birch, wire birch, and yellow birch.

Range: transcontinental.

Arboridia betulaspera (Richards & Varty) (Pl. I, Fig. 41)

Adults: 3 mm; patterned in orange or red, white, and smoky; abdomen usually black or gray. Late May to early July, late July to early November, and late March to mid-April (overwintering); feeding on native birch and choke cherry.

Range: transcontinental.

Typhlocyba ariadne McAtee (Pl. III, Fig. 68)

Adults: 4 mm; unmarked pale yellow; resembling *Typhlocyba hockingensis* but with apex of male abdomen rounded. Late June to late September; feeding on native alder and birch.

Range: transcontinental.

Oncopsis prolixa Hamilton (Pl. VIII, Fig. 154)

Adults: 5–6 mm; male mottled in brown and white; female mottled in yellow and gray. Early June to early August; feeding on paper birch, yellow birch, and probably other birches.

Range: Newfoundland and Nova Scotia to Ontario; British Columbia.

Typhlocyba hockingensis Knull (Pl. III, Figs. 68, 69)

Adults: 4 mm; unmarked pale yellow; resembling *Typhlocyba ariadne* but with apex of male abdomen bearing hooks. Mid-June to mid-September; feeding on birch, maple, and walnut.

Range: Newfoundland and Nova Scotia to Ontario.

Arboridia enata (Knull) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes, sometimes pale yellow with stripes faintly indicated. Early July and early August to early November (probably overwintering); feeding on yellow birch, sometimes also on paper birch, and probably other birches.

Range: Ontario.

2. European white birch (= silver birch), *B. pendula*, and varieties (weeping birch, cutleaf birch): small triangular leaves; catkins 3 cm, or shorter.

Oncopsis minor (Fitch) (Pl. VIII, Fig. 151)

Adults: 4 mm; similar to *Oncopsis cinctifrons* but slightly smaller. Mid-June to mid-August; feeding on wire birch and sometimes also on European white birch and paper birch.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Quebec and adjacent parts of Ontario.

Empoasca luda Davidson & DeLong (Pl. IV, Fig. 93)

Adults: 4 mm; green or orange, striped with black. Mid-July to late August; feeding on European white birch.

Range: Newfoundland; southern Ontario; British Columbia; introduced from Europe.

Oncopsis tristis (Zetterstedt) (Pl. VIII, Fig. 151)

Adults: 4 mm; brown with pale areas on wings. Late June to mid-August; feeding on European white birch.

Range: coastal British Columbia; introduced from Europe.

3. Paper birch (= canoe birch, white birch), *B. papyrifera*: large triangular leaves; catkins 4 cm, or longer

Oncopsis variabilis (Fitch) (Pl. IX, Fig. 155)

Adults: 4-5 mm; male black, usually with a white stripe down middle; female yellow, often patterned with black or red brown. Late May to late July, feeding exclusively on paper birch.

Range: Newfoundland and Nova Scotia to inland British Columbia.

Oncopsis cinctifrons (Provancher) (Pl. VIII, Fig. 151)

Adults: 4-5 mm; black with white areas on wings, and venter yellow (see also *Oncopsis minor*). Early June to mid-August; feeding on paper birch and Alaska birch (*B. neoalaskana*).

Range: Quebec to inland British Columbia.

Oncopsis minor (Fitch) (Pl. VIII, Fig. 151)

Adults: 4 mm; similar to *Oncopsis cinctifrons* but slightly smaller. Mid-June to mid-August; feeding on wire birch and sometimes also on European white birch and paper birch.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Quebec and adjacent parts of Ontario.

Typhlocyba scripta McAtee (Pl. III, Fig. 74)

Adults: 4 mm; white to pale yellow patterned in brown. Mid-July to late August; feeding on paper birch.

Range: Newfoundland and Nova Scotia to Quebec.

4. Water birch (= mountain birch, red birch, black birch),
B. occidentalis: small round leaves

Oncopsis prairiana Hamilton (Pl. IX, Fig. 159)

Adults: 4 mm; mottled in white, brown or red brown; similar to *Oncopsis incidens* but smaller. Mid-June to late August; feeding on water birch and dwarf, or bog, birch shrubs (*B. pumila*).

Range: Ontario to inland British Columbia.

Oncopsis marilynae Hamilton (Pl. IX, Fig. 156)

Adults: 4–5 mm; male black; female yellow, patterned in black or red brown. Early June to late July; feeding exclusively on water birch.

Range: Manitoba to inland British Columbia.

Oncopsis incidens Hamilton (Pl. IX, Fig. 159)

Adults: 5 mm; red brown with small, paler spots on wings; similar to *Oncopsis prairiana* but larger. Early June to late July; feeding on water birch.

Range: Manitoba to inland British Columbia.

Typhlocyba oregonensis Beamer (Pl. III, Fig. 77)

Adults: 4 mm; yellow, patterned in brown. August; feeding on water birch.

Range: inland British Columbia.

5. Wire birch (= swamp birch, poplar-leaved birch, gray birch),
B. populifolia: leaves with long, tapered tips

Oncopsis citrella Hamilton (Pl. IX, Fig. 160)

Adults: 4–5 mm; brown with white spots on wings; male nearly black; female often with body yellow. Early June to early August; feeding exclusively on wire birch.

Range: Nova Scotia to Quebec and adjacent parts of Ontario.

Oncopsis minor (Fitch) (Pl. VIII, Fig. 151)

Adults: 4 mm; black with white areas on wings. Mid-June to mid-August; feeding on wire birch and sometimes also on European white birch and paper birch.

Range: Nova Scotia to Quebec and adjacent parts of Ontario.

6. Yellow birch (= gold birch, curly birch, hard birch, sweet birch),
B. alleghaniensis: leaves elongate

Oncopsis concurrens Hamilton (Pl. IX, Fig. 161)

Adults: 4–5 mm; brown. Late June to mid-August; feeding exclusively on yellow birch.

Range: Nova Scotia to Ontario.

***Oncopsis vartyi* Hamilton** (Pl. VIII, Fig. 151)

Adults: 4–5 mm; black with white areas on wings. Mid-June to mid-August; feeding exclusively on yellow birch.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Ontario.

BLACK GUM: see tupelo

BLACK-LOCUST, or FALSE-ACACIA (*Robinia pseudoacacia*)

Leaves divided into small oval leaflets (as in honey-locust), with a single leaflet at tip; twigs with pairs of short thorns; fruits in narrow beanlike pods.

***Empoasca pergandei* Gillette** (Pl. IV, Fig. 88)

Adults: 4 mm; green. Late June to late September; feeding exclusively on black locust.

Range: Nova Scotia to Ontario; coastal British Columbia.

BLACK POPLAR and COTTONWOOD (*Populus* sections *Tacamahacca* and *Aegirus*)

Leaves leathery, triangular, with a supple stem (Fig. 26); fruits cottony, like those of aspen and silver poplar. Each host species has a distinctive leafhopper fauna, but the many varieties, cultivars, and hybrids confuse the picture. The leafhopper faunas of narrowleaf cottonwood (= willow-leaved cottonwood, bitter cottonwood), *P. angustifolia*; and balm-of-gilead (*P. candicans*) are unknown.

1. General on black poplar and cottonwood

***Macropsis graminea* (Fabricius)** (Pl. VII, Fig. 131)

Adults: 4–5 mm; pale green, wings usually golden brown, head with a black dot at tip; head pointed between eyes. Late June to late August; feeding on balsam poplar, European black poplar, eastern cottonwood, and hybrids of these species.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Ontario; inland British Columbia; introduced from Europe.

2. Balsam poplar (= tacamahac, balm poplar, rough-barked poplar), *P. balsamifera*; and black cottonwood (= western balm poplar), *P. trichocarpa*: leaves longer than wide, without marginal teeth

Empoasca zaisanensis (Mitjaev) (Pl. IV, Fig. 83)

Adults: 4 mm; pale green; similar to *Empoasca carsona* but without orange markings, and occurring farther east. Late June to late September; feeding on balsam poplar.

Range: New Brunswick to inland British Columbia.

Idiocerus midas Hamilton (Pl. VI, Fig. 120)

Adults: 6-7 mm; brown; male head and venter yellow; female head and venter green. Mid-July to late August; feeding on balsam poplar and black cottonwood.

Range: Quebec to inland British Columbia.

Idiocerus aureus Hamilton (Pl. VI, Fig. 123)

Adults: 6-7 mm; golden orange. Early July to late August; feeding on balsam poplar.

Range: Ontario to inland British Columbia.

Idiocerus cinctus DeLong & Caldwell (Pl. V, Fig. 110)

Adults: 5 mm; male brown with white spots and band across wings; female orange brown. Mid-July to late September; feeding exclusively on black cottonwood.

Range: Alberta and British Columbia.

Colladonus reductus (Van Duzee) (Pl. X, Fig. 179)

Adults: 5 mm; brown to black with yellow bands across head and body. Mid-June to late October; feeding on black cottonwood shoots or seedlings and on various herbaceous plants.

Range: Alberta and British Columbia.

Empoasca dissimilaris Hamilton (Pl. IV, Fig. 94)

Adults: 5 mm; male dark brown with a white band across wings; female green to golden yellow, with venter and edges of wings bright green. Mid-June to mid-July; feeding exclusively on black cottonwood.

Range: Alberta and British Columbia.

Empoasca portola Ross (Pl. IV, Fig. 91)

Adults: 5 mm; pale green. Late June to late August; feeding exclusively on black cottonwood.

Range: Alberta and British Columbia.

Empoasca hartzelli Baker (Pl. IV, Fig. 95)

Adults: 5 mm; yellow with black stripe down middle. Late July to late August, feeding exclusively on black cottonwood.

Range: British Columbia.

Empoasca carsona DeLong & Davidson (Pl. IV, Fig. 90)

Adults: 4 mm; green to yellow, often with orange markings. July to mid-September; feeding exclusively on black cottonwood.

Range: British Columbia.

Empoasca tigris Hamilton (Pl. IV, Fig. 96)

Adults: 4 mm; white banded with black (male) or brown (female). Late June to mid-July; feeding exclusively on black cottonwood.

Range: inland British Columbia.

Caladonus coquilletti (Van Duzee) (Pl. X, Fig. 177)

Adults: 5-6 mm; pale brown or pale orange marked with two pairs of black spots on head and body. Mid-July to mid-August; feeding on black cottonwood and also on shrub willow.

Range: inland British Columbia.

Idiocerus cingulatus Ball (Pl. V, Fig. 109)

Adults: 5 mm; male brown with two white bands across wings; female red brown. Mid-July to mid-August, and April (probably overwintering); feeding exclusively on black cottonwood.

Range: inland British Columbia.

Idiocerus bovinus Ball & Parker (Pl. V, Fig. 106)

Adults: 5 mm; mottled brown. Late July to late September; feeding exclusively on black cottonwood.

Range: coastal British Columbia.

Idiocerus vanduzeei Hamilton (Pl. VI, Fig. 118)

Adults: 6-7 mm; male pale greenish brown, with head and venter green; female pale green. Mid-July to late September; feeding exclusively on black cottonwood.

Range: coastal British Columbia.

3. Eastern cottonwood (= common cottonwood), *P. deltoides*; and **plains cottonwood** (= western cottonwood, river cottonwood), *P. deltoides* var. *occidentalis*: leaves longer than wide, and strongly toothed

Idiocerus fulgidus (Fabricius) (Pl. VI, Fig. 122)

Adults: 6 mm; pale green to yellow with wings smoky brown, darkest down middle. August; feeding on eastern cottonwood and European black poplar.

Range: Newfoundland, Prince Edward Island, Nova Scotia; introduced from Europe.

Idiocerus gillettei Hamilton (Pl. VI, Fig. 115)

Adults: 6–7 mm; robust, pale green, usually with dark stripe at tip of wings. Late June to late September; feeding on eastern cottonwood and plains cottonwood.

Range: New Brunswick to Alberta.

Empoasca gelbata DeLong & Davidson (Pl. IV, Fig. 92)

Adults: 4 mm; green; male with dark abdomen showing through wings. Mid-June to late September; feeding on eastern cottonwood, plains cottonwood, European black poplar, lombardy poplar, and silver poplar.

Range: Quebec to inland British Columbia.

Macropsis osborni Breakey (Pl. VII, Fig. 138)

Adults: 5–6 mm; male dark brown; female green with dark patch on wing bases and sometimes another patch at wing tips; head pointed between eyes. Late June to mid-August; feeding on eastern cottonwood and plains cottonwood.

Range: southern Ontario; Manitoba to Alberta.

Macropsis cinerea Breakey (Pl. VIII, Fig. 143)

Adults: 5 mm; gray; female usually blotched with brown or black; head pointed between eyes. Late June to mid-August; feeding on eastern cottonwood and plains cottonwood.

Range: southern Ontario; Manitoba to Alberta.

Empoasca trifasciata Gillette (Pl. IV, Fig. 97)

Adults: 4 mm; pale green with three brown bands. Mid-July to mid-August; feeding on eastern cottonwood and plains cottonwood.

Range: southern Ontario; inland British Columbia; probably widespread but seldom encountered.

Idiocerus moniliferae Osborn & Ball (Pl. V, Fig. 101)

Adults: 5 mm; gray checkered with black. August; feeding on eastern cottonwood and plains cottonwood.

Range: Manitoba and Saskatchewan; probably also southern Ontario, because it has been collected in adjacent parts of New York State.

Empoasca obtusa Walsh

Adults: 4 mm; slender, green; resembling *Empoasca gelbata* (Pl. IV, Fig. 92) but with abdomen pale. Mid-July to late September; feeding on eastern cottonwood and plains cottonwood.

Range: Manitoba and Saskatchewan.

Colladonus montanus (Van Duzee) (Pl. X, Fig. 178)

Adults: 4–5 mm; brown to black, patterned with yellow and white. Late May to mid-July, and mid-August to early October; feeding on various herbaceous plants and sometimes also on cherry and plains cottonwood.

Range: Saskatchewan to inland British Columbia.

4. European black poplar (*P. nigra*) and lombardy poplar (*P. nigra* var. *italica*): leaves at least as wide as long, and usually strongly toothed (Fig. 26)

Empoasca populi Edwards (Pl. IV, Fig. 89)

Adults: 4 mm; dark green. Early July to early August; in Europe feeding on European black poplar, lombardy poplar, silver poplar, and European trembling aspen (*P. tremula*).

Range: Newfoundland and Nova Scotia; introduced from Europe.

Idiocerus fulgidus (Fabricius) (Pl. VI, Fig. 122)

Adults: 6 mm; pale green to yellow with wings smoky brown, darkest down middle. August; feeding on eastern cottonwood and European black poplar.

Range: Newfoundland, Prince Edward Island, Nova Scotia; introduced from Europe.

Empoasca gelbata DeLong & Davidson (Pl. IV, Fig. 92)

Adults: 4 mm; green; male with dark abdomen showing through wings. Mid-June to late September; feeding on eastern cottonwood, plains cottonwood, European black poplar, lombardy poplar, and silver poplar.

Range: Quebec to inland British Columbia.

Rhytidodus decimaquartus (Schrank) (Pl. V, Fig. 99)

Adults: 6–7 mm; tawny, usually mottled with brown. Late June to late July; feeding on European black poplar and lombardy poplar.

Range: Newfoundland and Nova Scotia; Ontario; inland British Columbia; introduced from Europe.

BOX-ELDER: see maple

BUCKTHORN (*Rhamnus* spp.): no leafhopper fauna

BUTTERNUT: see walnut

BUTTONBALL: see sycamore

CASCARA (*Rhamnus purshiana*): no leafhopper fauna

CATALPA (*Catalpa* spp.): no leafhopper fauna

CEDAR, JUNIPER, CYPRESS, and ARBORVITAE (*Juniperus* spp., *Thuja* spp., and *Chamaecyparis* spp.)

Needles scalelike or prickly (Figs. 8, 9), tightly pressed to twigs; fruits in small cones or dry berries. One leafhopper species feeds on all cedars; eastern red-cedar (*Juniperus virginiana*) and Rocky Mountain juniper (*J. scopulorum*) support additional leafhoppers.

Scaphoideus opalinus Osborn (Pl. X, Fig. 164)

Adults: 5 mm; tawny, wings gray, mottled with black; head narrow and pointed. Mid-August to late September; feeding exclusively on eastern red-cedar.

Range: Quebec and Ontario.

Empoasca junipera DeLong (Pl. IV, Fig. 84)

Adults: 3 mm; olive green. Late June to early September; feeding on native species of *Juniperus*, *Thuja*, and *Chamaecyparis* but apparently not on introduced species.

Range: Ontario; British Columbia.

Idiocerus nervatus Van Duzee (Pl. VI, Fig. 126)

Adults: 4–5 mm; pale green with dark wing veins. Early August to late September, and early April to late June (overwintering); feeding on pacific and shining willow, overwintering on cedar (native *Juniperus* spp.).

Range: southern Ontario; British Columbia.

Idiocerus cedrus Hamilton (Pl. V, Fig. 104)

Adults: 4–5 mm; gray mottled with brown; head broad and blunt. Mid-August to late September; feeding exclusively on eastern red-cedar.

Range: southern Ontario.

Idiocerus pericallis Hamilton (Pl. VI, Fig. 125)

Adults: 4–5 mm; pale green with orange back. Late July to late August; feeding exclusively on Rocky Mountain juniper.

Range: inland British Columbia.

CHERRY (*Prunus* subgenus *Cerasus*)

Leaves ovoid or tapered, with minute teeth and two prominent glands at their base; fruits small, fleshy, borne singly or in pairs on long stems. The leafhopper faunas of sweet cherry, *Prunus avium*; bitter cherry, *P. emarginata*; and pin cherry (= red cherry, bird cherry, fire cherry), *P. pensylvanica* are similar.

Empoasca maligna (Walsh) (Pl. IV, Fig. 88)

APPLE LEAFHOPPER

Adults: 4 mm; bright green. Mid-June to late October; feeding on apple and hawthorn, and also recorded from cherry (possibly strays).

Range: transcontinental.

Typhlocyba spp. (four native species and three European species) (Pl. III, Fig. 68)

Adults: 3–4 mm; unmarked ivory white or yellow. Mid-June to early November; feeding on many trees including sometimes cherry. No definite host-associations with cherry are established as yet.

Range: transcontinental.

Arboridia plena (Beamer) (Pl. I, Fig. 42)

Adults: 3 mm; white with four orange stripes; abdomen usually dark. Late May to mid-July, and mid-August to late September; feeding on sweet cherry and bitter cherry.

Range: New Brunswick; Ontario; inland British Columbia; possibly transcontinental.

Colladonus montanus (Van Duzee) (Pl. X, Fig. 178)

Adults: 4–5 mm; brown to black, patterned with yellow and white. Mid-August to early October, and May to mid-July (probably overwintering); feeding on various herbaceous plants and sometimes also on cherry and plains cottonwood.

Range: Saskatchewan to inland British Columbia.

Colladonus geminatus (Van Duzee) (Pl. X, Fig. 181)

Adults: 4–5 mm; gray, head yellow marked with four black spots between eyes. Late August to early October, and early May to mid-July (probably overwintering); feeding on various herbaceous plants, straying occasionally to cherry and peach.

Range: British Columbia.

Zygina flammigera (Fourcroy) (Pl. II, Fig. 50)

Adults: 3 mm; white with red zigzag line down each wing. Early August to late October, and April (probably overwintering); feeding on sweet cherry; also reported on peach in Europe.

Range: coastal British Columbia; introduced from Europe.

CHESTNUT (*Castanea* spp.): no leafhopper fauna

CHINESE-SUMAC: see tree-of-heaven

CHOKE CHERRY (*Prunus* subgenus *Padus*)

Leaves as in cherry; fruits in small, loose clusters on a single common stem. Several species of leafhoppers occur on both species of native choke cherry (*P. virginiana* and *P. serotina*).

Ossiannilssonola volans (McAtee) (Pl. II, Fig. 54)

Adults: 3–4 mm; ivory white to yellow with two broad brown bands. Mid-June to late September; feeding on black cherry (*P. serotina*), and on vine maple (*Acer circinatum*) and probably other shrubs.

Range: transcontinental.

Typhlocyba spp. (four native species) (Pl. III, Fig. 68)

Adults: 3 mm; unmarked ivory white to yellow. Mid-June to late October; feeding on various plants, including choke cherry.

Range: transcontinental.

Arboridia spp. (four native species) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Late May to late September; feeding on choke cherry.

Range: New Brunswick to inland British Columbia.

COTTONWOOD: see black poplar

CUCUMBERTREE: see magnolia

CYPRESS: see cedar

DOGWOOD (*Cornus* spp.)

Leaves broad, smooth-edged, with veins curving toward tip of leaf (as in buckthorn, but leaves are alternate rather than opposite); flowers large and showy; fruits in dense cluster at end of twig. Two dogwoods attain tree size in Canada, but only the western flowering, or Pacific, dogwood (*C. nuttallii*) has a leafhopper fauna.

Typhlocyba commissuralis Stål (Pl. III, Fig. 81)

Adults: 4–5 mm; white with brown stripe down back. July; feeding on dogwood and on alder shrub.

Range: British Columbia.

DOUGLAS-FIR (*Pseudotsuga menziesii*): no leafhopper fauna

ELM (*Ulmus* spp.)

Leaves broad, strongly toothed, tapered and asymmetrical at base; fruit disc-shaped. Leafhopper faunas of introduced elms differ from those of native elms. "Bastard elm" is actually hackberry (p. 44).

1. General on elms

Typhlocyba spp. (three native and one European species) (Pl. III, Fig. 68)

Adults: 3 mm; unmarked ivory white to pale yellow. Mid-June to late October; feeding on various plants, including elm.

Range: transcontinental.

2. American elm (= water elm, white elm), *U. americana*; **red elm** (= budded elm, slippery elm), *U. rubra*; and **rock elm** (= hickory elm, cork elm), *U. thomasi*: leaves large, broadest at or below middle; fruit about 1 cm wide

Ribautiana ulmi (Linnaeus) (Pl. II, Fig. 52)

Adults: 4 mm; ivory white to yellow, head with two black spots and usually also a spot on body and a brown band across wing tips. Late June to late October; feeding on European and native elms.

Range: Newfoundland, Prince Edward Island, and Nova Scotia; Ontario; British Columbia; introduced from Europe.

Erythroneura spp. (four native species) (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot near each wing tip, wings often with orange dots as well. Early August to early October, and early May to late June (overwintering); feeding on native elm.

Range: New Brunswick to Ontario.

Scaphoideus pullus DeLong & Mohr (Pl. X, Fig. 163)

Adults: 4–5 mm; mottled brown with a yellow stripe down back. Early July to late August; feeding on American elm.

Range: Quebec to Manitoba.

Typhlocyba venusta McAtee (Pl. III, Fig. 73)

Adults: 4 mm; white to pale yellow with two brown bands across wings, or with brown patch at base or tip of wings in addition to brown band; two-banded forms similar to adults of *T. gillettei* (Pl. III, Fig. 72), but bands usually wider. Late May to mid-October; feeding on basswood and native elm.

Range: Quebec to Manitoba.

Typhlocyba saffrana McAtee (Pl. III, Fig. 79)

Adults: 4 mm; yellow with a row of brown dots across wing tips. Late June to mid-August; feeding on beech, native elm, and hop-hornbeam.

Range: Quebec and Ontario.

Typhlocyba vestita McAtee (Pl. III, Fig. 78)

Adults: 4 mm; ivory white with brown back, including wings. Late June to late August; feeding on red elm.

Range: Quebec and Ontario.

Erythroneura basilaris (Say) (Pl. I, Fig. 33)

Adults: 3 mm; pale yellow, wings brown at base as in dark form of *Typhlocyba venusta* but without apical band, wings usually also spotted with orange. Mid-July to mid-October, and late April to mid-May (overwintering); feeding on native elm.

Range: Quebec and Ontario.

Scaphoideus soleus DeLong (Pl. X, Fig. 166)

Adults: 6-7 mm; yellow and gray, boldly patterned in black. Mid-June to mid-August; feeding on American elm.

Range: Quebec and probably adjacent Ontario.

Ossiannilssonola ulmi Hamilton (Pl. II, Fig. 55)

Adults: 3-4 mm; ivory white to yellow with two broad brown bands across wings; resembling *Typhlocyba venusta* and *T. gillettei* (Pl. III, Fig. 72), but with head narrower. Mid-July to early August; feeding on American elm and red elm.

Range: Ontario and Manitoba.

Erythroneura ardens McAtee (Pl. I, Fig. 35)

Adults: 3 mm; white, back with a large brown spot and usually orange dots on wings. July and May (probably overwintering); feeding on native elm.

Range: Ontario.

Alebra fumida Gillette (Pl. II, Fig. 67)

Adults: 3 mm; brown, venter paler; resembling *Typhlocyba vestita* (Pl. III, Fig. 78), but with head flat between eyes. Early July to mid-August; feeding on hawthorn and sometimes on native elm.

Range: southern Ontario.

Scaphoideus atlantus Ball (Pl. X, Fig. 168)

Adults: 5-6 mm; brown. Late July to mid-September; feeding on American elm.

Range: southern Ontario.



Plate I, Figs. 32-49. 32, *Erythroneura* spp.; 33, *E. basilaris* (Say); 34, *E. affinis* Fitch; 35, *E. ardens* McAtee; 36, *E. ligata* McAtee; 37, *E. rosa* Robinson; 38, *E. hartii* (Gillette); 39, *Arboridia* spp.; 40, *A. noeva* (Gillette); 41, *A. betulaspera* (Richards & Varty); 42, *A. plena* (Beamer); 43, *A. tietzi* (Ross & DeLong); 44, *A. fumida* (Gillette); 45, *A. crataegi* (Johnson); 46, *A. ulmosa* (Ross & DeLong); 47, *A. dorsalis* (Gillette); 48, *A. stolata* (McAtee); 49, *A. bitincta* (McAtee).



Plate II, Figs. 50-67. 50, *Zygina flammigera* (Fourcroy); 51, *Dikrella* spp.; 52, *Ribautiana ulmi* (Linnaeus); 53, *Ribautiana* spp.; 54, *Ossiannilssonola volans* (McAtee); 55, *O. ulmi* Hamilton; 56, *O. duplicata* (McAtee); 57, *O. quadrata* (DeLong & Johnson); 58, *O. appendiculata* (Malloch); 59, *O. clymene* (McAtee); 60, *Ossiannilssonola* spp.; 61, *O. phryne* (McAtee); 62, *O. serrula* (Ross & DeLong), *Typhlocyba froggatti* Baker, and *Alnetoidia alneti* (Dahlbom); 63, *O. tunicarubra* (Gillette); 64, *Aguriahana stellulata* (Burmeister); 65, *Fagocyba douglasi* (Edwards); 66, *Alebra aurea* (Walsh); 67, *A. fumida* Gillette.



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Plate III, Figs. 68-82. 68, *Typhlocyba* spp.; 69, *T. pomaria* McAtee and *T. hockingensis* Knull; 70, *T. albicans* (Walsh); 71, *T. apicata* McAtee; 72, *T. gillettei* (Van Duzee); 73, *T. venusta* McAtee; 74, *T. scripta* McAtee; 75, *T. casta* McAtee; 76, *T. latifasciata* (Christian); 77, *T. oregonensis* Beamer; 78, *T. vestita* McAtee; 79, *T. saffrana* McAtee; 80, *T. transviridis* Christian; 81, *T. commissuralis* Stål; 82, *T. quercus* (Fabricius).



Plate IV, Figs. 83-98. 83, *Empoasca* spp.; 84, *E. junipera* DeLong and *E. banksianae* Hamilton; 85, *E. elongella* Metcalf; 86, *E. coccinea* (Fitch) and *E. pinella* Davidson & DeLong; 87, *E. bipunctata* (Oshanin); 88, *E. maligna* (Walsh) and *E. pergandei* Gillette; 89, *E. populi* Edwards; 90, *E. carsona* DeLong & Davidson; 91, *E. portola* Ross, *E. rossi* Hamilton, and *E. empusa* Hamilton; 92, *E. gelbata* DeLong & Davidson and *E. coronata* Hamilton; 93, *E. lucidae* Ross, *E. luda* Davidson & DeLong, and *E. smaragdula* (Fallén); 94, *E. dissimilaris* Hamilton; 95, *E. hartzelli* Baker; 96, *E. tigris* Hamilton; 97, *E. trifasciata* Gillette; 98, *E. copula* DeLong.



Plate V, Figs. 99-114. 99, *Rhytidodus decimaquartus* (Schrank); 100, *Idiocerus stigmaticalis* Lewis; 101, *I. moniliferae* Osborn & Ball; 102, *I. musteus musteus* Ball; 103, *I. musteus verrucosus* Ball; 104, *I. cedrus* Hamilton and *I. striolus* Fieber; 105, *I. couleanus* Ball & Parker; 106, *I. bovinus* Ball & Parker; 107, *I. cognatus* Fieber; 108, *I. amabilis* Ball; 109, *I. cingulatus* Ball; 110, *I. cinctus* DeLong & Caldwell; 111, *I. maximus* Freytag; 112, *I. lachrymalis* Fitch; 113, *I. venosus* Hamilton; 114, *I. formosus* Ball.

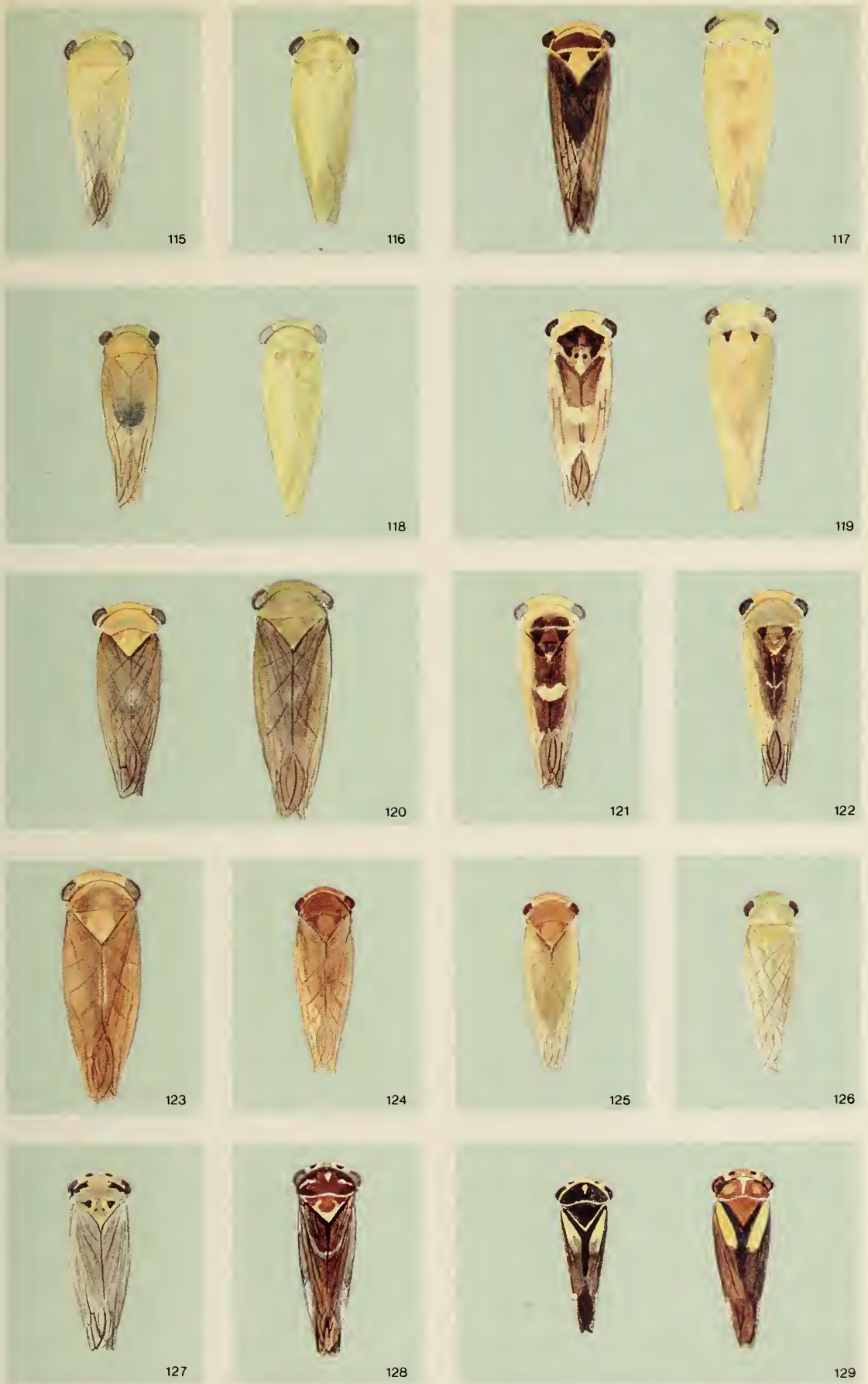


Plate VI, Figs. 115-129. 115, *Idiocerus gillettei* Hamilton; 116, *I. unicolor* Hamilton; 117, *I. stellaris* DeLong & Caldwell; 118, *I. pallidus* Fitch and *I. vanduzeei* Hamilton; 119, *I. obsoletus* (Walker); 120, *I. midas* Hamilton; 121, *I. lunaris* Ball; 122, *I. suturalis* Fitch and *I. fulgidus* (Fabricius); 123, *I. aureus* Hamilton; 124, *I. concinnus* Ball and *I. amoenus* Van Duzee; 125, *I. pericallis* Hamilton; 126, *I. nervatus* Van Duzee; 127, *Balcanocercus crataegi* (Van Duzee); 128, *B. fitchi* (Van Duzee); 129, *B. provancheri* (Van Duzee).



Plate VII, Figs. 130-140. 130, *Macropsis canadensis* (Van Duzee); 131, *M. graminea* (Fabricius); 132, *M. mendax* (Fieber); 133, *M. trivialis* (Ball) and *M. decisa* Hamilton; 134, *M. notata* (Prohaska); 135, *M. tunicata* Hamilton; 136, *M. ocellata* Provancher; 137, *M. confusa* Breakey; 138, *M. osborni* Breakey; 139, *M. fumipennis* (Gillette & Baker); 140, *M. aurifera* Breakey.

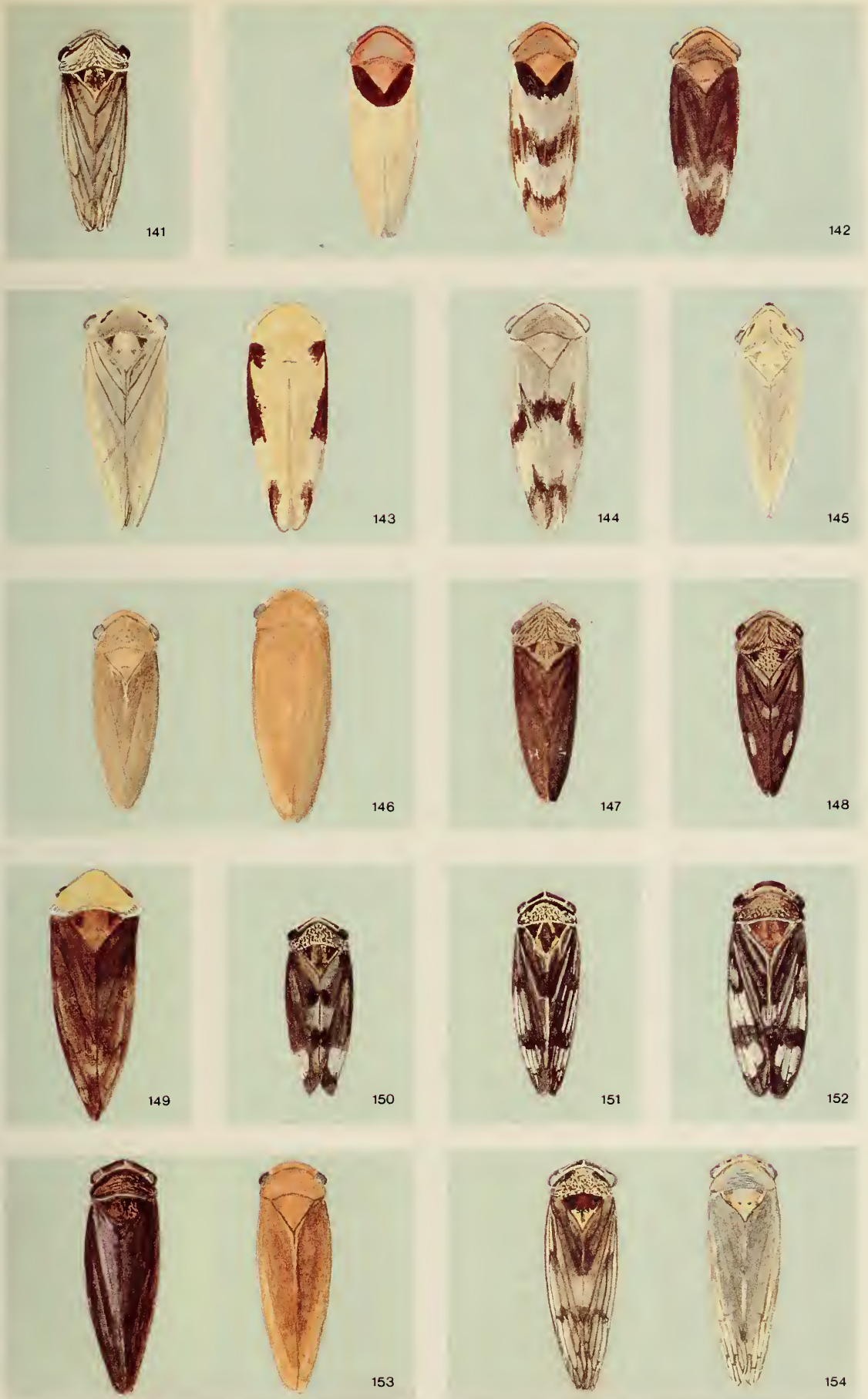


Plate VIII, Figs. 141-154. 141, *Macropsis tristis* (Van Duzee); 142, *M. basalis* (Van Duzee); 143, *M. cinerea* Breakey; 144, *M. bifasciata* (Van Duzee); 145, *M. vicina* (Horváth); 146, *M. vinea* Hamilton; 147, *M. insignis* (Van Duzee); 148, *M. trimaculata* (Fitch); 149, *Pediopsis tiliae* (Germar); 150, *Pediopsoides distinctus* (Van Duzee); 151, *Oncopsis* spp.; 152, *O. abietis* (Fitch); 153, *O. sobria* (Walker); 154, *O. prolixa* Hamilton.



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Plate IX, Figs. 155-161. 155, *Oncopsis variabilis* (Fitch); 156, *O. marilynnae* Hamilton; 157, *O. californica* Van Duzee; 158, *O. citra* Hamilton; 159, *O. prairiana* Hamilton and *O. incidens* Hamilton; 160, *O. citrella* Hamilton; 161, *O. concurrens* Hamilton.



Plate X, Figs. 162-181. 162, *Scaphoideus intricatus* Uhler; 163, *S. pullus* DeLong & Mohr; 164, *S. opalinus* Osborn; 165, *S. curvatus* DeLong & Mohr; 166, *S. soleus* DeLong; 167, *S. luteolus* Van Duzee; 168, *S. atlantus* Ball; 169, *Japananus hyalinus* (Osborn); 170, *Allygus mixtus* (Fabricius); 171, *Orientus ishidae* (Matsumura); 172, *Eutettix luridus* (Van Duzee); 173, *E. variabilis* Hepner; 174, *Pendarus franconianus* (Ball); 175, *P. punctiscriptus* (Van Duzee); 176, *Fieberiella florii* (Stål); 177, *Caladonus coquilletti* (Van Duzee); 178, *Colladonus montanus* (Van Duzee); 179, *C. reductus* (Van Duzee); 180, *C. belli* (Uhler); 181, *C. geminatus* (Van Duzee).



Plate XI, Figs. 182-193. 182, *Xestocephalus brunneus* Van Duzee; 183, *Stragania apicalis* (Osborn & Ball); 184, *S. alabamensis* (Baker); 185, *Koebelia californica* Baker; 186, *Gyponana geminata* (Osborn); 187, *G. striata* (Burmeister); 188, *G. brevita* DeLong; 189, *G. mali* DeLong; 190, *G. querci* (DeLong); 191, *Jikradia olitoria* (Say); 192, *Microcentrus caryae* (Fitch); 193, *M. perditus* (Amyot & Serville).

Scaphoideus luteolus Van Duzee (Pl. X, Fig. 167)

Adults: 5–6 mm; orange. Early July to mid-September; feeding on native elm.

Range: not yet recorded from Canada but collected in New York, Ohio, Wisconsin, and Minnesota and thus to be expected in southern Ontario.

Arboridia ulmosa (Ross & DeLong) (Pl. I, Fig. 46)

Adults: 3 mm; light brown with four orange stripes. Early July to late September, and May (probably overwintering); feeding on American elm.

Range: not yet recorded from Canada but collected in Illinois and thus to be expected in southern Ontario.

3. Scotch elm (= wych elm), *U. glabra*; and **umbrella elm** (= camperdown elm), *U. glabra* var. *camperdownii*: leaves large, distinctly broadest beyond middle; fruit more than 2 cm wide

Ribautiana ulmi (Linnaeus) (Pl. II, Fig. 52)

Adults: 4 mm; ivory white to yellow, head with two black spots and usually also a spot on body and a brown band across wing tips. Late June through October; feeding on European and native elms.

Range: Newfoundland, Prince Edward Island, and Nova Scotia; Ontario; British Columbia; introduced from Europe.

Macropsis mendax (Fieber) (Pl. VII, Fig. 132)

Adults: 4–5 mm; male brown; female green; head pointed between eyes. Late June to late July; feeding on umbrella elm and probably also on Scotch elm.

Range: southern Ontario; introduced from Europe.

Typhlocyba plebeja Edwards (Pl. III, Fig. 68)

Adults: 4 mm; ivory white to yellow, unmarked. July and August; feeding on Scotch and umbrella elm.

Range: Newfoundland; coastal British Columbia.

4. Siberian elm (= Chinese elm), *U. pumila*: leaves small, less than 8 cm long

Empoasca bipunctata (Oshanin) (Pl. IV, Fig. 87)

Adults: 4 mm; pale green with a small black spot on each wing tip. Early June to early September; feeding exclusively on Siberian elm.

Range: Ontario to inland British Columbia, and probably also Eastern Canada; introduced from Asia.

FALSE-ACACIA: see black-locust

FIR (*Abies* spp.): no leafhopper fauna on ornamental species

GINKGO, or MAIDENHAIR TREE (*Ginkgo biloba*): no leafhopper fauna

GUM: see tupelo

HACKBERRY, BASTARD ELM, SUGARBERRY, or NETTLETREE (*Celtis* spp.): no leafhopper fauna

HACKMATAK: see larch

HAWTHORN, or THORN (*Crataegus* spp.)

Leaves with coarse teeth or jagged edges, similar to those of crabapple but not arising in clumps; twigs usually with long thorns; fruits like small apples on long stems, borne in clusters. The many species of hawthorn probably have similar leafhopper faunas.

Empoasca maligna (Walsh) (Pl. IV, Fig. 88) APPLE LEAFHOPPER

Adults: 4 mm; bright green. Mid-June to late October; feeding on apple and sometimes on hawthorn.

Range: transcontinental.

Typhlocyba pomaria McAtee (Pl. III, Fig. 68) WHITE APPLE LEAFHOPPER

Adults: 3 mm; unmarked ivory white. Mid-June to late October; feeding on apple and hawthorn, and also sometimes on alder, elm, cherry, choke cherry, hickory, poplar, and walnut.

Range: transcontinental.

Balcanocerus provancheri (Van Duzee) (Pl. VI, Fig. 129)

Adults: 5–6 mm; brown or black with bright yellow streaks at wing bases. Mid-June to late September; feeding on herbaceous plants (chokeberry, *Aronia* spp.) and occasionally on apple and hawthorn.

Range: Nova Scotia to inland British Columbia.

Arboridia bitincta (McAtee) (Pl. I, Fig. 49)

Adults: 3 mm; brown with large, pink or greenish yellow oval spot on wings. Early June to late September, and early April (overwintering); feeding on hawthorn.

Range: New Brunswick and Ontario.

Balcanocerus fitchi (Van Duzee) (Pl. VI, Fig. 128)

Adults: 5–6 mm; brown mottled with white. Early July to late September; feeding on hawthorn and occasionally on apple and pear.

Range: Ontario; Saskatchewan.

Balcanocerus crataegi (Van Duzee) (Pl. VI, Fig. 127)

Adults: 5 mm; gray with three pairs of black spots on head and back. Early July to early September; feeding on hawthorn.

Range: Ontario; Saskatchewan.

Arboridia spp. (four native species) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Early August to early September; feeding on hawthorn.

Range: Ontario; Saskatchewan.

Ossiannilssonola duplicata (McAtee) (Pl. II, Fig. 56)

Adults: 3 mm; ivory white with two brown crossbands; similar to *Typhlocyba gillettei* (Pl. III, Fig. 72), but smaller and with head narrower. Late June to early August; feeding on hawthorn.

Range: Quebec and Ontario.

Arboridia crataegi (Johnson) (Pl. I, Fig. 45)

Adults: 3 mm; back yellow, wings white with red margins and two broad, dusky crossbands; venter black. Late June to late September, and early April (overwintering); feeding on hawthorn.

Range: Ontario.

Alebra fumida Gillette (Pl. II, Fig. 67)

Adults: 3 mm; brown, venter paler. Early July to mid-August; feeding on hawthorn and sometimes on elm.

Range: southern Ontario.

Erythroneura minor Beamer (Pl. I, Fig. 32)

Adults: 3 mm; white with orange dots. August; feeding on downy hawthorn (*C. mollis*).

Range: southern Ontario.

Arboridia tietzi (Ross & DeLong) (Pl. I, Fig. 43)

Adults: 3 mm; brown to orange, back patterned with yellow, wings with two gray spots. Late August to late September, and May (probably overwintering); feeding on downy hawthorn.

Range: not yet reported from Canada but collected in Iowa and Illinois and thus to be expected in southern Ontario.

HEMLOCK (*Tsuga* spp.)

Needles small, with distinct stalks, in flat series either side of twig; cones small, at tip of twig. Three species occur in Canada, but only eastern hemlock (*T. canadensis*) has a leafhopper fauna.

Gyponana striata (Burmeister) (Pl. XI, Fig. 187)

Adults: 8–9 mm; oval, green with faint orange stripes. Mid-July to late August; feeding exclusively on eastern hemlock.

Range: Quebec and Ontario.

HICKORY, or KINGNUT (*Carya* spp.)

Leaves large, more than 25 cm long, divided into 5–11 broad leaflets, each leaflet usually broadest beyond middle, smooth-edged and usually slightly curved (except terminal leaflet); fruit a nut enclosed in large, spherical, leathery capsule with prominent seams (Fig. 17). The various species probably have similar leafhopper faunas.

Typhlocyba pomaria McAtee
(Pl. III, Fig. 68)

WHITE APPLE LEAFHOPPER

Adults: 3 mm; unmarked ivory white. Mid-June to late October; feeding on apple and hawthorn, and sometimes also on cherry, choke cherry, elm, hickory, poplar, walnut, and shrub alder.

Range: transcontinental.

Microcentrus caryae (Fitch) (Pl. XI, Fig. 192)

Adults: 7–9 mm; brown. Early July to late October; feeding on hickory.

Range: Ontario.

Gyponana brevitata DeLong (Pl. XI, Fig. 188)

Adults: 9–10 mm; oval, pale green. Mid-July to mid-August; feeding on shagbark hickory (*Carya ovata*).

Range: southern Ontario.

**HONEY-LOCUST, or THREE-THORNED ACACIA
(*Gleditsia triacanthos*)**

Leaves divided into small leaflets like those of peas, without a terminal leaflet; twigs usually with long thorns; fruit a beanlike pod.

Stragania alabamensis (Baker) (Pl. XI, Fig. 184)

Adults: 4–5 mm; green; head narrower than body; face oval. Late June to late August; feeding exclusively on honey-locust.

Range: Prince Edward Island; southern Ontario; introduced from USA.

Stragania apicalis (Osborn & Ball) (Pl. XI, Fig. 183)

Adults: 4–5 mm; green, with head as wide as body; face oval. Mid-July to late August; feeding exclusively on honey-locust.

Range: southern Ontario.

Macropsis fumipennis (Gillette & Baker) (Pl. VII, Fig. 139)

Adults: 4–5 mm; green to brown; head pointed between eyes; face diamond-shaped. Early June to mid-July; feeding exclusively on honey-locust.

Range: southern Ontario.

Arboridia spp. (two native species) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Late July to early September (possibly overwintering); feeding exclusively on honey-locust.

Range: not yet recorded from Canada but collected in Ohio and Illinois and thus to be expected in southern Ontario.

HOP-HORNBEAM, or IRONWOOD (*Ostrya virginiana*)

Leaves finely toothed, resembling those of birch but not grouped in pairs; fruits in loose aggregates of whitish bracts forming hoplike cones at tip of twig.

Typhlocyba saffrana McAtee (Pl. III, Fig. 79)

Adults: 4 mm; yellow with a row of dots across wing tips. Late June to mid-August; feeding on beech, elm, and hop-hornbeam.

Range: Quebec and Ontario.

Typhlocyba tortosa Ross & DeLong

Adults: 3 mm; unmarked yellow, similar to *Ossiannilssonola serrula* (Pl. III, Fig. 62) but with a broader head. Early June to mid-July; feeding exclusively on hop-hornbeam.

Range: Ontario.

Typhlocyba apicata McAtee (Pl. III, Fig. 71)

Adults: 3 mm; pale yellow with one or two brown crossbands; similar to *Typhlocyba gillettei* (Pl. III, Fig. 72), but smaller. Early June to mid-August; feeding exclusively on hop-hornbeam.

Range: Ontario.

Ribautiana spp. (three native species) (Pl. II, Fig. 53)

Adults: 3 mm; ivory white with edges of wing tips dotted with black. Early June to mid-September; feeding on hop-hornbeam and blue-beech (*Carpinus caroliniana*).

Range: Ontario.

Arboridia obliqua (Say) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Early June to early October; feeding on basswood and hop-hornbeam.

Range: Ontario.

Erythroneura spp. (three native species) (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot at each wing tip, wings often with orange dots as well. Late June to mid-September, and late March to mid-May (overwintering); feeding exclusively on hop-hornbeam.

Range: Ontario.

HOPTREE, or WAFER-ASH (*Ptelea trifoliata*)

Leaves divided into three broad leaflets without marginal teeth, on a long stem; fruits in dense clusters of large, lacy discs at end of twigs.

Empoasca pallida Gillette (Pl. IV, Fig. 83)

Adults: 3-4 mm; green; resembling *Empoasca fabae* (p. 8), but with different hosts. Late June to mid-July, late August to late September, and April (probably overwintering); feeding exclusively on hoptree.

Range: southern Ontario; extremely abundant at Point Pelee.

HORSE-CHESTNUT (*Aesculus hippocastanum*)

Leaves divided into seven radiating leaflets; flower heads prominent in early summer; fruits, pairs of large, glossy nuts, in prickly capsules.

Typhlocyba hippocastani Edwards (Pl. III, Fig. 68)

Adults: 4 mm; unmarked pale yellow. August; feeding on elm, and also recorded as breeding on horse-chestnut in England.

Range: Nova Scotia; introduced from Europe.

IRONWOOD: see hop-hornbeam

JUNIPER: see cedar

KENTUCKY-COFFEETREE (*Gymnocladus dioica*): no leafhopper fauna

KINGNUT: see hickory

LARCH, HACKMATAK, or TAMARACK (*Larix* spp.): no leafhopper fauna

LIME, or LINDEN: see basswood

LOCUST: see black-locust or honey-locust

MADRONA: see arbutus

MAGNOLIA, or CUCUMBERTREE (*Magnolia* spp.): no leafhopper fauna

MAIDENHAIR: see ginkgo

MANZANITA: see arbutus

MAPLE, BOX-ELDER, and MOOSEWOOD (*Acer* spp.)

Leaves notched at base, 3–7-lobed; fruits a pair of small nuts, each bearing a large, asymmetrical wing. Manitoba maple (= ash-leaved maple, box-elder), *A. negundo*, has compound leaves; it does not have a leafhopper fauna. Other maples have similar leafhopper faunas, although a few leafhopper species are found only on certain related maples.

Typhlocyba spp. (five native and one European species) (Pl. III, Fig. 68)

Adults: 3–4 mm; unmarked ivory white to yellow. Mid-June to early November; feeding on birch, elm, and maple.

Range: transcontinental.

Typhlocyba albicans (Walsh) (Pl. III, Fig. 70)

Adults: 4 mm; stout; ivory white, often marked with one or two brown spots along back. Late June to mid-August, and early to late September; feeding on various maples but preferring red maple (*A. rubrum*).

Range: Nova Scotia to Ontario.

Arboridia obvia (Beamer) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. August, and late May (probably overwintering); feeding on sugar maple (*A. saccharum*) and probably on black maple (*A. nigrum*).

Range: Quebec and Ontario.

Erythroneura trautmanae Knull (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot on each wing tip, wings often with orange dots as well; similar to *Erythroneura sancta* but with different hosts. Early to mid-August, and late April to late June (probably overwintering); feeding on three-lobed maples: moosewood (= striped maple), *A. pensylvanicum*; and mountain maple (*A. spicatum*).

Range: Quebec and Ontario.

Erythroneura sancta **Beamer** (Pl. I, Fig. 32)

Adults: similar to *Erythroneura trautmanae* but with different hosts. August; feeding on sugar maple (*A. saccharum*) and probably other five-lobed maples.

Range: Ontario.

Ossiannilssonola serrula (**Ross & DeLong**) (Pl. II, Fig. 62)

Adults: 4 mm; unmarked bright yellow; resembling *Alebra aurea* (Pl. II, Fig. 66), but with head rounded, not flattened between eyes. Late June to late July; feeding on sugar maple (*A. saccharum*) and probably on related maples.

Range: Ontario.

Japananus hyalinus (**Osborn**) (Pl. X, Fig. 169)

Adults: 4–5 mm; yellow, wings gray flecked with brown; head strongly pointed. Early to late August; feeding on various maples.

Range: southern Ontario; coastal British Columbia; introduced from Asia.

MOUNTAIN-ASH, SERVICETREE, and ROWAN (*Sorbus* spp.)

Leaves divided into 11–17 narrow, toothed leaflets; showy white flowers and red berries in dense clump at ends of twigs. American mountain-ash (*S. americana*), showy mountain-ash (*S. decora*), and rowan (*S. aucuparia*) probably all have similar leafhopper faunas.

Typhlocyba rosae (**Linnaeus**) (Pl. III, Fig. 68) ROSE LEAFHOPPER

Adults: 3–4 mm; unmarked ivory white. Mid-July to late September; feeding on apple, cherry, mountain-ash, and pear; also on rose (*Rosa* spp.) and bramble (*Rubus* spp.).

Range: transcontinental; introduced from Europe.

MULBERRY (*Morus* spp.): no leafhopper fauna

NETTLETREE: see hackberry

OAK (*Quercus* spp.)

Leaves strongly lobed, usually irregular in outline; fruit an acorn. Oaks growing in coastal British Columbia support only general-feeding leafhoppers; those from other parts of Canada have a leafhopper fauna for each species-group of oak.

1. General on oaks

Erythroneura spp. (10 native species) (Pl. I, Fig. 32)

Adults: 3 mm; white with a black dot on each wing tip, wings often with orange dots as well. Late June to late September, and late March to mid-May (overwintering); feeding on native oak.

Range: New Brunswick to Manitoba.

Typhlocyba casta McAtee (Pl. III, Fig. 75)

Adults: 4 mm; white with a curved brown band across middle of wings and a row of dots across each wing tip. Late June to mid-September; feeding on native oak.

Range: New Brunswick; Ontario and Manitoba.

Ossiannilssonola clymene (McAtee) (Pl. II, Fig. 59)

Adults: 4 mm; white with brown spot or band of spots across each wing tip. Late June to late September; feeding on oak.

Range: New Brunswick; Ontario.

Ossiannilssonola bernice (McAtee) (Pl. II, Fig. 60)

Adults: 4 mm; yellow with a row of dots across each wing tip; pale, freshly emerged adults resemble other species of *Ossiannilssonola*. Late June to late September; feeding on oak.

Range: New Brunswick, Ontario, and possibly Quebec.

Eutettix luridus (Van Duzee) (Pl. X, Fig. 172)

Adults: 6 mm; brown with yellow back. May, July, and August; feeding on native oak.

Range: not yet recorded from Canada but collected in New Hampshire, Ohio, Michigan, and Wisconsin and thus to be expected in southern Ontario.

2. Red oaks: black oak (= yellow-barked oak), *Q. velutina*; pin oak (= water oak), *Q. palustris*; red oak, *Q. rubra*: leaves with pointed, bristle-tipped lobes

Arboridia cornipes (Beamer) (Pl. I, Fig. 39)

Adults: 3 mm; white with four orange stripes. Early August to late September; feeding on black oak, pin oak, red oak.

Range: southern Ontario.

3. White oaks: bur oak (= scrub oak, mossy-cup oak, overcup oak), *Q. macrocarpa*; chestnut oak, *Q. prinus*; yellow oak (= chinquapin oak), *Q. muehlenbergii*; swamp white oak (= blue oak), *Q. bicolor*; and white

oak (= stave oak), *Q. alba*: leaves with rounded lobes or short marginal teeth. Garry oak (= Pacific post oak, Oregon white oak), *Q. garryana*; durmast oak, *Q. petraea*; and English oak, *Q. robur*, belong to this species-group, but they have no special leafhopper fauna.

Erythroneura ligata McAtee (Pl. I, Fig. 36)

Adults: 3 mm; white streaked with red and with brown zigzag mark on each wing. August; feeding on bur oak.

Range: Quebec and probably Ontario.

Ossiannilssonola appendiculata (Malloch) (Pl. II, Fig. 58)

Adults: 4 mm; pale yellow with brown cloud (palest at middle) across wings. Mid-June to mid-September; feeding on bur oak, swamp white oak, and white oak.

Range: Ontario.

Ossiannilssonola tunicarubra (Gillette) (Pl. II, Fig. 63)

Adults: 4 mm; yellow with most of each wing orange or red. Early June to late August; feeding on white oak.

Range: Ontario.

Ossiannilssonola phryne (McAtee) (Pl. II, Fig. 61)

Adults: 4 mm; ivory white with black stripe down middle. Late June to mid-October; feeding on bur oak.

Range: Ontario.

Ossiannilssonola spp. (four native species) (Pl. II, Fig. 60)

Adults: 4 mm; ivory white to pale yellow with a row of dots across each wing tip. Mid-July to early September; feeding on white oak.

Range: Ontario.

Gyponana querci (DeLong) (Pl. XI, Fig. 190)

Adults: 8-9 mm; oval; pale mottled green. Mid-August to early September; feeding on swamp white oak and white oak.

Range: southern Ontario.

Eutettix variabilis Hepner (Pl. X, Fig. 173)

Adults: 6 mm; yellow with smoky wing tips. Late June to early September; feeding on swamp white oak and white oak.

Range: southern Ontario.

Microcentrus perditus (Amyot & Serville) (Pl. XI, Fig. 193)

Adults: 8-10 mm; back with earlike processes; dark brown. Late June to mid-October; feeding on bur oak.

Range: not yet recorded from Canada but collected in New York and Ohio and thus to be expected in southern Ontario.

OLEASTER: see Russian olive

OSAGE-ORANGE (*Maclura pomifera*): no leafhopper fauna

OSIER: see willow

PEACH: see plum

PEAR (*Pyrus communis*)

Leaves oval, pointed, dark, shiny; fruit bulbous.

Typhlocyba rosae (Linnaeus) (Pl. III, Fig. 68) ROSE LEAFHOPPER

Adults: 3–4 mm; unmarked ivory white. Mid-July to late September; feeding on apple, cherry, mountain-ash, and pear; also on bramble (*Rubus* spp.) and rose (*Rosa* spp.).

Range: transcontinental; introduced from Europe.

Balcanocerus fitchi (Van Duzee) (Pl. VI, Fig. 128)

Adults: 5–6 mm; brown, patterned with white. Early July to late September; feeding on hawthorn and occasionally on apple and pear.

Range: Ontario; Saskatchewan.

PEPPERIDGE: see tupelo

PINE (*Pinus* spp.)

Needles long, in bundles of two, three, or five; cones large. The leafhopper faunas of eastern white pine, jack pine, lodgepole pine, and ponderosa pine are distinctive. No leafhoppers are known on other pines in Canada.

1. Eastern white pine (= Weymouth pine, Quebec pine, cork pine, pattern pine, pumpkin pine, sapling pine), *P. strobus*: needles in bundles of five

Pendarus franconianus (Ball) (Pl. X, Fig. 174)

Adults: 5–6 mm; gray mottled with brown, head and back orange. Early July to late August; feeding exclusive on eastern white pine.

Range: New Brunswick and Quebec.

Empoasca coccinea (Fitch) (Pl. IV, Fig. 86)

Adults: 3 mm; orange or bright red with greenish, smoky wings and green legs. Late June to mid-August; feeding exclusively on eastern white pine.

Range: Newfoundland; Ontario.

Scaphoideus curvatus DeLong & Mohr (Pl. X, Fig. 165)

Adults: 5 mm; brown mottled with black and yellow. Early July to mid-August; feeding exclusively on eastern white pine.

Range: southern Ontario.

2. Jack pine (= banksian pine, gray pine, princess pine, scrub pine), *P. banksiana*; and **lodgepole pine** (= black pine, shore pine, screw pine), *P. contorta*: needles in bundles of two, 8 cm, or shorter (scotch, or scots, pine, *P. sylvestris*, has longer needles; it has no leafhopper fauna)

Gyponana geminata (Osborn) (Pl. XI, Fig. 186)

Adults: 7-8 mm; oval; pale green. Mid-August to mid-September; feeding exclusively on jack pine.

Range: Nova Scotia to Saskatchewan.

Empoasca banksianae Hamilton (Pl. IV, Fig. 84)

Adults: 3 mm; olive green. Late June to mid-August; feeding on jack pine and lodgepole pine.

Range: Ontario; Alberta to inland British Columbia.

Pendarus punctiscriptus (Van Duzee) (Pl. X, Fig. 175)

Adults: 5-7 mm; gray mottled with brown and yellow. June, and mid-August to early September; feeding on jack pine and its relatives in the USA.

Range: southern Ontario; southern Manitoba.

Empoasca perlonga Davidson & DeLong (Pl. IV, Fig. 83)

Adults: 3 mm; bright green. September; feeding on jack pine and its relatives in the USA.

Range: southern Ontario.

Koebelia californica Baker (Pl. XI, Fig. 185)

Adults: 6-7 mm; mottled in various shades of brown. Early July to mid-August; feeding on lodgepole pine and its relatives in the USA.

Range: British Columbia.

3. Ponderosa pine (= British Columbia pine, bull pine, yellow pine), *P. ponderosa*: needles in bundles of three

Empoasca pinella Davidson & DeLong (Pl. IV, Fig. 86)

Adults: 3–4 mm; orange tinged with green; similar to *Empoasca coccinea* but paler; legs green. Late July to mid-August; feeding on ponderosa pine.

Range: inland British Columbia.

PLANETREE: see sycamore

PLUM and PEACH (*Prunus* subgenus *Prunophora*)

Leaves with minute teeth and two prominent glands at base (as in cherry); fruits large, grooved on one side, borne singly on short stem, with large, flattened “pit.” The leafhopper fauna of peach differs from that of plum.

1. Peach (*Prunus persica*): leaves folded along midrib; fruits fuzzy, with deeply wrinkled “pit”

Colladonus belli (Uhler) (Pl. X, Fig. 180)

Adults: 4 mm; gray, head yellow with a black bar between eyes, and a pair of black apical spots. Late July to mid-September, and early May to late June (probably overwintering); feeding on various herbaceous plants, straying to peach.

Range: Alberta to inland British Columbia.

Colladonus geminatus (Van Duzee) (Pl. X, Fig. 181)

Adults: 4–5 mm; gray, head yellow with four black spots. Late August to early October, and early May to mid-June (probably overwintering); feeding on various herbaceous plants, straying to cherry and peach.

Range: British Columbia.

Zygina flammigera (Fourcroy) (Pl. II, Fig. 50)

Adults: 3 mm; white with a red zigzag line down each wing. Early August to late October, and April (probably overwintering); feeding on cherry, and reported on peach in Europe.

Range: coastal British Columbia; introduced from Europe.

2. Plum (*Prunus americana*, *P. domestica*, and *P. nigra*): leaves flat; fruits smooth, with a nearly smooth “pit”

Macropsis trimaculata (Fitch) (Pl. VIII, Fig. 148) PLUM LEAFHOPPER

Adults: 4 mm; brown with pale patches on each wing; head pointed between eyes. Mid-June to late August; feeding on various species of plum.

Range: Nova Scotia; Ontario.

Macropsis insignis (Van Duzee) (Pl. VIII, Fig. 147)

Adults: 4 mm; greenish brown with dark brown wings; head pointed between eyes. Early July to late August; feeding on various species of plum.

Range: southern Ontario.

***Macropsis tristis* (Van Duzee)** (Pl. VIII, Fig. 141)

Adults: 5 mm; brown with darker wing veins; head pointed between eyes; face yellow with black spot. Early to late July; feeding on various species of plum.

Range: southern Manitoba.

***Typhlocyba prunicola* Edwards** (Pl. III, Fig. 68) PRUNE LEAFHOPPER

Adults: 4 mm; unmarked ivory white. Late June to late August; feeding on plum, also on bramble (*Rubus* spp.).

Range: inland British Columbia; introduced from Europe.

POPLAR, or POPPLE: see aspen, black poplar, or silver poplar

ROWAN: see mountain-ash

RUSSIAN OLIVE, or OLEASTER (*Elaeagnus angustifolia*): no leafhopper fauna

SASSAFRAS (*Sassafras albidum*)

Leaves leathery, unlobed, mitten-shaped or three-lobed, with three main veins; fruits, small blue berries on cuplike bases.

***Erythroneura certa* Beamer** (Pl. I, Fig. 32)

Adults: 3 mm; ivory white with a black dot on each wing tip. August; feeding exclusively on sassafras.

Range: southern Ontario.

SERVICETREE: see mountain-ash

SILVER, or WHITE, POPLAR (*Populus alba*)

Leaves three-lobed, resembling those of maples, but strikingly silvery beneath; fruit cottony.

***Empoasca* spp. (two native species)** (Pl. IV, Fig. 83)

Adults: 4 mm; green. Mid-June to late September; feeding on poplar and willow.

Range: transcontinental: *Empoasca incida* DeLong occurs throughout British Columbia, and *E. gelbata* DeLong & Davidson ranges from Nova Scotia to inland British Columbia. The distribution will distinguish between these species throughout most of Canada.

Empoasca populi Edwards (Pl. IV, Fig. 89)

Adults: 4 mm; dark green. Early July to early August; feeding on silver poplar and, in Europe, on other poplars.

Range: Newfoundland and Nova Scotia; introduced from Europe.

Macropsis vicina (Horváth) (Pl. VIII, Fig. 145)

Adults: 4–5 mm; gray, head pointed between eyes; face spotted with black. August; feeding exclusively on silver poplar.

Range: Prince Edward Island; southern Ontario; introduced from Europe.

Idiocerus cognatus Fieber (Pl. V, Fig. 107)

Adults: 4–5 mm; gray with a pale brown saddle-shaped mark across wings. Mid-July to early November; feeding exclusively on silver poplar.

Range: Nova Scotia; Ontario; coastal British Columbia; introduced from Europe.

Typhlocyba candidula Kirschbaum (Pl. III, Fig. 68)

Adults: 4 mm; unmarked ivory white. Early July to early August; feeding exclusively on silver poplar.

Range: Ontario; coastal British Columbia; introduced from Europe.

SLOE (*Prunus spinosa*): no leafhopper fauna

SPRUCE (*Picea* spp.): no leafhopper fauna

SUGARBERRY: see hackberry

SUMAC (*Rhus* spp.): no leafhopper fauna

SYCAMORE, BUTTONBALL, or PLANETREE (*Platanus* spp.)

Leaves very broad, three-lobed, deeply scalloped like those of grape; fruits, pairs of nobby balls suspended on long stems. Native sycamore (*P. occidentalis*) and London plane (*P. acerifolia*) probably have similar faunas.

Erythroneura lawsoni Robinson (Pl. I, Fig. 32)

Adults: 3 mm; ivory white with a black dot on each wing tip, wing often with orange dots as well. Late July to late August; feeding on sycamore.

Range: not yet recorded from Canada but collected in New York and Illinois and thus to be expected in southern Ontario.

TACAMAHAC: see black poplar

TAMARACK: see larch

THORN: see hawthorn

TREE-OF-HEAVEN, or CHINESE-SUMAC (*Ailanthus altissima*): no leafhopper fauna

TULIPTREE, or YELLOW-POPLAR (*Liriodendron tulipifera*): no leafhopper fauna

TUPELO, PEPPERIDGE, or BLACK GUM (*Nyssa sylvatica*): no leafhopper fauna

WAFER-ASH: see hoptree

WALNUT (*Juglans* spp.)

Leaves long, divided into 11-23 smooth-edged, narrow leaflets; fruit a nut enclosed in a large, spherical, leathery capsule (Fig. 16). Most leafhoppers prefer black, or American, walnut (*J. nigra*), but some may be found on butternut, or white walnut (*J. cinerea*) and English, or Persian, walnut (*J. regia*).

Typhlocyba spp. (two native and one European species) (Pl. III, Fig. 68)

Adults: 3-4 mm; unmarked ivory white. Mid-June to late October; feeding on apple, birch, cherry, cottonwood, elm, hawthorn, hickory, maple, mountain-ash, pear, poplar, and walnut; also on alder shrub and bramble (*Rubus* spp.).

Range: transcontinental.

Pediopsoides distinctus (Van Duzee) (Pl. VIII, Fig. 150)

Adults: 4 mm; back and wings brown with white spots; venter yellow. Mid-June to early September, and May (probably overwintering); feeding mainly on black walnut, but also on butternut.

Range: southern Ontario.

Arboridia noeva (Gillette) (Pl. I, Fig. 40)

Adults: 3 mm; white with a brown spot on back, and usually also four orange or red stripes. Mid-August to mid-September, feeding on black walnut.

Range: southern Ontario.

WHITEWOOD: see basswood

WILLOW, or OSIER (*Salix* spp.)

Leaves narrow to oval, vein tips following margins; fruits cottony, in catkins. Most willows are shrubs and not used as ornamentals; those species that are used as ornamentals usually have unique leafhopper faunas. Common osier (*Salix viminalis* has no leafhopper fauna.

1. Bayleaf willow (*S. pentandra*): leaves broadly oval, pointed at tip, dark shiny green.

Idiocerus stigmatalis Lewis (Pl. V, Fig. 100)

Adults: 6–7 mm; brown mottled with black and yellow; wing veins forming a crossband at each wing tip; male often with orange stripe on wing edge; venter paler. Early July to late September; feeding on bayleaf willow, crack willow, white willow, and varieties of white willow.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Ontario; introduced from Europe.

Idiocerus obsoletus (Walker) (Pl. VI, Fig. 119)

Adults: 5–6 mm; pale green, or pink, or half pink and half green, usually with two black spots on back and often with brown wing pattern. Mid-June to mid-September; feeding on many broad-leaved willows, including bayleaf willow.

Range: transcontinental.

Empoasca fontana Ross (Pl. IV, Fig. 83)

Adults: 4 mm; bright green. Early July to late September; feeding on many willows, including bayleaf willow.

Range: British Columbia.

2. Black willow (*S. nigra*): leaves very narrow, pointed at both ends, dark with contrastingly paler midrib

Empoasca patula DeLong (Pl. IV, Fig. 83)

Adults: 4 mm; bright green. Late June to early September; feeding on many willows, including black willow.

Range: Newfoundland and New Brunswick to Manitoba; British Columbia.

Idiocerus pallidus Fitch (Pl. VI, Fig. 118)

Adults: 5–6 mm; unmarked pale green; male with dark abdomen showing through wings. Mid-June to September; feeding on many broad-leaved willows, and also on black willow.

Range: Newfoundland and Nova Scotia to Alberta.

Macropsis tunicata **Hamilton** (Pl. VII, Fig. 135)

Adults: 4–5 mm; green; male with brown wings; head pointed between eyes. Mid-June to mid-August; feeding on black willow and on *Salix eriocephala*, a common shrub willow.

Range: Ontario; Saskatchewan.

Idiocerus unicolor **Hamilton** (Pl. VI, Fig. 116)

Adults: 6 mm; pale green. Early July to mid-August; feeding on black willow, peachleaf willow (*Salix amygdaloides*), and *S. eriocephala*, a common shrub willow.

Range: New Brunswick; Ontario.

Macropsis decisa **Hamilton** (Pl. VII, Fig. 133)

Adults: 5 mm; green; head pointed between eyes; male with black feet and a dot behind each eye on side of body. Late June to early July; feeding exclusively on black willow.

Range: New Brunswick.

Macropsis notata (**Prohaska**) (Pl. VII, Fig. 134)

Adults: 4–5 mm; green; face and sometimes back dotted with black; head pointed between eyes. July; feeding on black willow.

Range: New Brunswick; introduced from Europe.

3. Crack willow (*Salix fragilis*), **white willow** (*S. alba*), **golden willow** (*S. alba* var. *vitellina*), and **weeping willow** (*S. babylonica*): leaves narrow, pointed at tip, clothed in pale hairs and thus appearing whitish at a distance; weeping willow with distinctive drooping branches

Empoasca spp. (three native species) (Pl. IV, Fig. 83)

Adults: 4 mm; bright green. Late June to late September; feeding on many willows, including crack willow, white willow, and varieties of white willow.

Range: New Brunswick to Manitoba; British Columbia.

Macropsis ocellata **Provancher** (Pl. VII, Fig. 136)

Adults: 4–5 mm; pale green with a small black dot at tip of head, and (rarely) two black stripes on back; head pointed between eyes. Mid-June to early September; feeding on white willow and its varieties.

Range: Nova Scotia to Ontario; introduced from Europe.

Idiocerus stigmatalis **Lewis** (Pl. V, Fig. 100)

Adults: 6–7 mm; brown mottled with black and yellow; wing veins forming a crossband at each wing tip; male often with orange stripe on wing

edge; venter paler. Early July to late September; feeding on bayleaf willow, crack willow, white willow, and varieties of white willow.

Range: Newfoundland, Prince Edward Island, and Nova Scotia to Ontario; introduced from Europe.

Typhlocyba barbata Ribaut (Pl. III, Fig. 68)

Adults: 4 mm; unmarked ivory white. Late June to mid-July; feeding on white willow and its varieties.

Range: inland British Columbia; introduced from Europe.

4. Pacific willow (*Salix lasiandra*) and shining willow (*S. lucida*): leaves with very long, thin, drawn-out tips

Empoasca spp. (three native species) (Pl. IV, Fig. 83)

Adults: 4 mm; bright green. Late June to late September; feeding on many willows, including Pacific and shining willows.

Range: Newfoundland and New Brunswick to Manitoba; British Columbia.

Idiocerus amabilis Ball (Pl. V, Fig. 108)

Adults: 5–6 mm; pale green, with back brown and wings sometimes mottled brown. Late June to late September, feeding on Pacific and shining willows.

Range: Newfoundland and New Brunswick to Manitoba; British Columbia.

Macropsis vinea Hamilton (Pl. VIII, Fig. 146)

Adults: 4–5 mm; brown to orange; head pointed between eyes. Late June to early August; feeding on Pacific and shining willows.

Range: Quebec to British Columbia.

Idiocerus nervatus Van Duzee (Pl. VI, Fig. 126)

Adults: 4–5 mm; pale green with dark wing veins. Early August to late September, and early April to late June (overwintering); feeding on Pacific and shining willows, overwintering on cedar (native *Juniperus* spp.).

Range: southern Ontario; British Columbia.

Empoasca lucidae Ross (Pl. IV, Fig. 93)

Adults: 4–5 mm; green or pale orange striped with brown. Early June to mid-September; feeding exclusively on Pacific willow.

Range: Alberta and British Columbia.

Idiocerus spp. (two native species) (Pl. VI, Fig. 124)

Adults: 5 mm; orange; head flat between eyes. Mid-August to early September; feeding exclusively on Pacific willow.

Range: British Columbia; *Idiocerus amoenus* Van Duzee occurs in inland British Columbia, whereas *I. concinnus* Ball occurs on the Pacific coast.

5. Peachleaf willow (*S. amygdaloides*): leaves narrow, pointed at tips, resembling those of white willow (*S. alba*) but without hairs, and standing out from twigs rather than lying along branches.

Macropsis trivialis (Ball) (Pl. VII, Fig. 133)

Adults: 5–7 mm; green; head pointed between eyes; male with black feet and a spot behind eye on side of body. Mid-June through August; feeding exclusively on peachleaf willow.

Range: Quebec to Alberta.

Idiocerus unicolor Hamilton (Pl. VI, Fig. 116)

Adults: 6 mm; pale green; head flat between eyes. Early July to mid-August; feeding on black willow, peachleaf willow, and *Salix eriocephala*, a common shrub willow.

Range: New Brunswick; Ontario and Manitoba.

6. Pussy willow (*Salix discolor*): leaves moderately broad, bluntly pointed at tips, margins wavy wrinkled; immature female catkins in early spring forming fuzzy balls, or pussies; with a similar leafhopper fauna to that of scouler willow (*S. scouleriana*)

7. Scouler willow (*Salix scouleriana*): leaves broadest beyond middle, tips rounded

Macropsis canadensis (Van Duzee) (Pl. VII, Fig. 130)

Adults: 4–5 mm; male brown; female green, often with two brown bands across wings; head pointed between eyes. Early June to late August; feeding on many broad-leaved willows, including pussy and scouler willows.

Range: transcontinental.

Empoasca andresia Ross (Pl. IV, Fig. 83)

Adults: 4 mm; bright green. Early June to early September; feeding on many different willows, including pussy and scouler willows.

Range: transcontinental.

Idiocerus obsoletus (Walker) (Pl. VI, Fig. 119)

Adults: 5–6 mm; pale green, or pink, or half pink and half green, usually with two black spots on back and often with brown wing pattern.

Mid-June to mid-September; feeding on many broad-leaved willows, including pussy and scouler willows.

Range: transcontinental.

Idiocerus musteus Ball (Pl. V, Figs. 102, 103)

Adults: 4–5 mm; gray or brown mottled with black; resembling females of *Idiocerus striolus* but differing in the flatter head. Late June to late August; feeding on various willows, including pussy and scouler willows.

Range: transcontinental.

Idiocerus pallidus Fitch (Pl. VI, Fig. 118)

Adults: 5–6 mm; unmarked pale green; male with dark abdomen showing through wings. Mid-June to early September; feeding on most broad-leaved willows, including pussy willow and probably also scouler willow.

Range: Newfoundland and Nova Scotia to Alberta.

Idiocerus striolus Fieber (Pl. V, Fig. 104)

Adults: 4–5 mm; brown or gray mottled with black; male face striped with four black lines; female face pale. Late June to early October, and early April to mid-May (probably overwintering); feeding on various willows, including pussy and scouler willows.

Range: Ontario to inland British Columbia.

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