

# AMERICAN INSECTS

A handbook of the insects of  
America north of Mexico

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# Order 21

## HOMOPTERA

### (Cicadas, Leafhoppers, Aphids, Scale Insects, and Allies)

Some of the primitive Homoptera are of very much the same appearance as the Hemiptera, although some other species are hardly even recognizable as insects. Several distinctive features to be described subsequently are shared by many of the diverse forms assigned here. Individuals of many species are exceedingly abundant. As a group, the homopterans are perhaps the most detrimental order of insects, not only because of the economic loss they cause by damaging crops and ornamental plants but because they are vectors of plant pathogens.

One of their ordinal features is reflected in their Latin name, *homo*, meaning "same," and *pteron*, "wing." This refers to the more or less uniform structure of the front wings, which are generally membranous and thin or, at most, only slightly thickened throughout, as opposed to the basal thickening of the front wings of the Hemiptera. Although this wing type is found in many other insect groups, none of the other orders combine it with this wing shape and venation (Fig. 21.1) or with piercing-sucking mouthparts. Although the order is basically winged, many species are wingless throughout the adult stage, having secondarily lost their wings during their long evolution; it is therefore necessary to consider several other features in order to define the order. Fortunately, the several body types represented (and illustrated) in this section are very distinctive.

All Homoptera are plant-juice feeders, although a few tiny leaf-hoppers may sometimes mistake an arm for a plant and inadvertently, or so it would seem, inject some saliva as they bite; the bite can be momentarily painful. There is no evidence that they actually suck blood, however, and very likely they are unable to. It is certain that no Homopteran sucks blood of any animal as a food source.

*Diagnosis:* L. 1-55 mm (rarely, to 100 mm, or more, in some tropical species). Body of many species soft but others thickened and leathery, sometimes with spines, setae, or with a secreted waxy covering. (See Fig. 21.29). Most species are green

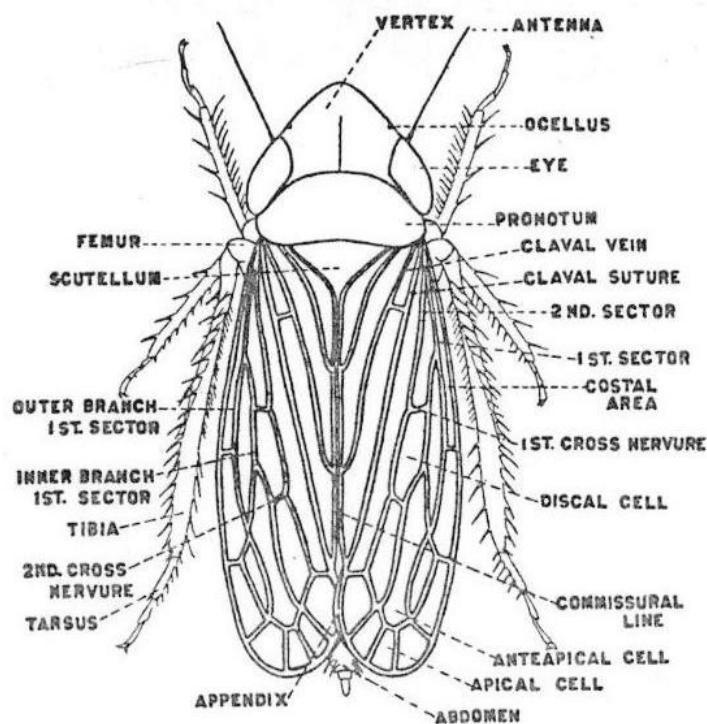


Fig. 21.1. (From Britton, 1923)

or brown, but some, particularly tropical species, are brightly colored, marked with red, yellow, black, white, blue, and so on. The head is bent down (except in scale insects) and does not move very much. The antennae—ordinarily 3- to 10-segmented, but some 11-, 12-, or 13-segmented—are bristlelike and short—commonly shorter than the head but in some, longer than the head; in some female scale insects, they are absent. The mouthparts, modified for piercing-sucking, arise from the hind portion of the head. The wings, if they are present, are more or less of a uniform texture, with reduced venation, and are held at rest tentlike over the abdomen. The males of all scale insects that have wings have two pairs, the hind pair greatly reduced. The legs, when present, are moderate in length and often exhibit heavy spines; the hind legs, although not greatly enlarged for jumping, are often used for this purpose (especially those of leafhoppers, and the like). Tarsi have one, two, or three tarsomeres only. The abdomen is not provided with cerci, although the basal segment of a few is modified for sound production (see cicadas). On their fifth or sixth abdominal segment, many aphids—for example, the rose aphid *Macrosiphum rosae* [Aphididae (19.122)] (Fig. 21.2)—have paired, short, tubelike structures, called *cornicles*, through which they secrete a defensive fluid. At first sight, leafhoppers and other Homoptera might be confused with Hemiptera, but the position of their beak readily distinguishes them. Aphids might be confused with barklice, but the latter have chewing mouthparts.

The nymphs of most families closely resemble the adults.

**Metamorphosis:** Paurometabolous, usually with eggs (some species are ovoviviparous) and nymphal (some with prepupal as well as pupal) and adult stages. The prepupal and pupal stages of male scale insects resemble those found in some thrips.

**Habits and habitats:** The long, coiled mouthparts of most species penetrate into the phloem and xylem—the food- and water-conducting tissues—of a plant; those of others act as cell bursters in leaf tissues. The proboscis of most scale insects affixes itself to a plant in a manner similar to that of an oil derrick and pump, allowing both the nymphs and adults to feed on the plant's liquid carbohydrates. Homopterans are never found far from their host plants, all parts of which they infest—

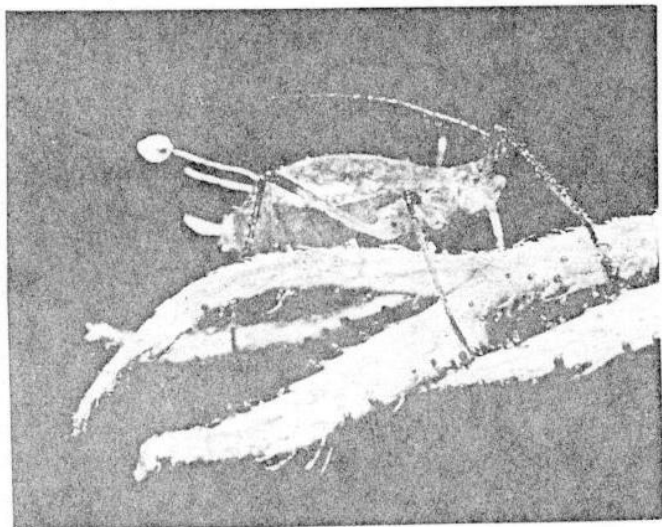


Fig. 21.2. (Courtesy of O. Wilford Olsen and Insect World Digest)

roots, stems, leaves, flowers, and fruits. Some species of aphids, as well as male scale insects, lack mouthparts and do not feed as adults. There are no predacious or true aquatic members of the order. Some species are attracted to lights at night.

**Reproductive behavior:** Species may be biparental or parthenogenetic. The males of some species—certain cicadas—attract females by sound production. Courtship patterns have been little studied.

**Economic importance:** All groups of Homoptera contain species that are economically significant, as will be discussed in detail later. The cicada, [Cicadidae (13)], or seventeen-year locust, loudly announce their presence shortly after emergence from the soil with a shrill, midsummer song; after copulation, the female inserts her eggs into twigs of young fruit trees, causing them serious damage, just one example of the type of injury that can occur to a plant in addition to that caused by juice sucking. To get an idea of the great abundance of certain species of this order—such as spittle bugs [Cercopidae (12)] or leafhoppers [Cicadellidae (14)]—one need only use a sweep net across any field in summer; thousands of individuals will be captured in a few sweeps. Although treehoppers [Membracidae (15)] come in bizarre shapes, especially tropical species, they are very rarely pests. Some species of the superfamily Fulgoroidea can be equally bizarre and pests as well. The heads of some of its members are grossly enlarged, a famous case being that of an insect from the South American tropics called the Peanut Bug (Fig. 21.3), or sometimes the Lanternfly because it was once thought to be luminescent. Jumping plantlice [Psyllidae (17)], the whiteflies [Aleyrodidae (18)], aphids [superfamily Aphidoidea], and the scale insects [superfamily Coccoidea] are almost all very damaging plant pests. In addition to sapping the strength of plants by sucking their juices, they also transmit viral plant diseases that thrive on the weakened plants.

**Collecting and preserving:** Some cicadas are attracted to lights at night, but those that rest high in trees will be difficult to collect. (The author has seen people in Japan capture unwary cicadas from top branches by touching them with a sticky substance at the tip of a long bamboo pole; other people have been known to shoot cicadas with very fine bird shot.) Sweeping fields, beating vegetation, and searching flowers and foliage will yield other representatives of the order. Scale insects and whiteflies must be collected with care. A frequent custom is to remove a sample of the infested plant and preserve it with the insects attached. Because many species are host specific, it is important to keep detailed records of the host plants for all aphids, whiteflies, and scale insects. Hard-bodied Homoptera may be pinned, if they are large enough, or glued to triangular points, if they are small. Soft-bodied aphids, scale insects, and whiteflies may be preserved in 80-percent alcohol; for purposes of identification, they may be, and often must be, mounted on

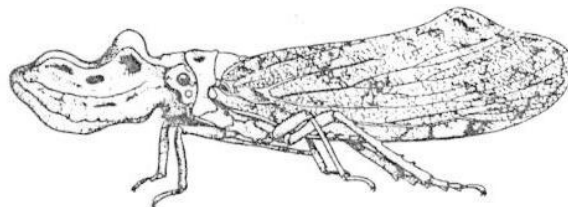


Fig. 21.3. (After Comstock)

microscope slides. Scale insects also require special techniques for detailed studies and identification. For many of these insects—with the exception of the Cicadidae, some Cicadellidae, the Membracidae, and the Fulgoroidea—a high-magnification microscope is necessary for accurate identification.

**Rearing:** Many species, especially aphids and scale insects, are easily reared on potted plants.

**Distribution:** Approximately 32,000 species of this order have been described throughout the world, with 6,359 of these in 894 genera recorded in the U.S. and Canada. Many new species are described each year, and much remains to be known about the vast number of tropical species, many of which are undescribed.

**Identification:** The identification of Homoptera does not come easily. Because of the great number of species, their relatively small size (for the most part), and the lack of readily available literature, this group is particularly difficult, even for specialists.

## CLASSIFICATION

The order Homoptera is divided into three suborders, as follows:

1. Suborder COLEORRHYNCHA (Primitive Homoptera)—These insects are very primitive, resembling some of the fossil Palaeozoic protohemipterans. There are about 20 species, found only in Australia, New Zealand, and South America.
2. Suborder AUCHENORRHYNCHA (Cicadas, Leafhoppers, and allies)—These insects have tarsi with three tarsomeres; their mouthparts arise from the back, lower surface of the head; their antennae are usually short and bristle-like. (See Fig. 21.4.)
3. Suborder STERNORRHYNCHA (Jumping Plantlice, Aphids, Whiteflies, and Scale Insects)—These insects have only one or two tarsomeres (some scales have no legs at all); their mouthparts, if visible, seem to arise between the front coxae; their antennae can be an unsegmented tubercle or filiform and moderately long. (See Fig. 21.5 for the general morphology of scale insects.)

The North American families of the last two suborders are listed in Table 21.1. These families are grouped in nine superfamilies, as defined by the accompanying Key to the Superfamilies.

### Key to the Superfamilies of Homoptera of the U.S. and Canada

1. Legs absent or reduced; when present, tarsi with one or two tarsomeres; reduced body regions and segments usually indistinct; body often covered with secretions in the form of scale (females and sedentary nymphs of the scale insects) ..... Superfamily **COCCOIDEA**
- Legs present and distinct; body region and segments usually distinct; body sometimes covered with secretions, but not in the form of a scale ..... 2
- 2(1). Labium arising distinctly from head; tarsi with three tarsomeres; antennae with bristlelike flagellum, usually short ..... 3
- Labium arising apparently between or behind the front coxae and not continuous with head; tarsi with two tarsomeres or none; antenna threadlike, often long, never bristlelike ..... 9
- 3(2). Tegula (a small scale between pronotum and base of front wing) present ..... Superfamily **FULGOROIDEA**
- Tegula absent ..... 4
- 4(3). Middle coxae elongate, similar to front coxae and inserted some distance from midline ..... Superfamily **FULGOROIDEA**
- Middle coxae shorter than front coxae and inserted near midline ..... 5
- 5(4). Three ocelli ..... Superfamily **CICADOIDEA**
- Two ocelli, or ocelli absent ..... 6
- 6(5). Pronotum extending over abdomen and hiding the scutellum ..... (Superfamily **MEMBRACOIDEA**) 15. **Membracidae**
- Pronotum not extending over abdomen and not hiding scutellum ..... 7
- 7(6). Posterior border of pronotum produced into a broadly rounded median lobe ..... (Superfamily **MEMBRACOIDEA**) 16. **Aetalionidae**
- Posterior border of pronotum straight or emargined; if produced into a median lobe, the latter emargined ..... 8
- 8(7). Hind tibiae with one or two toothlike projections on shaft and an apical crown of denticles, all immovable ..... Superfamily **CERCOPOIDEA**
- Hind tibiae with rows of articulated spines or bristles on shaft ..... Superfamily **CICADELLOIDEA**
- 9(2). Tarsi, when present, with one or two tarsomeres and with one claw on each; females and some males wingless, other males with one pair of wings ..... Superfamily **COCCOIDEA**
- Tarsi with two tarsomeres and with two claws each; two pairs of wings in winged individuals ..... 10
- 10(9). Hind legs with femora thickened, saltatorial; antennae five- to ten-segmented, the last segment with two fine apical bristles ..... Superfamily **PSYLLOIDEA**
- Hind legs with femora slender, not saltatorial; antennae three- to seven-segmented, the last segment without two fine apical bristles ..... 11



## Key to the Superfamilies of Homoptera of the U.S. and Canada (Contd.)

- 11(10). Wings opaque, subequal; tarsomeres subequal, usually a strong empodium present; body of adult usually covered with fine powdery white wax; anal apparatus, the opening of which is the vasiform orifice, with an operculum and a lingula ..... Superfamily **ALEYRODOIDEA**
- Wings transparent and hind wings considerably smaller; basal tarsomere usually reduced, empodium usually absent; body not covered with fine powdery wax but sometimes with woolly wax; cornicles often present on abdomen of aphids ..... Superfamily **APHIDOIDEA**

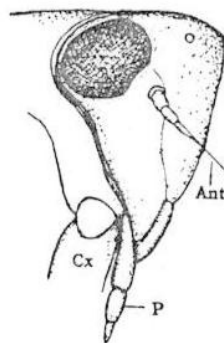


Fig. 21.4. (Courtesy of E. J. Gerberg)

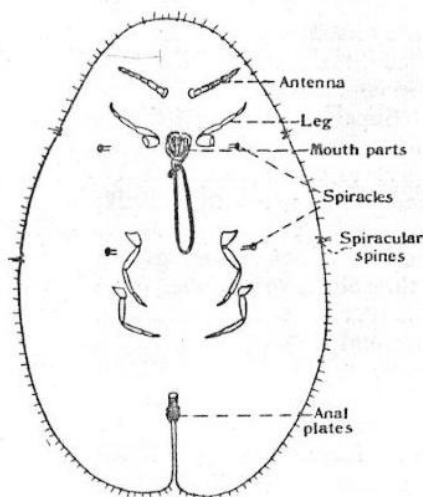


Fig. 21.5. (From Britton, 1923)

Table 21.1 Families of the Homoptera of the U.S. and Canada

## Suborder AUCHENORRHYNCHA

## Superfamily FULGOROIDEA

1. CIXIIDAE (Cixiid Planthopper Family)
2. DELPHACIDAE (Delphacid Planthopper Family)
3. FULGORIDAE (Fulgorid Planthopper Family)
4. ACHILIDAE (Archilid Planthopper Family)
5. TROPIDUCHIDAE (Tropiduchid Planthopper Family)
6. ISSIDAE (Issid Planthopper Family)
7. ACANALONIIDAE (Acanaloniid Planthopper Family)
8. FLATIDAE (Flatid Planthopper Family)
9. DERBIDAE (Derbid Planthopper Family)
10. KINNARIDAE (Kinnarid Planthopper Family)
11. DICTYOPHARIDAE (Dictyopharid Planthopper Family)

Table 21.1 Families of the Homoptera (Contd.)

## Superfamily CERCOPOIDEA

12. CERCOPIDAE (Spittle Bug Family)

## Superfamily CICADOIDEA

13. CICADIDAE (Cicada Family)

## Superfamily CICADELLOIDEA

14. CICADELLIDAE (Leafhopper Family)

## Superfamily MEMBRACOIDEA

15. MEMBRACIDAE (Treehopper Family)
16. AETALIONIDAE (Aetalionid Treehopper Family)

## Suborder STERNORRHYNCHA

## Superfamily PSYLLOIDEA

17. PSYLLIDAE (Jumping Plantlice Family)

## Superfamily ALEYRODOIDEA

18. ALEYRODIDAE (Whitefly Family)

## Superfamily APHIDOIDEA

19. APHIDIDAE (Aphid Family)
20. ADELGIDAE (Pine and Spruce Adelgid Family)
21. PHYLLOXERIDAE (Phylloxerid Family)

## Superfamily COCCOIDEA

22. ORTHEZIIDAE (Ensign Scale Insect Family)
23. MARGARODIDAE (Giant Scale Insect Family)
24. PUTOIDAE (Giant Mealybug Family)
25. PSEUDOCOCCIDAE (Mealybug Family)
26. COCCIDAE (Soft Scale Insect Family)
27. ACLERIDAE (Flat Grass Scale Insect Family)
28. DACTYLOPIIDAE (Cochineal Scale Insect Family)
29. KERMESIDAE (Gall-like Scale Insect Family)
30. CRYPTOCOCCIDAE (Bark Crevice Scale Insect Family)
31. ERIOCOCCIDAE (Felt Scale Insect Family)
32. TACHARDIIDAE (Lac Scale Insect Family)
33. LECANODIASPIDIDAE (False Pit Scale Insect Family)
34. CEROCOCCIDAE (Ornate Pit Scale Insect Family)
35. ASTEROLECANIIDAE (Pit Scale Insect Family)
36. CONCHASPIDIDAE (False Armored Scale Insect Family)
37. PHOENICOCOCCIDAE (Palm Scale Insect Family)
38. DIASPIDIDAE (Armored Scale Insect Family)

Table 21.2 Superfamilies of Auchenorrhyncha

Superfamily	Antennae	Ocelli	Hind tibiae	Special features
Cicadoidea	Between eyes	3	Spines in rows at apex	Usually large; wings entirely membranous
Membracoidea	Between eyes	2	Spines or spinelike setae usually in rows	Pronotum prolonged over abdomen, often with horns, stout spines, etc.
Cercopoidea	Between eyes	2	One or two spinelike seta on shaft; apex with several spines	Hind coxae short and cone-shaped
Cicadelloidea	Between eyes	2	Rows of many spinelike setae on shaft; none at apex	Hind coxae transverse
Fulgoroidea	Below eyes	2 (rarely, 3)	Rows of few spines on shaft (or none); apex with several spines	Middle coxae elongate, widely separated; front wings with tegulae

### Suborder AUCHENORRHYNCHA

**Diagnosis:** L. 2–150 mm. In addition to the features noted in the preceding discussion, the metapleura of these insects are relatively well developed; the female usually has a well-developed ovipositor for laying her eggs in plant tissue. Most species are active, with well-developed wings. The suborder is divided into five superfamilies, whose characteristics are briefly described in Table 21.2.

#### Superfamily FULGOROIDEA (Planthoppers)

L. 2–20 mm (some tropical species over 100 mm). The eleven families recognized in this superfamily are of diverse body form. Eyes, antennae, and ocelli are located laterally. The front and

sides of the head and the clypeus often have three carinae. Many of the species are difficult to distinguish except by examining the characteristics of the male genitalia.

Planthoppers are abundant in the tropics. All are plant-juice feeders and when abundant enough transmit plant pathogens. Little is known of their host plant preferences, but these include herbaceous plants, grasses, shrubs, and trees. Often the eggs are laid in the twigs of shrubs and trees.

The nymphs are often, and the adults seldom, covered with wax. They are frequently found with the adults. They prefer herbaceous plants and must migrate to their preferred host from the site of egg-laying.

The accompanying Key will distinguish the families that occur in the U.S. and Canada.

#### Key to the Families of Fulgoroidea

1. Hind tibiae with a broad apical spur nearly as long as first tarsomere, inserted inside apical rim of tibiae and movable in life; wings well-developed or short .... 2. **Delphacidae**
- Hind tibiae without apical spur as just described ..... 2
- 2(1). Anal area of hind wing with many cross veins between anal veins ..... 3. **Fulgoridae**
- Anal area of hind wing without cross veins ..... 3
- 3(2). Hind tarsi with second tarsomere with apex rounded with an apical spur on each side ... 4
- Hind tarsi with second tarsomere with apex straight across or emarginate and with a row of apical spurs ..... 9
- 4(3). Clavus of front wing either granulate with numerous small secretory pores, or base of costa strongly bent; wings longer than body, held almost vertical to body when at rest, usually wedge-shaped, mothlike ..... 8. **Flatidae**
- Clavus of front wing not granular, without small secretory pores, base of costa not strongly bent; wings various ..... 5
- 5(4). Scutellum with apex separated by a distinct transverse groove ..... 5. **Tropiduchidae**
- Scutellum without a transverse groove ..... 6
- 6(5). Front wings large, very broad, oval, with costal margin rounded, longer than body, costal area reticulate, without cross veins, basal cell large; hind tibiae without lateral spines except for a crown of spines at apex ..... 7. **Acanaloniidae**
- Front wings thick, leathery, sometimes of roughened consistency, and when well-developed, oval, convex, covering body laterally (Issinae) but often shorter than abdomen (Caliscelinae), with many cross veins in costal area, basal cell very small or obscure, base of costa gradually curved; hind tibiae often with spines on sides in addition to apical ones ..... 6. **Issidae**
- 9(3). Apical segment of labium very short, not more than  $1\frac{1}{2}$  times as long as wide ..... 9. **Derbidae**
- Apical segment of labium more than twice as long as wide, usually longer ..... 10
- 10(9). Species in NA somewhat flattened; folded front wings markedly overlapping at apex, basal half of costal area usually without cross veins; claval suture short, ending just beyond halfway, not reaching wing margin but making a distinct angle ..... 4. **Achilidae**

## Key to the Families of Fulgoroidea (Contd.)

- Species not particularly flattened; folded front wing usually not overlapping; claval suture otherwise ..... 11
- 11(10). Head prolonged anteriorly into a long, slender, beaklike structure (spp. of *Scolops*); if not so prolonged, then front with 2 or 3 longitudinal carinae (in addition to lateral carinae) or with tegulae of wings absent and claval suture obscure; median ocellus absent from front ..... 11. Dictyopharidae
- Head not particularly prolonged in front; front either without carinae or with median carinae only; tegulae of wing present; median ocellus usually present ..... 12
- 12(11). Veins of front wing usually with pustules or granules; abdominal terga 6 to 8 rectangular ..... 1. Cixiidae
- Veins of front wing without pustules or granules; abdominal terga 6 to 8 V-shaped, with wax-secreting pores ..... 10. Kinnaridae

## 1. CIXIIDAE (Cixiid Planthopper Family)

L. 3–10 mm. Body often somewhat flattened, broad; head short, at most only slightly extended anteriorly; antennae two-segmented with apical flagellum; usually three ocelli; both pairs of wings usually relatively large, held rooflike over abdomen when at rest. Legs with long hind tibiae and only a few or no lateral spines, but with a circle of apical spines on the hind tibiae. Adults are good jumpers and feed on trees and shrubs. They overwinter as nymphs in the soil and feed on roots of grasses and other plants. There are 13 genera and 172 species in the U.S. and Canada, as follows.

## Tribe Cixiini

[1.1 *Pintalia* Stål (3 spp.)]

1.2 *Oliarus* Stål

Fifty-one species, including the following:

*O. cinnamomeus* Provancher (Huckleberry Planthopper). L. 6–7 mm. Blackish, with narrow pale front margin on front wings. Occurs in bogs. Uncommon. (See Fig. 21.6) (1) n.e. US.

[1.3 *Monorachis* Uhler (1 sp., *M. sordulentus* Uhler); 1.4 *Myndus* Stål (34 spp.); 1.5 *Cixius* Latreille (25 spp.); 1.6 *Oecleus* Stål (40 spp.); 1.7 *Microledrida* Fowler (3 spp.); 1.8 *Platycixius* Van Duzee (1 sp., *P. calvus* Van Duzee); 1.9 *Nymphocixia* Van Duzee (1 sp., *N. unipunctata* Van Duzee)]

## Tribe Bothriocerini

[1.10 *Bothriocera* Burmeister (10 spp.); 1.11 *Oliaronus* Ball (1 sp., *O. tontonius* Ball)]

## 2. DELPHACIDAE (Delphacid Planthopper Family)

[= Araeopidae]

L. 2–9 mm. Body usually elongate, almost parallel-sided; brown; head usually short, sometimes as long as body; head

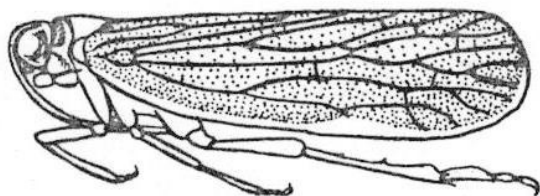


Fig. 21.6.

carinae may be indistinct; antennae simple, short; pronotum usually collarlike; mesonotum triangular. Front wings often short with reduced venation; hind wings sometimes reduced. Ovipositor of female long, curved, sword-shaped. Sexes sometimes very different. These species are frequently found on grasses and sedges in humid habitats, especially on grassy meadows near streams. Some species are of economic importance, especially in tropical regions. The 26 genera and 145 species are classified as follows.

## Subfamily Asiracinae

[2.1 *Copicerus* Swartz (1 sp., *C. irroratus* Swartz); 2.2 *Pentagramma* Van Duzee (3 spp.)]

## Subfamily Delphacinae

## Tribe Alohini

[2.3 *Stobaera* Stål (8 spp.)]

## Tribe Tropidocephalini

[2.4 *Liburniella* Crawford (1 sp., *L. ornata* Stål); 2.5 *Eurysa* Fieber (2 spp.)]

## Tribe Araeopini

[2.6 *Laccocera* Van Duzee (5 spp.); 2.7 *Achorotile* Fieber (2 spp.); 2.8 *Phyllodictus* Ball (3 spp.); 2.9 *Phyllodinus* Van Duzee (1 sp., *P. nervatus* Van Duzee); 2.10 *Stenocranus* Fieber (7 spp.); 2.11 *Kelisia* Fieber (4 spp.); 2.12 *Megamelus* Fieber (10 spp.); 2.13 *Bakerella* Crawford (1 sp., *B. maculata* Crawford); 2.14 *Bostaera* Ball (1 sp., *B. nasuta* Ball); 2.15 *Saccharosydne* Kirkaldy (1 sp., *S. saccharivora* Westwood); 2.16 *Dicranosydne* Fieber (1 sp., *D. incerta* Van Duzee); 2.17 *Euidella* Puton (5 spp.)]

2.18 *Peregrinus* Kirkaldy

One species, as follows:

*P. maidis* Ashmead (Corn Hopper). L. 4–5 mm. A pest of corn in the U.S., Canada, and throughout the world. (1), (2), (3), (4), (5).

[2.19 *Pissonotus* Van Duzee (19 spp.); 2.20 *Megamelanus* Ball (8 spp.); 2.21 *Kormus* Fieber (1 sp., *K. californicus* Crawford); 2.22 *Prokelisia* Osborn (4 spp.); 2.23 *Chloriona* Fieber (1 sp., *C. slosoni* Ball); 2.24 *Criomorphus* Curtis (2 spp.); 2.25 *Liburnia* Stål (5 spp.); 2.26 *Delphacodes* Fieber (48 spp.)]

## 3. FULGORIDAE (Fulgorid Planthopper Family)

L. 1–8+ mm. Usually reddish, but of various brilliant colors in tropical species; head may be produced; front large,

usually quadrangular, with well-elevated lateral margins; usually two ocelli, located between eye and antennal base; thorax large, with pronotum sometimes transverse; mesonotum triangular. Wings large with many cross veins. Some species secrete a large amount of wax in the form of filaments. This family includes the famous Peanut Bug referred to before. Host plant preferences are known for only a few species. The group is mostly tropical but is represented in the U.S. and Canada by 15 species in 7 genera.

#### Subfamily Poiocerinae

##### Tribe Poicerini

[3.1 *Poblicia* Stål (4 spp.); 3.2 *Calyptoproctus* Spinola (1 sp., *C. marmoratus* Spinola); 3.3 *Cyrpoptus* Stål (5 spp.)]

#### 3.4 *Alphina* Stål

One species, as follows:

*A. glauca* (Metcalf). L. 10–15 mm. Brownish gray. Common at lights in southwestern canyons. (2) MS; (3) AZ, TX.

#### Subfamily Amyclinae

##### Tribe Amyclini

[3.5 *Amycle* Stål (2 spp.); 3.6 *Scolopsella* Ball (1 sp., *S. reticulata* Ball); 3.7 *Rhabdocephala* Van Duzee (1 sp., *R. brunnea* Van Duzee)]

### 4. ACHILIDAE (Achilid Planthopper Family)

L. 3–14 mm. Brown or tan, sometimes green, a few species black. Proboscis often long, five-segmented, with apical segment very long, reaching the apex of hind coxae, or short, only as long as the clypeus; two ocelli. Hind tibiae with or without spine in basal half. Abdomen without wax pores and basal processes. Many species live in coniferous forests in North America. Nymphs of these species live under loose bark and in rotten logs. They may feed on fungi. Poorly represented in the U.S. and Canada, with 46 species in three genera as follows.

#### Subfamily Achilinae

[4.1 *Catonia* Uhler (33 spp.); 4.2 *Uniptera* Ball (1 sp., *U. ampliata* Ball); 4.3 *Epiptera* Metcalf (12 spp.)]

### 5. TROPIDUCHIDAE (Tropiduchid Planthopper Family)

L. 7–9 mm. Body slender; greenish, yellowish, or brownish. Head narrow, usually projecting forward; anterior margin of vertex often with a thick callus; two ocelli, usually in front of compound eyes; scutellum with apex set apart by a distinct transverse groove. Hind trochanter usually directed posteriorly. Abdomen large, somewhat flattened. This large tropical family is represented in the U.S. by only three species, as follows.

#### Subfamily Tambiniinae

##### Tribe Tambiniini

[5.1 *Neuroteta* Guérin-Ménéville (1 sp., *N. sponsa* Guérin-Ménéville) (2) FL; 5.2 *Pelitropis* Van Duzee (1 sp., *P. rotulata* Van Duzee, (2) NC, FL, MS); 5.3 *Monopsis* Spinola (1 sp., *M. tabida* Spinola, (2) FL)]

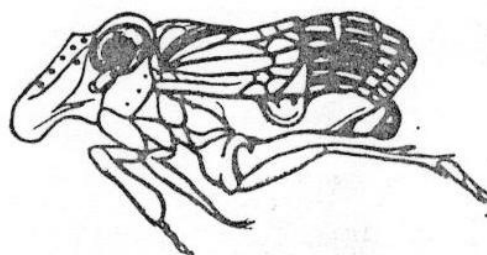


Fig. 21.7.

### 6. ISSIDAE (Weevillike Planthopper Family)

L. 3–8 mm. Body compact, often slightly compressed; dull brown to nearly black. Head produced in some species to form a short weevillike snout; ocelli present or absent; antennal flagellum unsegmented. Front legs of some species enlarged with leaflike femora and tibiae; hind tarsi with second tarsomere having a spine on each side. Both adults and nymphs live on trees or on grasses. This is a large tropical family with 127 species in 23 genera represented in the U.S. and Canada.

#### Subfamily Caliscelinae

##### Tribe Caliscelini

#### 6.1 *Fitchiella* Van Duzee

Eight species, including the following:

*F. robertsoni* Fitch. L.  $\pm 6$  mm. Brownish with black dots. (See Fig. 21.7.)

#### 6.2 *Bruchomorpha* Newman

Twenty species, of which the following is common:

*B. dorsata* Fitch. L.  $\pm 5$  mm. Body with coppery reflections. (See Fig. 21.8.)

#### 6.3 *Aphelonema* Uhler

Fifteen species, of which the following is representative:

*A. histrionica* Stål. L. 7–8 mm. Two parallel dorsal lines and broader stripes on the side of the abdomen. (See Fig. 21.9.)

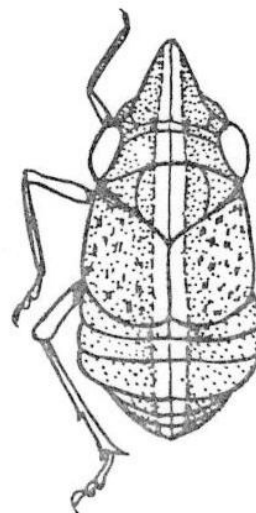


Fig. 21.8.



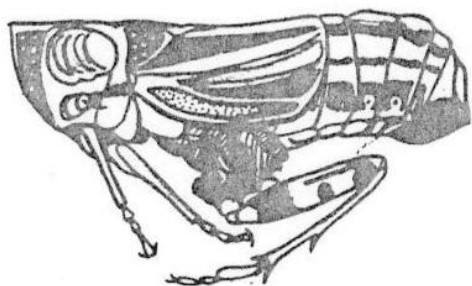


Fig. 21.9.

**Tribe Ommatidiotini****6.4 Asarcopus Horvath**

One species only, as follows:

*A. palmarum* Horvath (Date Bug). L.  $\pm 7$  mm.

[6.5 *Papagona* Ball (2 spp.)]

**Subfamily Issinae****Tribe Hysteropterini**

[6.6 *Euthiscia* Van Duzee (1 sp., *E. tuberculata* Van Duzee); 6.7 *Traxus* Metcalf (1 sp., *T. fulvus* Metcalf); 6.8 *Hysteropterum* Amyot and Serville (11 spp.); 6.9 *Dictyonia* Uhler (1 sp., *D. obscura* Uhler); 6.10 *Misodema* Melichar (1 sp., *M. reticulata* Melichar); 6.11 *Neaethus* Stål (18 spp.); 6.12 *Dictyssa* Melichar (15 spp.); 6.13 *Dictyonissus* Uhler (2 spp.); 6.14 *Dictyobia* Uhler (4 spp.); 6.15 *Dictyssonina* Ball (1 sp., *D. beameri* Ball); 6.16 *Dytia* Uhler (7 spp.); 6.17 *Danapteryx* Uhler (5 spp.); 6.18 *Osbornia* Ball (2 spp.)]

**Tribe Issini**

[6.19 *Ulixes* Stål (1 sp., *U. scutatus* Walker); 6.20 *Tylanira* Ball (1 sp., *T. bifurea* Ball)]

**Tribe Thioniini**

[6.21 *Thionia* Stål (6 spp.); 6.22 *Picumma* Stål (3 spp.)]

**Subfamily Tonginae**

[6.23 *Tylana* Stål (1 sp., *T. ustulata* Uhler)]

## 7. ACANALONIIDAE (Acanaloniid Planthopper Family)

L. 10–12 mm. Usually greenish, yellowish, sometimes with brown markings; front wings very broad, oval, without many cross veins in costal area; head usually narrower than pronotum or mesonotum. First segment of antennae collarlike, second subglobular. Hind tarsi with second tarsomere having a spine on each side. Usually found on grasses, this small group, has only one genus and 18 species in the U.S. and Canada.

**7.1 Acanalonia Spinola**

Eighteen species, of which the following is common:

*A. bivittata* Say. L. 10–12 mm. Pale green or greenish yellow. (1) n.e. NA; (2) s.e. US; (5) ND, MN, NE, IA, KS, MO.

**8. FLATIDAE (Flatid Planthopper Family)**

L. 8–15 mm. Mothlike with wedge shape; brownish or pale green, often brilliantly colored in the tropics. Head with two ocelli; antennal flagellum unsegmented; hind tibiae with spines

on sides in addition to apical spines, but without a movable spur. Tarsi with first tarsomere short or very short and second tarsomere short or very short, with a spine on each side. Sexual dimorphism is common. Adults and nymphs are gregarious. Nymphs have long waxy filament on body. This group feeds on sap of shrubs, trees, and vines in wooded areas. This large family contains 14 genera and 33 species in the U.S. and Canada.

**Subfamily Flatinae****Tribe Flatini**

[8.1 *Hesperophantia* Kirkaldy (1 sp., *H. ricanoides* Spinola)]

**Tribe Nephesini**

[8.2 *Leptormenis* Melichar (1 sp., *L. relicta* Fabricius); 8.3 *Acrophaea* Melichar (4 spp.)]

**8.4 Anormenis Melichar**

Two species, of which the following is common:

*A. septentrionalis* Spinola. L. 10–12 mm. Light green to nearly white. (1) NY, PA, NJ, DE, MD; (5) MN, NE, IA, MO.

[8.5 *Antillormenis* Fennah (1 sp., *A. contaminata* Uhler); 8.6 *Ormenoides* Melichar (2 spp.); 8.7 *Melormenis* Metcalf (2 spp.)]

**8.8 Metcalfa Caldwell and Martorell**

One species, as follows:

*M. pruinosa* (Say) (Citrus Planthopper). L. 5–8 mm. Bluish, appearing to be covered with powder; eyes and parts of body beneath powder are light brown. A pest of citrus fruit as well as many woody plants, this species lays its eggs in small twigs, sometimes stunting new growth. (See A&J 73.) (1) n.e. US; (2) s.e. US; (3) s.w. US.

[8.9 *Ormenaria* Metcalf and Bruner (1 sp., *O. rufifascia* Walker)]

**Tribe Selizini**

[8.10 *Mistharnophantia* Kirkaldy (6 spp.); 8.11 *Cyarda* Walker (3 spp.)]

**Subfamily Flatoidinae**

[8.12 *Flatoides* Guérin-Méneville (2 spp.); 8.13 *Flatoidinus* Melichar (5 spp.); 8.14 *Atracodes* Melichar (2 spp.)]

**9. DERBIDAE (Derbid Planthopper Family)**

L. 8–11 mm. Delicate, mothlike insects; yellow, brown, or cream; head more or less compressed; antennae often flattened, short; vertex and frons usually greatly reduced; compound eyes very large; two ocelli, usually prominent, located in front of compound eyes. Legs slender, often elongate. Hind tarsi with second tarsomere large, with row of spines at apex; abdomen usually small. These insects feed on woody fungi growing on rotting logs or on flowering plants, including trees, particularly willow, oak, and hickory. This large family contains 47 species in 14 genera in the U.S. and Canada.

**Subfamily Zoraidinae****Tribe Sikaianini**

[9.1 *Euklastus* Metcalf (1 sp., *E. harti* Metcalf); 9.2 *Mula* Ball (1 sp., *M. resonans* Ball); 9.3 *Mysidia* Westwood (1 sp., *M. mississippiensis* Dozier)]

**Tribe Cenchreini**

[9.4 *Patara* Westwood (1 sp., *P. vanduzeei* Ball); 9.5 *Syntames* Fowler (3 spp.); 9.6 *Neocenchrea* Metcalf (1 sp., *N. heidemanni* Ball); 9.7 *Dysimia* Muir (1 sp., *D. maculata* Muir); 9.8 *Cedusa* Fowler (16 spp.); 9.9 *Sayiana* Ball (1 sp., *S. sayi* (Ball))]

**Tribe Otiocerini**

[9.10 *Amalopota* Van Duzee (2 spp.); 9.11 *Anotia* Kirby (7 spp.)]

**9.12 *Otiocerus* Kirby**

There are nine species in this genus throughout the eastern U.S. and Canada, the following of which is the largest:

*O. kirbyi* Fitch. L. 10–11 mm. Pale yellow to whitish, with vitta on front wing from apex of clavus to costal margin. (1) NY.

**9.13 *Apache* Kirkaldy**

One species, as follows:

*A. degeeri* (Kirby). L. 11 mm. Reddish to dark red; front wings with a short whitish line beyond apex of clavus. Widely distributed. (1), (2), (3), (4), (5).

[9.14 *Shellenius* Ball (2 spp.)]

**10. KINNARIDAE (Kinnarid Planthopper Family)**

L. 3–4 mm. Pale, without dark spots on wings. Labium nearly reaches apex of abdomen, with long apical segment; compound eyes wider than long; three ocelli; antennae short, second segment usually globose, rarely elongate. Wings usually somewhat rounded, very clear and glassy. Most species are tropical, but five species occur in the U.S., as follows:

[10.1 *Oecliidius* Van Duzee (5 spp.)]

**11. DICTYOPHARIDAE (Dictyopharid Planthopper Family)**

L. 8–12 mm. Green or brown; head of most adults prolonged anteriorly into long slender, beaklike structure, but that of others as in key to family. Apex of front wing usually narrow, with reticulate network of small veins; hind wing large, small, or absent. Legs usually slender, elongate. Most adults and nymphs feed on grasses in damp meadows. Moderately large family with 16 genera and 64 species in the U.S. and Canada. (See Fig. 21.10 for general features.)

**Subfamily Dictyopharinae****Tribe Dictyopharini**

[11.1 *Nersia* Stål (2 spp.); 11.2 *Mitrops* Fennah (1 sp., *M. dioxys* Walker); 11.3 *Rhynchomitra* Fennah (3 spp.); 11.4 *Phylloscelis* Germar (5 spp.)]

**11.5 *Scolops* Schaum**

Thirty-two species, of which the following is common:

*S. sulcipes* Say (Meadow Planthopper). L. 10–12 mm. Brown. Common in grassy meadows. (2) s.e. US.

*S. angustatus* Uhler.

**Subfamily Orgeriinae****Tribe Orgeriini**

[11.6 *Orgamara* Ball (3 spp.); 11.7 *Deserta* Ball and Hartzell (4 spp.); 11.8 *Yucanda* Ball and Hartzell (3 spp.); 11.9 *Orgerius* Stål (1 sp., *O.*

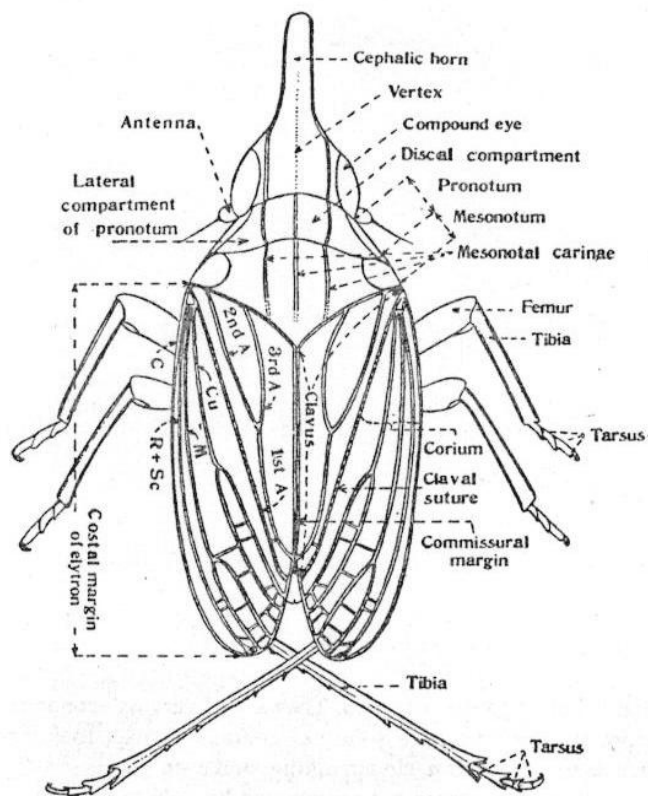


Fig. 21.10. (From Britton, 1923)

*rhyparus* Stål); 11.10 *Parorgerius* Melichar (1 sp., *P. minor* Ball); 11.11 *Acinaca* Ball and Hartzell (1 sp., *A. lurida* Ball and Hartzell); 11.12 *Aridia* Ball and Hartzell (3 spp.); 11.13 *Timodema* Ball (1 sp., *T. miracula* Ball); 11.14 *Ticida* Uhler (1 sp., *T. cingulata* Uhler); 11.15 *Loxophora* Van Duzee (2 spp.); 11.16 *Timonidia* Ball and Hartzell (1 sp., *T. solitaria* Ball and Hartzell)]

**Superfamily CERCPOIDEA**

One family only, as follows:

**12. CERCOPIDAE (Spittle Bug Family)**

L. 5–20 mm (usually not more than 15 mm). Most species brown or gray, some tropical species brightly colored; head usually narrower than pronotum; antennae short, bristlelike, inserted in front of compound eyes; two ocelli on vertex; pronotum usually large, flat or convex; scutellum as long as or longer than pronotum in most species. Front wings longer than body, often very thick, leathery, venation often obscured; hind wings usually large; hind coxae often short and conical, laterally dilated; hind femora and tibiae usually elongate, adapted for leaping; hind tibiae with one or two stout marginal spines and usually with single or double row of circlets of spines at apex. (See Fig. 21.11 for general features.)

Eggs are laid in the stems or sheaths of grasses and other plants where they overwinter. The nymphs, which appear in the spring, are often so abundant that their "spittle," the secreted froth in which they hide, will wet the clothing of someone crossing their habitat. The spittle appears to be effective in protecting this stage of the bugs. Adults are often called "froghoppers" because they have a vague resemblance to frogs and are strong jumpers. Most species suck sap from herbaceous

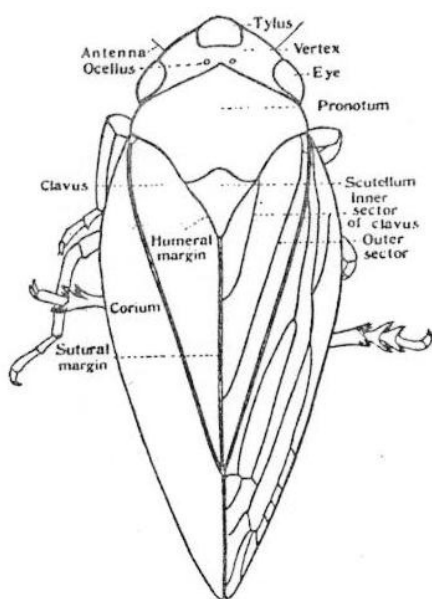


Fig. 21.11. (From Britton, 1923)

plants, but some feed on trees. They are of varying economic importance, some species doing considerable damage to crops such as pecans, cotton, clover, alfalfa, and even pine.

The family is large but represented by only seven genera and 54 species in the U.S. and Canada.

#### Subfamily Cercopinae

##### Tribe Cercopini

#### 12.1 *Prosapia* Fennah

One species, as follows:

*P. bicincta* Say (Two-lined Spittle Bug). L. 8–10 mm. Dark, nearly black, with two narrow orange bands across front wings. Common in the Southeast, sparse in the Northeast. Extends into the tropics. The species has been divided into four subspecies, *P. b. bicincta* s.str.; *P. b. angustata* Walker; *P. b. bifascia* Walker, and *P. b. ignipecta* Fitch. (1) n.e. US; (2) s.e. US; (5) IA, KS, MO.

#### Subfamily Aphrophorinae

##### Tribe Ptyelini

[12.2 *Philaronia* Ball (2 spp., 6 subsp.)]

##### Tribe Lepyroniini

#### 12.3 *Lepyronia* Amyot and Serville

Four species, one of which, *L. coleoptrata* Linnaeus, is questionable. The following is a widespread representative:

*L. quadrangularis* Say. L. 8–10 mm. Brown, with two oblique brown bands across front wings. (1) n.e. NA; (2) s.e. US; (3) NM, TX; (4) UT; (5) AB, MB, MN, SD, NE, IA, CO, KS, MO.

#### 12.4 *Philaenus* Stål

Three species, including the following:

*P. leucophthalmus* Linnaeus, divided into 12 subspecies, including *P. l. spumarius* Linnaeus (Meadow Spittle Bug): L.

6–8 mm. Brownish with paler mottled markings. (1) n.e. US; (2) s.e. US; (3) CA; (4) UT; (5) ND, SD. (See A & J 70.)

*P. lineatus* Linnaeus (Lined Spittle Bug). (1) n.e. NA.

#### 12.5 *Aphrophora* Germar

Fourteen species, of which the following are common:

*A. parallela* Say (Pine Spittle Bug). (1) n.e. NA; (5) AB, SK, MN.

*A. saratogensis* (Fitch) (Saratoga Spittle Bug). (1) n.e. NA; (2) s.e. US; (3) CA; (4) BC.

[12.6 *Omalophora* Matsumura (1 sp., *O. salicis* DeGeer, (1) n.e. US)]

#### Subfamily Clastopterinae

##### Tribe Clastopterini

#### 12.7 *Clastoptera* Germar

Thirty-two species and 11 subspecies. Several species of economic importance are as follows:

*C. achatina* Germar (Pecan Spittle Bug). (1) n.e. US; (2) s.e. US; (3) CA, NM, TX; (5) CO, KS, IA, MO.

*C. obtusa* Say (Alder Spittle Bug). Divided into three subspecies. (1) n.e. NA; (2) s.e. US; (3) TX; (5) AB, CO, KS, MO.

*C. proteus* Fitch (Dogwood Spittle Bug). Divided into four subspecies. (1) n.e. NA; (2) s.e. US; (3) TX; (4) WA, UT; (5) CO, KS, IA, MO.

*C. saintcyri* Provancher (Heath Spittle Bug). Divided into two subspecies. (1) n.e. NA; (2) s.e. US; (3) CA; (5) CO.

*C. xanthocephala* Germar (Sunflower Spittle Bug). Divided into two subspecies. (1) n.e. NA; (2) s.e. US; (3) s.w. US; (5) CO, KS, IA, MO.

#### Superfamily CICADOIDEA

One family only, as follows:

#### 13. CICADIDAE (Cicada Family)

L. 23–55 mm. Head wide and blunt; antennae short, inserted on front of head between compound eyes; three ocelli close together, forming a triangle; compound eyes large, colored; body green, brown, often with black markings. Wings large, transparent brown, black, or green; hind wings smaller than front wings, veins not reaching wing margin, sometimes with brown or black spots. Front femora enlarged, often armed with teeth; middle coxae short, inserted close together.

Members of this family are best known for the characteristic song of each species made by male stridulation. Sound-producing organs are located on venter at base of abdomen in most species. Others make sound by wing banging. Both males and females of a few species produce sound by tapping costal margins of front wings.

Eggs are laid in twigs of trees, causing them to wilt, droop down, and eventually fall to the ground. This natural pruning process usually results in better foliage growth the following year, although young trees may be killed. One of the mysteries of natural processes is why the eggs are laid high in the tree since the newly hatched nymphs must drop or fall with the twig to the



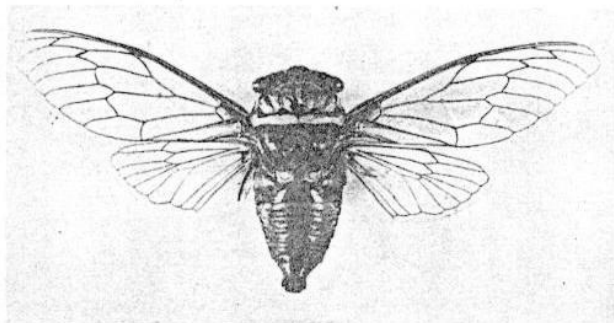


Fig. 21.12.

ground, then dig their way into the soil, down to the tree roots where they feed.

All species have a long life cycle of four or more years; three North American species have a 17-year cycle; three have a 13-year cycle. These species occur in broods that emerge in different years. The 17-year cycle species have 13 broods; the 13 year cycle species, five broods. Each of these has a different geographic range. Emerging broods may contain two or three different species. When the last nymphal stage is reached, the nymphs crawl out of the soil and complete their transformation to the adult stage on the trunk of a tree. The emergent adult leaves its last nymphal shell clinging to the bark. After inflating and drying its wings, it flies high into the branches. The males sing only during the daytime, often just before sunset.

Twenty-two genera and 166 species occur in the U.S. and Canada.

#### Subfamily Tibiceninae

##### Tribe Zammarini

[13.1 *Odopoea* Stål (1 sp., *O. fumestra* Walker); 13.2 *Zammara* Amyot and Serville (1 sp., *Z. smaragdina* Walker)]

##### Tribe Tibicenini

[13.3 *Diceroprocta* Stål (22 spp., and 9 subspecies)]

#### 13.4 *Tibicen* Latreille

Thirty species and 15 subspecies, of which the following are common:

*T. canicularis* Harris (Dog-day Cicada). L. 50–60 mm. Green. Song is characteristic of hot summer days, the time of heat waves in the North, but foreshadows the coming of autumn, after which they become silent. Nymphal stage last 2 to 5 years. Since broods overlap, adults are present each year. (See A & J 65.) (1) n.e. NA; (2) s.e. US; (3) TX; (5) CO, KS, MO.

*T. resh* Haldeman. (See Fig. 21.12.) (2) AR, LA, MS, AL; (3) s.w. US; (4) UT; (5) KS, MO.

*T. similis* Smith and Grossbeck (See Fig. 21.13.) (2) s.e. US.

*T. superbus* Fitch. (See Fig. 21.14.) (2) AR; (3) NM, OK, TX; (5) KS, MO.

[13.5 *Cornuplura* Davis (2 spp., (3) s.w. US); 13.6 *Cacama* Distant (5 spp., (3) s.w. US; (4) UT; (5) CO)]

##### Tribe Fidicinini

[13.7 *Proarna* Stål (1 sp., *P. championi* Distant, (3) s.w. US; 13.8 *Beameria* Davis (2 spp., (3) s.w. US; (5) CO, KS)]

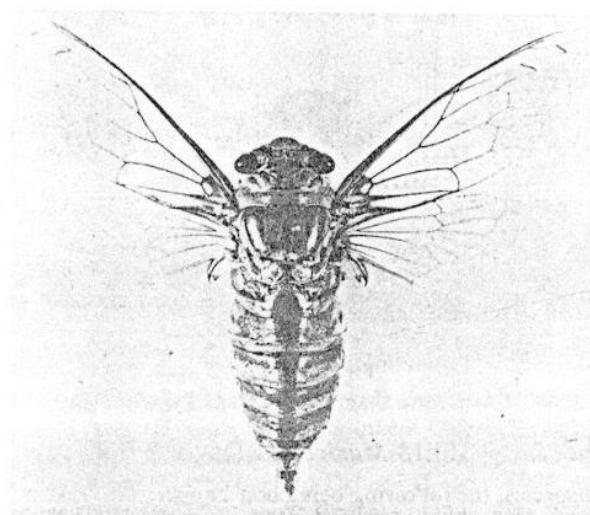


Fig. 21.13.

#### 13.9 *Pararina* Distant

One species, as follows:

*P. puella* Davis. (See Fig. 21.15.) (2) LA; (3) AZ, TX, OK.

##### Tribe Hyantiini

#### 13.10 *Quesada* Distant

One species, as follows:

*Q. gigas* Olivier (See Fig. 21.16.) (3) s.w. US.

#### Subfamily Cicadinae

##### Tribe Cicadini

[13.11 *Neocicada* Kato (1 sp., *N. hieroglyphica* Say, (1) n.e. US; (2) s.e. US; (5) KS, MO); 13.12 *Cicada* Linnaeus (2 spp., *C. chisos* Davis, (3) TX; *C. guttata* Foerster, questionable record)]

#### Subfamily Tibicininae

##### Tribe Carinetini

[13.13 *Herrera* Distant (1 sp., *H. ancilla* Stål, (3) s.e. US)]

##### Tribe Tibicinini

[13.14 *Tibicinoides* Distant (4 spp., (3) s.w. US; (4) UT; (5) MT, CO, KS); 13.15 *Okanagana* Distant, 51 spp., 14 subspp.; 13.16 *Okanagodes* Davis (2 spp., 2 subspp., (3) s.e. US; (4) UT); 13.17 *Clidophleps* Van Duzee (6 spp., 2 subspp., (3) CA)]

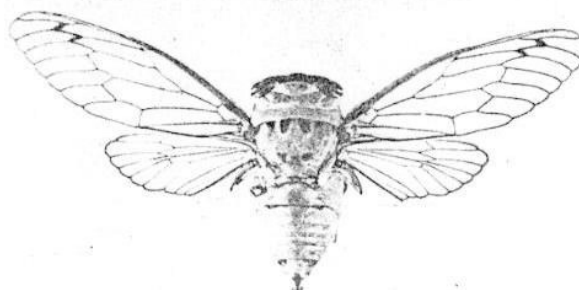


Fig. 21.14.



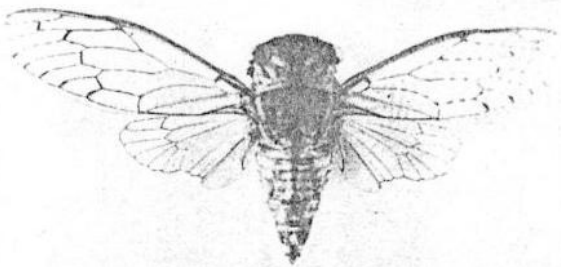


Fig. 21.15.

### 13.18 *Magicicada* Davis

Three species, the following being best known:

*M. septendecim* Linnaeus (Periodical Cicada). L. 27–33 mm (17-year race); 19–27 mm (13-year race). Body dark; eyes and principal wing veins red. Studies show that a complex of biological species is included under this one name. Often called locusts, a name properly applied to certain Orthoptera (some grasshoppers), these insects are well known by their sound if not on sight. Two races are common in various parts of the eastern U.S. The 17-year race (so-called because the nymph takes 17 years to mature) occurs in n. US from the Mississippi River e. and from s. NY s. to n. GA and MS. The 13-year race occurs throughout the s.e. U.S., extending into (3) TX, OK and (5) MO and reaching as far north as central IL. Their broods emerge in different parts of this range in different years according to a predictable schedule. There are 30 broods whose distribution and emergence dates have been plotted. Of the 18 distinct broods (13 for the 17-year and 5 for the 13-year race) some have discontinuous distribution. When a brood is due to emerge, young trees—which may be killed by the great number of eggs laid in their twigs—must be covered in advance. Since more than one brood may be in an area, adults appear oftener than every 13 or 17 years but never in as great numbers as the main brood. (See Fig. 21.17 and A & J 66.)

#### Tribe Cicadettini

[13.19 *Cicadetta* Kolenati (4 spp., 2 subspecies, (2) s.e. U.S.; (5) MO)]

#### Subfamily Tettigadinae

[13.20 *Tettigades* Amyot and Serville (1 sp., *T. mexicana* Distant, (3) AZ)]

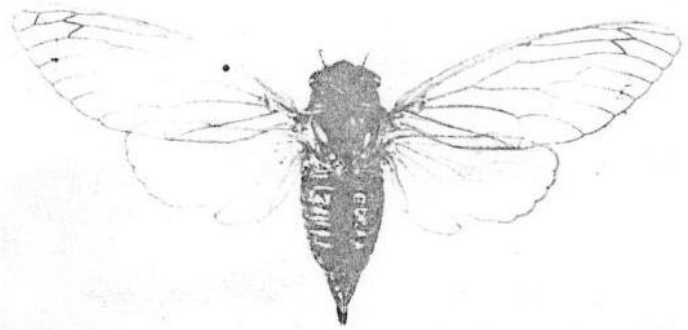
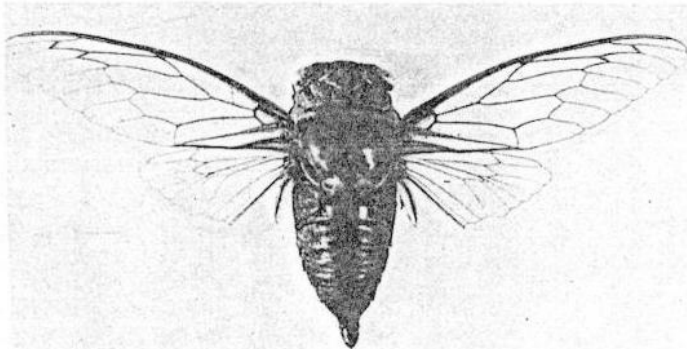


Fig. 21.17.

#### Subfamily Platypediinae

### 13.21 *Platypedia* Uhler

Twenty-three species and 5 subspecies found in (3) s.w. U.S.; (4) Pacific n.w.; (5) MT, WY, CO, NE, SD. The following is representative:

*P. areolata* Uhler (Orchard Cicada). L. 18–23 mm. (3) CA; (4) Pacific n.w.; (5) MT, CO.

[13.22 *Neoplatypedia* Davis (2 spp., (3) CA, AZ; (4) OR, UT, ID)]

### Superfamily CICADELLOIDEA

One family only, as follows:

## 14. CICADELLIDAE (Leafhopper Family)

[= Jassidae]

L. 3–12 mm (some to 22 mm). Green, brown, often with bright color markings; head usually with two ocelli well-separated from the compound eyes. Front wing thickened, with claval area and corium. Both long-wing and short-wing forms occur in some species. Hind legs fitted for jumping.

Leafhoppers (also called Sharpshooters and Doggers) are very abundant in numbers of individuals and species. With more than 20,000 species worldwide, this is the largest family of the Homoptera. There are 2507 species in 225 genera in the U.S. and Canada, with many subfamilies and tribes as indicated below. They are very difficult to identify.

Many species are pests of many cultivated plants, and probably all plants are infested with one or more species. They suck plant juices and leave white or yellowish spots on the leaves. Their egg laying process, in which the ovipositor is inserted into plant tissue, plugs the conductive tissues of stalks and veins and causes leaves to curl and brown. They also excrete a honeydew on which sooty mold grows, interfering with photosynthesis. Some species are known to be vectors of plant diseases.

There may be more than one generation per year. Most species have five nymphal instars. They overwinter as eggs or as adults.

#### Subfamily Ledrinae

#### Tribe Xerophloeini

[14.1 *Xerophloea* Germar (13 spp.)]

**Subfamily Dorycephalinae****Tribe Dorycephalini**

[14.2 *Dorycephalus* Kouchakewitch (subgenus *Dorycephalus* s. str., 4 spp.; *Atleniopyga* Oman, 4 spp.); 14.3 *Neoslossonia* Van Duzee (1 sp., *N. putnami* (Osborn))]

**Subfamily Hecalinae****Tribe Hecalini**

[14.4 *Hecullus* Oman (2 spp.); 14.5 *Hecalus* Stål (2 spp.); 14.6 *Memnonia* Ball (5 spp.); 14.7 *Parabolocratus* Fieber (21 spp.); 14.8 *Dicyphonia* Ball (5 spp.); 14.9 *Spangbergiella* Signoret (3 spp.)]

**Subfamily Megophthalminae****Tribe Megophthalmini**

[14.10 *Brenda* Oman (1 sp., *B. arborea* (Ball)); 14.11 *Tiaja* Oman (6 spp.)]

**Subfamily Agalliinae****Tribe Agalliini**

[14.12 *Agalliopsis* Kirkaldy (subgenus *Agalliopsis* s. str., 5 spp.; subgenus *Agallaria* Oman, 10 spp.)]

**14.13 *Agallia* Curtis**

Nine species, including the following:

*A. quadripunctata* Provancher. (See Fig. 21.18.) (1) n.e. US; (2) s.e. US; (3) CA, NM; (4) Pacific n.w.; (5) MN, SD, NE, IA, CO, KS, MO.

[14.14 *Ceratagallia* Kirkaldy (25 spp.)]

**14.15 *Aceratagallia* Kirkaldy**

Two subgenera: *Ionia* Ball (1 sp., *A. trianata* (Ball)) and *Aceratagallia* s. str., with 28 species, the following being of economic importance:

*A. (A.) sanguinolenta* (Provancher) (Clover Leafhopper)

**Subfamily Macropsinae****Tribe Macropsini**

[14.16 *Oncopsis* Burmeister (15 spp.)]

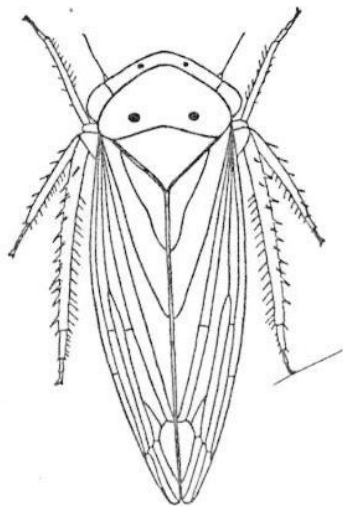


Fig. 21.18. (From Britton, 1923)

**14.17 *Macropsis* Lewis**

Thirty-nine species, the following being of economic importance:

*M. trimaculata* (Fitch) (Plum Leafhopper).

**Subfamily Idiocerinae****Tribe Idiocerini**

[14.18 *Idiocerus* Lewis (73 spp.)]

**Subfamily Iassinae****Tribe Gyponini**

[14.19 *Dragonana* Ball and Reeves (1 sp., *D. dracontea* (Gibson)); 14.20 *Prairiana* Ball (12 spp.); 14.21 *Negosiana* Oman (5 spp.); 14.22 *Gyponana* Ball: 2 subgenera: *Gyponana* s. str. (70 spp.) and *Rugosana* DeLong (9 spp.); 14.23 *Hamana* DeLong (5 spp.); 14.24 *Acusana* DeLong (11 spp.); 14.25 *Gypona* Germar (8 spp.); 14.26 *Marganana* DeLong (1 sp., *M. suilla* (Ball)); 14.27 *Polana* DeLong (1 sp., *P. quadrinotata* (Spångberg)); 14.28 *Ponana* Ball: 2 subgenera: *Ponana* s. str. (20 spp.) and *Bulbana* DeLong (4 spp.)]

**Tribe Iassini****14.29 *Stragania* Stål**

Twenty-two species, of which the following is of economic importance:

*S. robusta* (Uhler) (Robust Leafhopper).

[14.30 *Pachyopsis* Uhler (1 sp., *P. laetus* Uhler)]

**Subfamily Pentimiinae****Tribe Pentimiini**

[14.31 *Penthimia* Germar (2 spp.)]

**Subfamily Koebeliinae****Tribe Koebeliini**

[14.32 *Koebelia* Baker (4 spp.)]

**Subfamily Coelidiinae****Tribe Coelidiini**

[14.33 *Coelidia* Germar (5 spp.)]

**Tribe Tinobregmini**

[14.34 *Tinobregmus* Van Duzee (5 spp.)]

**Subfamily Nioniinae****Tribe Nioniini**

[14.35 *Nionia* Ball (1 sp., *N. palmeri* (Van Duzee))]

**Subfamily Aphrodinae****Tribe Aphrodini**

[14.36 *Aphrodes* Curtis (6 spp.)]

**Subfamily Xestocephalinae****Tribe Xestocephalini**

[14.37 *Xestocephalus* Van Duzee (14 spp.)]

**Subfamily Neocoelidiinae****Tribe Neocoelidiini**

[14.38 *Neocoelidia* Gillette and Baker (23 spp.); 14.39 *Paracoelidea* Baker (3 spp.)]

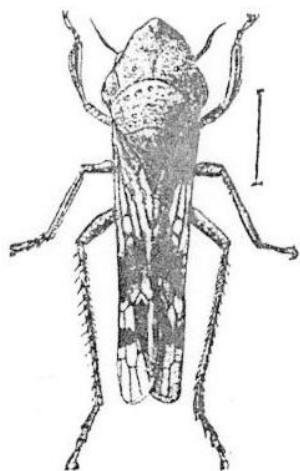


Fig. 21.19. (From U.S. Dept. Agric.)

**Subfamily Tettigellinae****Tribe Proconiini**

[14.40 *Aulacizes* Amyot and Serville (2 spp.); 14.41 *Homalodisca* Stål (4 spp., including *H. triquetra* (Fabricius) [Fig. 21.19]); 14.42 *Oncometopia* Stål (3 spp.); 14.43 *Cuerna* Melichar (16 spp.)]

**Tribe Tettigellini**

[14.44 *Ciminius* Metcalf and Bruner (3 spp.); 14.45 *Tylozygus* Fieber (4 spp.); 14.46 *Plesiommata* Provancher (2 spp.)]

**14.47 *Draeculacephala* Ball**

Sixteen species, of which the following are common:

*D. mollipes* (Say) (Watercress Sharpshooter).

*D. minerva* Ball (Grass Sharpshooter).

*D. sp.* (See Fig. A & J 72.)

*D. angulifera* (Walker). (See Fig. 21.20.)

**14.48 *Carneocephala* Ball**

Eight species, of which the following is of economic interest:

*C. flaviceps* (Riley) (Yellowheaded Leafhopper).

[14.49 *Helochara* Fitch (2 spp.); 14.50 *Hortensia* Metcalf and Bruner (1 sp., *H. similis* (Walker))]

**14.51 *Graphocephala* Van Duzee**

Five species, of which the following is common and attractive:

*G. coccinea* (Forster) (Candy-stripe Leafhopper). L. 8–9 mm. Green with red markings. Common on blackberry and various cultivated ornamentals. Widespread throughout (1), (2), (3), (4), (5). (See Fig. A & J 71.)

[14.52 *Hordnia* Oman (2 spp.); 14.53 *Sibovia* China (1 sp., *S. occatoria* (Say)); 14.54 *Colimona* Oman (2 spp.); 14.55 *Marathonia* Oman (1 sp., *M. marathonensis* Olsen); 14.56 *Decua* Oman (2 spp.); 14.57 *Manzutus* Oman (2 spp.); 14.58 *Neokolla* Melichar (3 spp.); 14.59 *Keonella* Oman (5 spp.)]

**Tribe Evacanthini**

[14.60 *Evacanthus* Peletier and Serville (2 spp.)]



Fig. 21.20. (From Beirne, 1956)

**Tribe Errhomenellini**

[14.61 *Errhomus* Oman (3 spp.); 14.62 *Carsonus* Oman (6 spp.); 14.63 *Pagaronia* Ball (4 spp.); 14.64 *Friscanus* Oman (1 sp., *F. friscanus* (Ball)); 14.65 *Thatuna* Oman (1 sp., *T. gilletti* Oman); 14.66 *Lystridea* Baker (2 spp.)]

**Subfamily Cicadellinae****Tribe Alebrini**

[14.67 *Alebra* Fieber (1 sp., *A. albostriella* (Fallen)); 14.68 *Protalebra* Baker (3 spp.)]

**Tribe Dikraneurini**

[14.69 *Alconeura* Ball and DeLong (21 spp.); 14.70 *Dikraneura* Hardy (25 spp.); 14.71 *Notus* Fieber (2 spp.); 14.72 *Forcipata* DeLong and Caldwell (10 spp.); 14.73 *Kunzeana* Oman (12 spp.); 14.74 *Dikrella* Oman (14 spp.); 14.75 *Idona* DeLong (1 sp., *I. minuenda* (Ball)); 14.76 *Dikraneuroidea* Lawson (1 sp., *D. beameri* Lawson)]

**14.77 *Empoasca* Walsh**

This very large genus is divided into the following subgenera: *Kybos* Fieber (45 spp.); *Hebata* DeLong (29 spp.), and *Empoasca* s. str. (103 spp.). The following species are of economic interest:

*E. fabae* Harris (Potato Leafhopper). L. 5–7 mm. Pale green. A pest of potatoes, beans, clover, and alfalfa that migrates north in the spring. (1) n.e. NA; (2) s.e. US; (3) central CA.

*E. maligna* (Walsh) (Apple Leafhopper).

*E. stevensi* Young (Steven's Leafhopper).

*E. solana* DeLong (Southern Garden Leafhopper).

*E. abrupta* DeLong (Western Potato Leafhopper).

**Tribe Jorumini**

[14.78 *Joruma* McAtee (2 spp.)]

**Tribe Cicadellini**

[14.79 *Cicadella* Dumeril (10 spp.); 14.80 *Typhlocybella* Baker (2 spp.)]

14.81 *Typhlocyba* Germar

Eighty-two species, the following being of economic interest:

*T. pomaria* McAtee (White Apple Leafhopper).

*T. rosae* (Linnaeus) (Rose Leafhopper).

*T. prunicola* (Edwards) (Prune Leafhopper).

14.82 *Erythroneura* Fitch

Three hundred and seventy species in this gigantic genus, of which the following two are common, but many others are abundant as well:

*E. tricincta* Fitch (Threebanded Leafhopper).

*E. ziczac* Walsh (Virginia Creeper Leafhopper).

[14.83 *Hymetta* McAtee (7 spp.)]

## Subfamily Deltocephalinae

## Tribe Cochlorhinini

[14.84 *Eulonus* Oman (1 sp., *E. almus* Van Duzee); 14.85 *Drionia* Ball (1 sp., *D. nigra* Ball); 14.86 *Cochlorhinus* Uhler (6 spp.); 14.87 *Calonia* Beamer (1 sp., *C. signata* (Ball)); 14.88 *Huleria* Ball (1 sp., *H. quadripunctata* Ball); 14.89 *Penhuleria* Beamer (1 sp., *P. acuticephala* Beamer)]

## Tribe Scaphytopiini

[14.90 *Japananus* Ball (1 sp., *J. hyalinus* (Osborn)); 14.91 *Ascius* DeLong (1 sp., *A. triangularis* DeLong)]

14.92 *Scaphytopius* Ball

This genus is divided into the following three subgenera: *Convelinus* Ball (19 spp.); *Scaphytopius* s. str. (6 spp.); *Cloanthanus* Ball (47 spp.). The following is a common species:

*S. loricatus* (Van Duzee) (Yellow-faced Leafhopper).

## Tribe Acinopterini

14.93 *Acinopterus* Van Duzee

Twenty-three species, of which the following is common:

*A. angulatus* Lawson (Angulate Leafhopper).

## Tribe Balcluthini

[14.94 *Nesosteles* Kirkaldy (9 spp.)]

14.95 *Balclutha* Kirkaldy

Seven species, of which the following are common:

*B. hospes* Kirkaldy (Little Green Leafhopper).

*B. beardleyi* Namba (Beardsley Leafhopper).

## Tribe Macrostelini

[14.96 *Baldulus* Oman (3 spp.)]

14.97 *Macrosteles* Fieber

This genus is divided into the following three subgenera: *Davisonia* Dorst (5 spp.), *Sonronius* Dorst (3 spp.), and *Macrosteles* s. str. (17 spp.). The following is a common species on ornamental plants:

*M. fascifrons* (Stål) (Aster Leafhopper).

## Tribe Deltocephalini

[14.98 *Prescottia* Ball (2 spp.)]

14.99 *Scaphoideus* Uhler

Forty-seven species, of which the following is a pest:

*S. luteolus* Van Duzee (White-banded Elm Leafhopper).

[14.100 *Cantura* Oman (3 spp.); 14.101 *Osbornellus* Ball (26 spp.); 14.102 *Spathanus* DeLong (5 spp.); 14.103 *Omanana* DeLong (2 spp.); 14.104 *Knollana* DeLong (1 sp., *K. huachuca* DeLong); 14.105 *Allygus* Fieber (1 sp., *A. mixtus* (Fabricius)); 14.106 *Chlorotettix* Van Duzee (45 spp.); 14.107 *Doleranus* Ball (3 spp.)]

14.108 *Colladonus* Ball

Thirty-one species, of which the following are common:

*C. clitellarius* (Say) (Saddled Leafhopper).

*C. montanus* (Van Duzee) (Mountain Leafhopper).

[14.109 *Nigridonus* Oman (1 sp., *N. illumina* Ball); 14.110 *Caladonus* Oman (1 sp., *C. coquillettii* Van Duzee); 14.111 *Idiodonus* Ball (12 spp.); 14.112 *Nurenus* Oman (1 sp., *N. snowi* Ball); 14.113 *Neodonus* DeLong and Hershberger (1 sp., *N. piperatus* DeLong and Hershberger); 14.114 *Bonneyana* Oman (3 spp.); 14.115 *Floridonus* Oman (1 sp., *F. taxodii* Sanders and DeLong); 14.116 *Zabrosa* Oman (1 sp., *Z. sexpunctata* (Beamer)); 14.117 *Eusama* Oman (1 sp., *E. amanda* Ball); 14.118 *Cetexa* Oman (1 sp., *C. graecula* Ball); 14.119 *Fridonus* Oman (1 sp., *F. concanus* Oman); 14.120 *Gloridonus* Ball (4 spp.); 14.121 *Ballana* DeLong (70 spp.); 14.122 *Limbanus* Oman (3 spp.); 14.123 *Allygianus* Ball (3 spp.); 14.124 *Allygiella* Oman (1 sp., *A. clathratus* Ball); 14.125 *Pasadenus* Ball (5 spp.); 14.126 *Mesamia* Ball (16 spp.); 14.127 *Twiningia* Ball (19 spp.); 14.128 *Fitchana* Oman (3 spp.); 14.129 *Sobata* Oman (1 sp., *S. palliolata* Ball); 14.130 *Bandara* Ball (4 spp.); 14.131 *Danbara* Oman (1 sp., *D. aurata* Ball); 14.132 *Atanus* Oman (2 spp.); 14.133 *Ollarianus* Ball (9 spp.); 14.134 *Aligia* Ball (32 spp.); 14.135 *Eutettix* Van Duzee (34 spp.); 14.136 *Eusora* Oman (2 spp.); 14.137 *Crassana* DeLong and Hershberger (1 sp., *C. goniana* (Ball)); 14.138 *Norvellina* Ball (30 spp.); 14.139 *Aplanus* Oman (2 spp.); 14.140 *Paraphlepsius* Baker (63 spp.); 14.141 *Phlepsanus* Oman (3 spp.); 14.142 *Texananus* Ball, with 3 subgenera: *Texananus* s. str. (28 spp.), *Excultanus* Oman (4 spp.), and *Iowanus* Bau (6 spp.); 14.143 *Orientus* DeLong (1 sp., *O. ishidae* (Matsumura)); 14.144 *Dorydiella* Baker (2 spp.); 14.145 *Dixianus* Ball (1 sp., *D. utahus* (Ball)); 14.146 *Lycioides* Oman (8 spp.); 14.147 *Tropicanus* DeLong (2 spp.)]

14.148 *Opsius* Fieber

One species, as follows:

*O. stactogalus* Fieber (Tamarix Leafhopper).

14.149 *Circulifer* Zakhvatkin

One species, as follows:

*C. tenellus* (Baker) (Beet Leafhopper).

[14.150 *Fieberiella* Signoret (1 sp., *F. florii* Stål); 14.151 *Cicadula* Zetterstedt (14 spp.); 14.152 *Calanana* DeLong (3 spp.); 14.153 *Paluda* DeLong (2 spp.); 14.154 *Elymana* DeLong (6 spp.); 14.155 *Euscelidius* Ribaut (1 sp., *E. schenkii* (Kirschbaum)); 14.156 *Thamnotettix* Zetterstedt (1 sp., *T. simplex* (Herrich-Schaeffer)); 14.157 *Doliotettix* Ribaut (1 sp., *D. pallens* (Zetterstedt)); 14.158 *Macustus* Ribaut (1 sp., *M. griseus* (Zetterstedt)); 14.159 *Streptanus* Ribaut (2 spp.); 14.160 *Extrusanus* Oman (2 spp.); 14.161 *Frigartus* Oman (1 sp., *F. frigidus* (Ball)); 14.162 *Remadosus* Ball (2 spp.); 14.163 *Athysanus* Burmeister (1 sp., *A. argentatus* (Fabricius)); 14.164 *Limotettix* Sahlberg (9 spp.)]



14.165 *Scleroracrus* Van Duzee

Twenty-one species, of which the following is common.

*S. vaccinii* (Van Duzee) (Blunt-nosed Cranberry Leafhopper).

14.166 *Exitianus* Ball

Two species, of which the following is of economic importance:

*E. exitiosus* (Uhler) (Gray Lawn Leafhopper).

[14.167 *Stirellus* Osborn and Ball (9 spp.); 14.168 *Penestirellus* Beamer and Tuthill (1 sp., *P. catalinus* Beamer and Tuthill); 14.169 *Gillettiella* Osborn (3 spp.); 14.170 *Kinonia* Ball (1 sp., *K. elongata* Ball); 14.171 *Hardya* Edwards (1 sp., *H. dentata* (Osborn and Ball)); 14.172 *Stenometopiellus* Haupt (1 sp., *S. cookei* (Gillette)); 14.173 *Doratura* Sahlberg (1 sp., *D. stylata* (Boheman)); 14.174 *Driotura* Osborn and Ball (6 spp.); 14.175 *Athysanella* Baker, subgenus *Athysanella* s. str. (22 spp.); subgenus *Amphipyga* Osborn (25 spp.); subgenus *Brachydella* Ball and Beamer (1 sp., *B. abdominalis* Ball and Beamer); subgenus *Gladionura* Osborn (32 spp.); subgenus *Pedumella* Ball and Beamer (2 spp.); 14.176 *Menosoma* Ball (2 spp.); 14.177 *Paramesus* Fieber (1 sp., *P. obtusifrons* Stål); 14.178 *Pasaremus* Oman (1 sp., *P. concentricus* (Van Duzee)); 14.179 *Palus* DeLong and Slesman (7 spp.); 14.180 *Orocatus* Oman (1 sp., *O. perpusillus* Ball and DeLong); 14.181 *Auridius* Oman (3 spp.); 14.182 *Mocuellus* Ribaut (3 spp.); 14.183 *Psammotettix* Haupt (10 spp.); 14.184 *Hebexa* Oman (1 sp., *H. incognita* Oman); 14.185 *Arthaldeus* Ribaut (1 sp., *A. pascuellus* (Fallen)); 14.186 *Sorhoanus* Ribaut (9 spp.); 14.187 *Giprus* Oman (7 spp.); 14.188 *Cazenus* Oman (7 spp.); 14.189 *Laeviccephalus* DeLong (18 spp.); 14.190 *Lemellus* Oman (1 sp., *L. bimaculatus* Gillette and Baker); 14.191 *Verdanus* Oman (1 sp., *V. evansi* (Ashmead)); 14.192 *Diplocolenus* Ribaut (1 sp., *D. configuratus* (Uhler)); 14.193 *Cribrus* Oman (2 spp.); 14.194 *Aflexia* Oman (1 sp., *A. rubranura* (DeLong)); 14.195 *Flexamia* DeLong (27 spp.); 14.196 *Secopennis* DeLong and Steesman (1 sp., *S. slossonae* (Ball)); 14.197 *Alapus* DeLong and Slesman (7 spp.); 14.198 *Latalus* DeLong and Slesman (3 spp.); 14.199 *Errastunus* Ribaut (2 spp.); 14.200 *Pinumius* Ribaut (1 sp., *P. sexmaculatus* (Gillette and Baker)); 14.201 *Quontus* Oman (4 spp.); 14.202 *Rosenus* Oman (4 spp.); 14.203 *Hebecephalus* DeLong (16 spp.); 14.204 *Pazu* Oman (1 sp., *P. balli* (Beamer)); 14.205 *Telusius* Oman (2 spp.); 14.206 *Peconus* Oman (1 sp., *P. scriptanus* (Oman)); 14.207 *Commellus* Osborn and Ball (4 spp.); 14.208 *Cabrulus* Oman (3 spp.); 14.209 *Crumbana* Oman (1 sp., *C. arundineus* (Crumb)); 14.210 *Haldorus* Oman (1 sp., *H. australis* (DeLong)); 14.211 *Deltocephalus* Burmeister (27 spp.); 14.212 *Umoka* Lawson (1 sp., *U. ornata* (Gillette)); 14.213 *Polyamia* DeLong (30 spp.)]

14.214 *Endria* Oman

Four species, of which the following is common:

*E. inimica* (Say) (Painted Leafhopper).

[14.215 *Lonatura* Osborn and Ball (12 spp.); 14.216 *Mexara* Oman (1 sp., *M. atascasus* (Ball)); 14.217 *Deltella* Oman (1 sp., *D. decius* (DeLong)); 14.218 *Daltonia* Oman (1 sp., *D. estacadus* (Ball)); 14.219 *Amblysellus* Slesman (1 sp., *A. curtisii* (Fitch))]

14.220 *Graminella* DeLong

Thirteen species, of which the following are common:

*G. nigrifrons* (Forbes) (Blackfaced Leafhopper).

*G. sonorus* (Ball) (Lesser Lawn Leafhopper).

[14.221 *Destria* Oman (2 spp.); 14.222 *Deltanus* Oman (1 sp., *D. texanus* (Osborn and Ball)); 14.223 *Amplicecephalus* DeLong (6 spp.); 14.224 *Sanctanus* Ball (10 spp.); 14.225 *Arundanus* DeLong (15 spp.)]

## Superfamily MEMBRACOIDEA

Two families (distinguished in the Key to the Superfamilies).

## 15. MEMBRACIDAE (Treehopper Family)

L. 5–13 mm (rarely over 12 mm). Green, brown, or black, sometimes brightly colored in tropical species. The highly modified prothorax is characteristic of this family. The pronotum extends back over the abdomen and is variously modified; it may be humpbacked, thornlike, or with bizarre enlargements and branches. Two ocelli. Antennae short, hair-like, inserted below and in front of the compound eyes. Both pairs of wings membranous, concealed by the pronotum. Hind legs slightly enlarged for jumping; hind tibiae often with three longitudinal rows of small setae and a transverse row of spurs; tarsi with three tarsomeres. (See Fig. 21.21 for general features.)

This is a large group, with over 2400 species in the world. Common on trees, shrubs, and field vegetation, most species are host specific; they are sap feeders on trees and shrubs. Some nymphs feed on grasses and herbaceous plants. The nymphs, usually gregarious, are often attended by ants for the honeydew they excrete.

There are 56 genera and 258 species in the U.S. and Canada.

## Subfamily Centrotinae

## Tribe Platycentrini

[15.1 *Platycentrus* Stål (2 spp.); 15.2 *Tylocentrus* Van Duzee (2 spp.)]

## Subfamily Nessorhininae

## Tribe Nessorhinini

[15.3 *Callicentrus* Stål (1 sp., *C. bonasia* Fabricius)]

## Subfamily Membracinae

## Tribe Hoplophorionini

15.4 *Umbonia* Burmeister

One species, as follows:

*U. crassicornis* Amyot and Serville (Thorn Bug). L.  $\pm 5$  mm. Yellow; pronotum is modified into a thornlike projection, which is dark at the apex. Sometimes a pest in resort areas because pronotal thorns injure bare feet. (1) OH; (2) s.e. US. (See A&J 67.)

[15.5 *Platycotis* Stål (3 spp.); 15.6 *Leioscyta* Fowler (3 spp.); 15.7 *Campylenchia* Stål (2 spp.)]

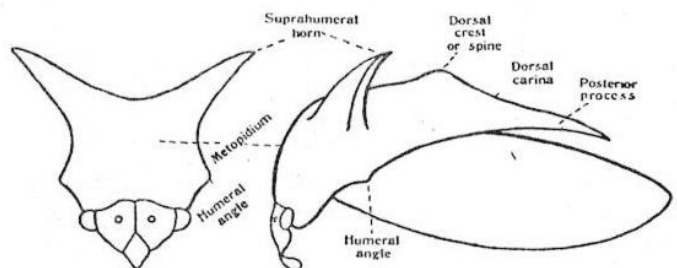


Fig. 21.21. (From Britton, 1923)

15.8 *Enchenopa* Amyot and Serville

Two species, of which the following is common:

*E. binotata* (Say) (Two-marked Treehopper).

[15.9 *Membracis* Fabricius (2 spp.)]

**Tribe Hypsoprini**

[15.10 *Philya* Walker (2 spp.); 15.11 *Hypsoprora* Stål (2 spp.); 15.12 *Scalmophorus* Fowler (1 sp., *S. minutus* Ball)]

15.13 *Sphongophorus* Fairmaire

All species of this genus are ornate. (See A&J 68, 69.) One species in the U.S., as follows:

*S. mexicana* (Guerin-Meneville) (Sponged Treehopper).

**Tribe Centrodontini**

All species of this tribe are found on Cresote Bush in (3) s.w. US, n. Mexico, and Baja California.

[15.14 *Centrodontus* Funkhouser (2 spp.); 15.15 *Multareoides* Cook (3 spp.); 15.16 *Multareis* Goding (1 sp., *M. cornutus* Goding)]

**Subfamily Darninae****Tribe Darnini**

[15.17 *Taunaya* Fonseca (2 spp.); 15.18 *Darnis* Fabricius (1 sp., *D. lateralis* Coquebert); 15.19 *Stictopelta* Stål (5 spp.)]

**Subfamily Smiliinae****Tribe Acutalini**

[15.20 *Acutalis* Fairmaire (4 spp.)]

**Tribe Microtalini**

[15.21 *Microtalis* Fowler (7 spp.)]

**Tribe Ceresini** — see Kopp & Yonke

[15.22 *Ilithucia* Stål (1 sp., *I. pacificata* Buckton); 15.23 *Ceresa* Amyot and Serville (3 spp.)]

15.24 *Stictocephala* Stål

Sixteen species, of which the following is a common example:

*S. bisonia* Kopp and Yonke (Buffalo Treehopper). L. 7–9 mm. Green or yellowish-green. Since its eggs are laid in the bark and twigs of fruit trees, this species is of some economic importance. The nymphs feed on herbaceous vegetation in orchards and fields. Common (1), (2), (3), (4), (5).

[15.25 *Tortistilus* Caldwell (9 spp.)]

15.26 *Spissistilus* Caldwell

Nine species, the following of which is common:

*S. festinus* (Say) (Three-cornered Alfalfa Treehopper).

[15.27 *Anisostylus* Caldwell (4 spp.); 15.28 *Stictolobus* Metcalf (3 spp.); 15.29 *Vestistilus* Caldwell (2 spp.); 15.30 *Trichaetopyga* Caldwell (1 sp., *T. juniperina* Ball); 15.31 *Parantonae* Fowler (1 sp., *P. hispida* Van Duzee)]

**Tribe Amastrini**

[15.32 *Bajulata* Ball (1 sp., *B. bajula* [Goding])]

15.33 *Vanduzeeia* Goding

Five species, of which the following is common:

*V. segmentata* (Fowler) (Van Duzee Treehopper).

[15.34 *Amastris* Stål (2 spp.)]

**Tribe Smilini**

[15.35 *Carynota* Fitch (4 spp.)]

15.36 *Glossonotus* Bulter

Six species, of which the following is common:

*G. crataegi* (Fitch) (Quince Treehopper).

[15.37 *Heliria* Stål (12 spp.); 15.38 *Helonica* Ball (1 sp., *H. excelsa* (Fairmaire)); 15.39 *Palonica* Ball (4 spp.); 15.40 *Telamona* Fitch (26 spp.); 15.41 *Telonaca* Ball (2 spp.); 15.42 *Telamonanthe* Baker (2 spp.)]

15.43 *Antianthe* Fowler

One species only, as follows:

*A. expansa* (Germar) (Solanaeoous Treehopper).

[15.44 *Atymna* Stål (6 spp.); 15.45 *Cyrtololus* Goding (40 spp.); 15.46 *Ashmeadea* Goding (1 sp., *A. carinata* (Stål)); 15.47 *Grandolobus* Ball (1 sp., *G. grandis* Van Duzee)]

15.48 *Thelia* Amyot and Serville

Two species, of which the following is common:

*T. bimaculata* Fabricius (Locust Treehopper). L. 10–11 mm. This extremely abundant species occurs only on locust, where it is attended by ants. (1) n.e. US; (2) s.e. US.

[15.49 *Ophiderma* Fairmaire (14 spp.); 15.50 *Smilia* Germar (2 spp.); 15.51 *Xantholobus* Van Duzee (12 spp.)]

**Tribe Polyglyptini**

[15.52 *Publilia* Stål (5 spp.); 15.53 *Bryantopsis* Ball (1 sp., *B. ensigera* Ball); 15.54 *Entylia* Germar (5 spp.)]

**Subfamily Stegaspininae****Tribe Microcentini**

[15.55 *Microcentrus* Stål (6 spp.); 15.56 *Dontonodus* Funkhouser (1 sp., *D. schaefferi* Goding)]

## 16. AETALIONIDAE (Aetalionid Treehopper Family)

L. 7–30 mm. Brown, reddish brown, or black. This family is worldwide in distribution, but most of the 50 species occur in tropical North and South America. Only one species reaches the U.S., as follows:

[16.1 *Aetalion* Latreille (1 sp., *A. nervosopunctatum* Signoret) (3) AZ.]

**Suborder STERNORRHYNCHA**

This large suborder contains the scale insects and related families, including the large family Aphididae. They are small in size and usually have long and filiform antennae, although these may be greatly reduced in some of the scale insects. Their legs are well developed, rudimentary, or entirely lacking. The beak, if present, seems to arise between the front coxae. The wings may or may not be present; if present, they are thin, with reduced venation. Wings are present in some scale insect males,

38.83 *Unaspis* MacGillivray

Two species, both of which are pests:

*U. citri* (Comstock) (Citrus Snow Scale).

*U. euonymi* (Comstock) (Euonymus Scale). (See Fig. 21.34 for female scales and male cocoons.)

[38.84 *Velataspis* Ferris (3 spp.); 38.85 *Xerophilaspis* Cockerell (1 sp., *X. prosopidis* Cockerell)]

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