



G R E A T L A K E S E N V I R O N M E N T

Matthew M. Douglas, Series Editor

A Focus on Peatlands and Peat Mosses

Howard Crum (Warren H. Wagner, Jr., Series Editor)

Mammals of the Great Lakes Region: Revised Edition

Allen Kurta

Ancient Life of the Great Lakes Basin: Precambrian to Pleistocene

J. Alan Holman

Insects of the Great Lakes Region

Gary A. Dunn

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Series Editor

Ann Arbor

THE UNIVERSITY OF MICHIGAN PRESS

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of their habitat). The legs are usually ringed with alternating darker and lighter bands.

Identification Resources. For further information on the identification of true bugs (Hemiptera) of North America, see Slater and Baranowski 1978; for bugs of the eastern United States, see Blatchley 1926; for Heteroptera of Illinois, see McPherson 1989; for families of aquatic bugs in North America, see Lehmkuhl 1979. For species of aquatic bugs of northern Michigan, see Hussey 1919; for Wisconsin, see Hilsenhoff 1984; for Minnesota see Bennett and Cook 1981. For species of semiaquatic bugs of Wisconsin, see Hilsenhoff 1986. Sources for identification keys and information on other families, when available, are mentioned under each respective family.

For identification keys to families and subfamilies of immature bugs (nymphs), see DeCoursey 1971. Keys to families of immature bugs can also be found in Herring and Ashcock 1971 and Lawton 1959.

Cicadas, Hoppers, Aphids, Scales, and Whiteflies (Order Homoptera)

Introduction. At first glance cicadas, hoppers, aphids, scale insects, and whiteflies would not appear to have much in common. However, despite tremendous diversity in size and appearance, they all share several important characteristics and indeed are closely related.

Description. The homopterans are minute to very large insects (1–50 mm, but most are small) with piercing/sucking mouthparts and uniformly textured wings. The wings may be thin and membranous, thickened and parchmentlike, or even absent in some cases. The forewings usually lay tentlike over the back of the abdomen. The head is equipped with compound eyes, ocelli (which may be lacking in some families), and a beaklike mouthpart that arises from the rear of the face and is directed rearward between the legs (in resting position). The antennae are generally short and often more or less inconspicuous. Homopterans may be soft bodied or hard bodied, and they may be naked, pubescent, or covered with waxy secretions. Other characteristics of shape and color are highly variable and are discussed under each respective family.

Life Cycle. Most homopterans develop through gradual metamorphosis. After hatching from the eggs, the nymphs join their adult counterparts in the appropriate habitat. Usually the nymphal homopterans resemble the adults, though the nymphs are smaller and lack wings. However in some cases the nymphs

Quick Guide to Identification

Cicadas, Hoppers, Aphids, Scales, and Whiteflies (Order Homoptera)

Winged		
Diagnostic Characteristics	Common Name(s)	Scientific Family/ Superfamily Name
Large, heavy-bodied; membranous wings	cicadas	Cicadidae
Pronotum enlarged, covering abdomen	treehoppers	Membracidae
Froglike; circle of spines on tibia	frohoppers	Cercopidae
Elongate; antennae in front of eyes	leafhoppers	Cicadellidae
Body more or less elongate; antennae below eyes	planthoppers	Fulgoroidea*
Small; powdery white wings/body	whiteflies	Aleyrodidae
Small; cornicles on abdomen	aphids	Aphididae
Small; wings rooflike over body	psyllids	Psyllidae
Small; single pair of wings	scales (male)	Coccoidea
Wingless		
Diagnostic Characteristics	Common Name(s)	Scientific Family Name
Small; cornicles on abdomen	aphids	Aphididae
Flattened; disklike or domelike	scale insects	Coccoidea
Flattened; with waxy threads	mealybugs	Pseudococcidae

*Includes the following difficult to separate families: Cixiidae, Delphacidae, Acanaloniidae, Flatidae, and Dictyopharidae.

are distinctly different, such as in the scale insects. Some homopterans have special life stages—for example, some active, first-stage nymphs are known as crawlers—and some even have pupalike stages. The life cycles of some homopterans are incredibly complex, involving parthenogenesis and alternate hosts. Some homopterans (such as aphids and leafhoppers) are capable of completing many generations each season, while others (such as cicadas) may require many years to complete a single generation.

Habits. Homopterans use their beak to extract fluids from plants. All are phytophagous, feeding on plant sap, nectar, or

fruit juices. One group of homopterans, the cicadas, are noted for their ability to sing.

Habitats. Homopterans can be found in a wide variety of subterranean, terrestrial, and arboreal habitats.

Ecological and Economic Status. Many homopterans are plant pests, sucking the sap from leaves, stems, and fruit. This action may seriously weaken plants, making them more susceptible to some of the plant diseases spread by homopterans and other insects.

Distribution and Faunistics. Many species of homopterans are widely distributed throughout the Great Lakes region. Since most families and species of homopterans are significant plant pests, many groups have received attention over the years. Some of the homopteran groups that have been studied in the Great Lakes region are the fulgorid planthoppers, the jumping plant lice, and the armored scale insects of Ohio; the spittlebugs of Canada and the adjacent United States; the leafhoppers of Illinois, Minnesota, Ohio, Wisconsin, and Michigan; the plant lice (aphids) of Illinois, Indiana, and Minnesota; and the lecanium scales of Michigan.

Cixiid Planthoppers (Family Cixiidae)

This relatively large group of planthoppers is best recognized by the broad body and long legs with only a few spines at the base of the tibia. The head is more or less normal and is not swollen or extended forward (although there may be two or three keel-like ridges). There are usually three ocelli present on the head. The forewings are membranous and often have dark spots along the veins.

The huckleberry planthopper, *Oliarus cinnamomensis* Provancher, is small (6–7 mm) and blackish with a narrow, pale front margin of the forewings. They are bog inhabitants said to feed on blueberries (huckleberries). The humble planthopper, *O. humilis* (Say), is smaller (5 mm) with a dark brown body. The wings are smoky brown or blackish on the outer one-third. The middle of the thorax has five or six longitudinal ridges.

More information on planthoppers of the Great Lakes region is available in Osborn 1938.

Delphacid Planthoppers (Family Delphacidae)

This group comprises the largest planthopper family, containing small (2–9 mm), more or less elongate planthoppers that are usually found on grasses in moist habitats (wet meadows, stream-

sides, etc.). They are recognized by the large spur at the tip of the tibia. More information on planthoppers of the Great Lakes region is available in Osborn 1938.

The three-ridged planthopper, *Stobaera tricarinata* (Say), is small (4 mm) and brown or brownish yellow. The face, legs, and forewings are banded with white and dark markings. The corn planthopper, *Peregrinus maidus* Ashmead, occurs on corn worldwide. It is small (4–5 mm) and light colored with fuscous markings.

Fulgorid Planthoppers (Family Fulgoridae)

Members of this family are among some of the largest of the planthoppers (1–8 mm and larger). Most are brownish or reddish and the front of the head may be prolonged forward. The forewings have many reticulate veins at the base of the wing near the tip of the scutellum. Two rare species, *Cyrtoptus belfragei* Stal and *Poblicia fuliginosa* (Olivier), are recorded from Ohio (Osborn 1938).

The planthoppers (superfamily Fulgoroidea) are well distributed in the region, with 107 species known from southern Illinois, for example (Wilson and McPherson 1980).

For identification keys and information on planthoppers of the Great Lakes region, especially Ohio, see Osborn 1938.

Acanaloniid Planthoppers (Family Acanaloniidae)

Acanaloniid planthoppers are medium sized (10–12 mm) and greenish or yellowish with greenish markings. The forewings are broad, rounded at the tip, and folded down beside the body. The front edge of the forewing has many netlike veins.

The two-striped planthopper, *Acanalonia bivittata* (Say), is greenish or greenish yellow with brown markings forming two parallel stripes on the face, pronotum, and leading edge of the wings. The legs are also brown. This species can be found on cranberry, goldenrod, and a variety of other herbaceous and weedy plants.

More information on planthoppers of the Great Lakes region, especially in Ohio, is available in Osborn 1938.

Flatid Planthoppers (Family Flatidae)

Flatid planthoppers are mothlike and wedge shaped (more elongate than the previous family). They are generally pale green or



Fig. 83. The three-ridged planthopper, *Stobaera tricarinata* (Say). (From Osborn 1938.)



Fig. 84. The fulgorid planthopper *Cyrtoptus belfragei* Stal. (From Osborn 1938.)

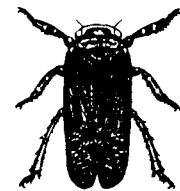


Fig. 85. The fulgorid planthopper *Poblicia fuliginosa* (Olivier). (From Kansas State University Extension 1962.)

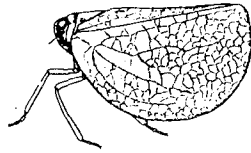


Fig. 86. The two-striped planthopper, *Acanalonia bivittata* (Say). (From Osborn 1938.)

brownish. The elongate, lower section (tibia) of the hind leg has many spines on it and there are generally only two ocelli on the head. The front edge of the wing has many regularly spaced short cross veins and the wing tips are squarely truncated. The nymphs produce white waxy threads.

Two common species are the New World planthopper, *Anormenis septentrionalis* Spinola, which is pale green to whitish with a length of 9–11 millimeters; and the citrus planthopper, *Metcalfa pruinosa* (Say), which is bluish gray above and pale gray below with dark spots on the forewings. The body is covered with a whitish powder. The New World planthopper is generally found on bittersweet, dogwood, plum, grape, prickly ash, red oak, and black ash. The citrus planthopper is found on many woody plants, including citrus.

More information on planthoppers of the Great Lakes region, especially Ohio, is available in Osborn 1938.



Fig. 87. The meadow planthopper, *Scolops sulcipes* Say. (From Osborn 1938.)

Dictyopharid Planthoppers (Family Dictyopharidae)

These planthoppers are generally small to medium sized (8–12 mm) and greenish or brownish. The forewings are long and narrow and many species have the head prolonged forward into a slender, beaklike structure.

The meadow planthopper, *Scolops sulcipes* Say, is very common. It is 6–10 millimeters in length and brownish. The forewings have many meshlike cross veins (reticulate) and there are both long-winged and short-winged forms. The head is prolonged forward as a slender conical spine. They are most commonly found in wet meadows (and sometimes lawns), where they feed on grasses.

More information on planthoppers of the Great Lakes region is available in Osborn 1938.

Spittlebugs and Froghoppers (Family Cercopidae)

The adults are small (less than 13 mm) and froglike. Their bodies are elliptical and greenish or brownish, and they actively hop about. The forewings are thickened and leathery, without conspicuous veins. The hind leg has one or two stout spines. The nymphs, referred to as spittlebugs, reside within frothy, bubble-like masses of "spittle." These spittle masses provide the young with protection against desiccation and predation. The bubbles are formed by forcing air from the abdomen into plant juices eliminated from the anal opening of the spittlebug. Cercopids feed on the sap of grasses, herbaceous plants, shrubs, or trees. Some species are involved in the transmission of plant diseases (viruses and fungi).

A little less than two dozen species are found in the Great Lakes region. For example, 21 species are known from Michigan (Hanna and Moore 1966) and 22 species are known from the Canadian part of the Great Lakes region (Hamilton 1982).

The Saratoga spittlebug, *Aphrophora saratogensis* (Fitch), is small (9–11 mm) and brownish with a pale scutellum and a light middorsal stripe on the head and pronotum. The forewing is mottled with tan and silver cross bands. Adults are most commonly found on red pine. The pine spittlebug, *Aphrophora parallelus* Say is a similar species but the wings flare broadly to the sides near the middle of the body and the front margin of the head is angular (differences apparent only when viewed from above). The diamond-backed spittlebug, *Lepyronia quadrangularis* (Say) is brownish above and blackish below and densely clothed with fine hairs. There are V-shaped dark brown markings on the wings that form a diamond shape when the wings are closed. The base of the wing, near the "shoulder," is also dark in color. This species is one of the most commonly collected spittlebugs in meadows, fields, pastures, and croplands of the Great Lakes region.

The meadow spittlebug, *Philaenius spumarius* (L.), is also a very common species that occurs in meadows and grasslands. It was an early introduction into the region from Europe and is now widespread. This species has a light-colored head (occasionally the pronotum is also light colored) and a dark oval spot on the underside of the thorax in the center. This species is highly variable in color, ranging from tan to brownish to grayish to blackish, either uniformly colored or patterned with darker and/or lighter colors. The dogwood spittlebug, *Clastoptera proteus* Fitch, is a short, stout spittlebug (4–5 mm) that is blackish and marked with yellow cross bands on the head, thorax, and forewings. The scutellum is also yellow.

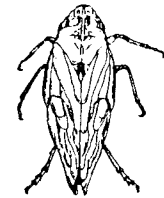


Fig. 88. The pine spittlebug, *Aphrophora parallelus* Say. (From State University of New York 1964.)