

**OHIO BIOLOGICAL SURVEY**

**THE FULGORIDAE OF OHIO**

*By*

**HERBERT OSBORN**

**THE OHIO STATE UNIVERSITY**

**COLUMBUS**

**OHIO**

# THE FULGORIDAE OF OHIO

By HERBERT OSBORN

This article covers one of the groups of Homoptera which have engaged the attention of the writer more or less continuously since his coming to the state forty years ago.

In Bulletins of the Ohio Biological Survey Nos. 14 and 31 the leafhoppers have been treated, the jumping plant lice in Bulletin 34, and lists in various groups have appeared in the *Ohio Naturalist* and *Ohio Journal of Science*. Articles on the Cicadidae, Membracidae and Cercopidae are in an advanced stage of preparation and it is hoped they may be issued in the not distant future. Naturally such surveys can never be considered as complete as the discovery of species that have been overlooked, the migration into the state of species hitherto known only from distant localities and new ecological or geographic details require additional study. The publication of records known up to date serve to show the present knowledge and is a basis for more detailed investigation.

## Family FULGORIDAE (Homoptera)

This group includes a large assemblage of insects which differ very distinctly from any of the other groups of Homoptera. Distinctive characters are found in the position of the antennae which are located beneath the eyes and are usually composed of two or three short, thick segments with a terminal bristle although in some cases the second segment may be long and variously modified. The head is subject to great modification; in some forms being greatly inflated, in others flattened or produced into a long spur and in others very short, the eyes forming most of the structure. There are usually two or three ocelli, one under each antenna, the third, if present, located on the lower border of the front. The prothorax is generally short, sometimes a mere collar; the mesonotum generally large and the metanotum short or covered and invisible. The elytra are usually quite densely veined, often opaque, but with very considerable differences in the different groups. The legs are usually slender, the tibiae sometimes foliaceous and in one group the hind tibiae are provided with a strong, movable spur, the *calcar*. The species are most abundant in tropical regions but we

have a considerable number in the northern states, some of them of distinct economic importance; and in the group *Delphacinae*, which are minute species, there are many kinds which occur in enormous numbers and must constitute a distinct economic factor, particularly in meadows and pastures.

The group includes a number of subdivisions which have very distinctive characters and have by some authors been given family rank, the group as a whole being a superfamily, *Fulgoroidae*. However, these divisions agree in so many respects that it seems preferable, at least for our purpose, to use the term subfamily, a plan

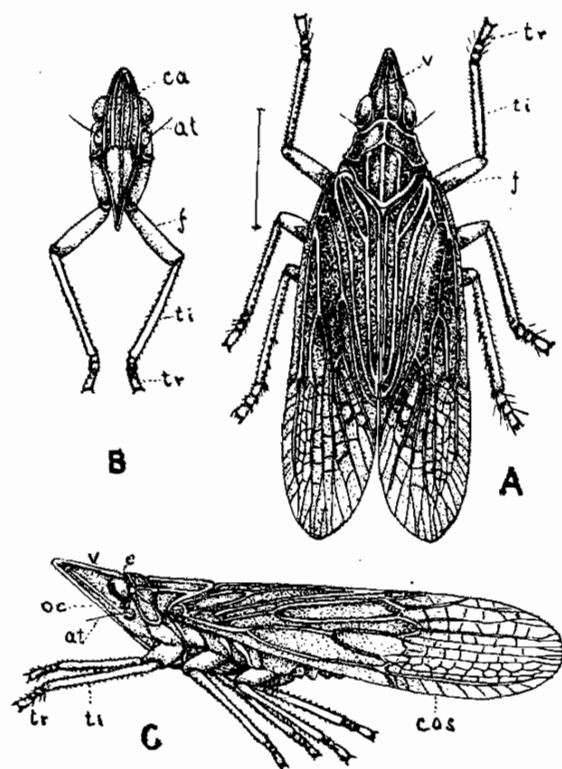


Fig. 1.—Terms used in descriptions: Fulgorid *Dictyophara lingula*, A, dorsal view; B, face; C, lateral view; v, vertex; f, frons (front); ti, tibia; tr, tarsus; c, carina; oc, ocellus; cos, costa. (From drawing by Miss E. Hyde.)

which has been followed by Mr. Van Duzee in his systematic papers. From the standpoint of the world fauna the other plan may have advantages, but for practical use on our local fauna I believe the subfamily rank will be found quite as satisfactory. Of the recognized subfamilies we have in Ohio representatives of all but two, the *Ricaninae* and *Tropiduchinae*.

Many collectors have assisted in the gathering of the specimens on which this paper is based and I am glad to acknowledge especially the work of Mr. O. H. Swezey who collected quite extensively in 1900, Professor J. S. Hine, for many years connected with the Department; Dr. E. P. Breakey, Mr. C. B. Mayer, Mr. J. N. Knull are others to be mentioned for particular species. For personal

credit initials J.S.H. for Prof. J. S. Hine; O.H.S., Mr. O. H. Swezey; H.O., Herbert Osborn; C.J.D., Carl J. Drake; E.P.B., Dr E. P. Breakey; C.C.B.M., Mr. Charles C. B. Mayer; J.N.K., Prof. J. N. Knull; A.C.M., Albert C. Miller; J.S.C., John S. Caldwell; F.B.W., F. B. Whittington; M.A., Dr. Mary Auten.

Dr. John S. Caldwell has prepared and drawn the genitalia for Cixiidae and some of the other genera as credited, and I am indebted to him for a number of additions and corrections to bring the records up to date.

For illustrations I have to thank Mrs. Celeste Taft, Miss C. M. King, Mrs. Dorothy M. (Johnson) Knull, Dr. J. S. Caldwell, and others for figures credited in each case to their respective artist.

Bibliographic or synonymic references are usually omitted except for species described or changed since the publication of Van Duzee's Catalogue in 1917.

Figure 1 explains the parts commonly used in the description or keys.

#### Subfamilies of FULGORIDAE

1. Anal area of the elytra reticulate, clypeus carinate.....FULGORINAE  
Anal area of the elytra not reticulate, clypeus not carinate..... 2
2. Hind tibiae without movable spur..... 3  
Hind tibiae with broad movable spur.....DELPHACINAE
3. Clavus without pustules or granulations..... 4  
Clavus with prominent pustules or granulations.....FLATINAE
4. Claval veins joined to commissural border..... 6  
Claval veins joined to claval suture or extending to apex..... 5
5. Without an ocellus at apex of front.....DICTYOPHORINAE  
With an ocellus at apex of front; elytra with numerous veins but not  
reticulate at apex.....CIXIINAE
6. Elytra broad, folded vertically.....ACANALONIINAE  
Elytra narrow, or lying horizontally..... 7
7. Head broad, eyes well separated.....ISSINAE  
Head narrow, eyes approximate..... 8
8. Elytra horizontal, overlapping at apex.....ACHILINAE  
Elytra somewhat decumbent, not overlapping at apex.....DERBINAE

#### Subfamily FULGORINAE

Represented in Ohio by one species included in the genus *Cyrpoptus* and possibly one in *Poblicia*.

#### Genus *Cyrpoptus* Stål

Members of this genus are flattened, usually dark colored with narrow elytra which are obliquely truncate at tip. They are southern in distribution and only one species known in Ohio and that very rare here.

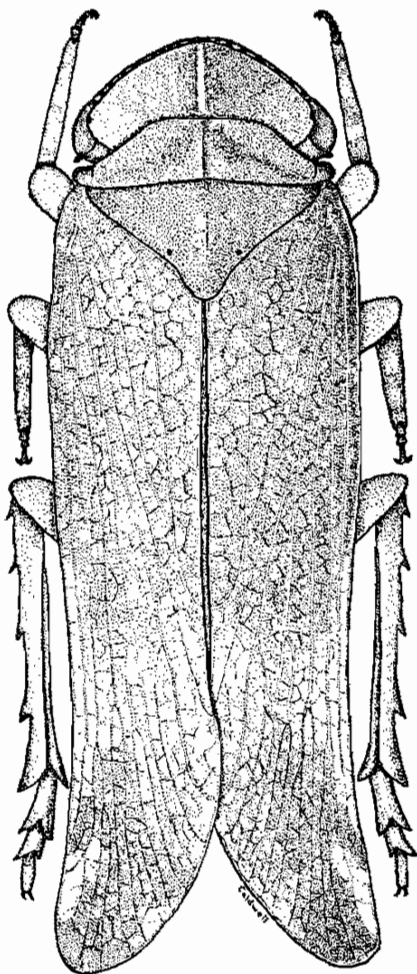


Fig. 2.—*Cyrpoptus belfragei*  
(J. S. Caldwell del)

### *Cyrpoptus belfragei* Stål (Fig. 2)

This species has a broad flattened head the anterior border of which is broadly rounded. The vertex nearly twice longer at middle than at eye and a little more than the length of pronotum. The gray brown color is tinged with reddish modified by small blackish patches and a fairly distinct smoky oblique bar near the tips with hyaline areas on costa.

Length of body 8-9 mm., to tip of elytra 13-14 mm.

One specimen collected in Vinton Co., 6/5-12-'00 by J. S. Hine, one male, Jackson Co. 6-30-'35 (A.C.M.) and one female specimen collected by J. B. Polivka, Scioto Trail Forest 6-24-'34. This last is slightly larger but agrees closely with the Vinton specimen.

### Genus *Poblicia* Stål

This genus has been credited with one species in Ohio.

### *Poblicia fuliginosa* (Oliv.)

Head broad and short the elytra coriaceous dark piceous and dotted with white. Length to tip of elytra 13-17 mm.

Van Duzee records this species from Ohio, but our collections do not contain any example. It is said to occur only on Sumac and it probably has a limited appearance in the adult stage. It seems hardly possible that the species would not be taken in all these years and it seems doubtful that it occurs. I cannot locate the source of Van Duzee's record and Dozier's reference is probably based on the record in Van Duzee's Catalogue.

## Subfamily DICTYOPHORINAE

### KEY TO OHIO GENERA

1. Vertex produced in a long cephalic process.....*Scolops*  
Vertex short, fore femora expanded, leaf like.....*Phylloscelis*

### Genus *Scolops* Schaum.

1. Elytra with numerous cross-veins, reticulate.....*sulcipes*  
Elytra with cross-veins only near apex..... 2

2. Cephalic process long, upcurved..... 3  
     Cephalic process short, scarcely upcurved.....*angustatus*
3. Cephalic process slender, one-half as wide as vertex, form elongate  
     oval, color brownish.....*perdix*  
     Cephalic process thicker. Three-fourths as wide as vertex, form oval,  
     broad. Short winged elongate oval.....*pungens*

### *Scolops sulcipes* Say (Fig. 3)

This is our most common species and is distinguished by the numerous small square areoles in the apical part of the elytra. Length 6 mm.

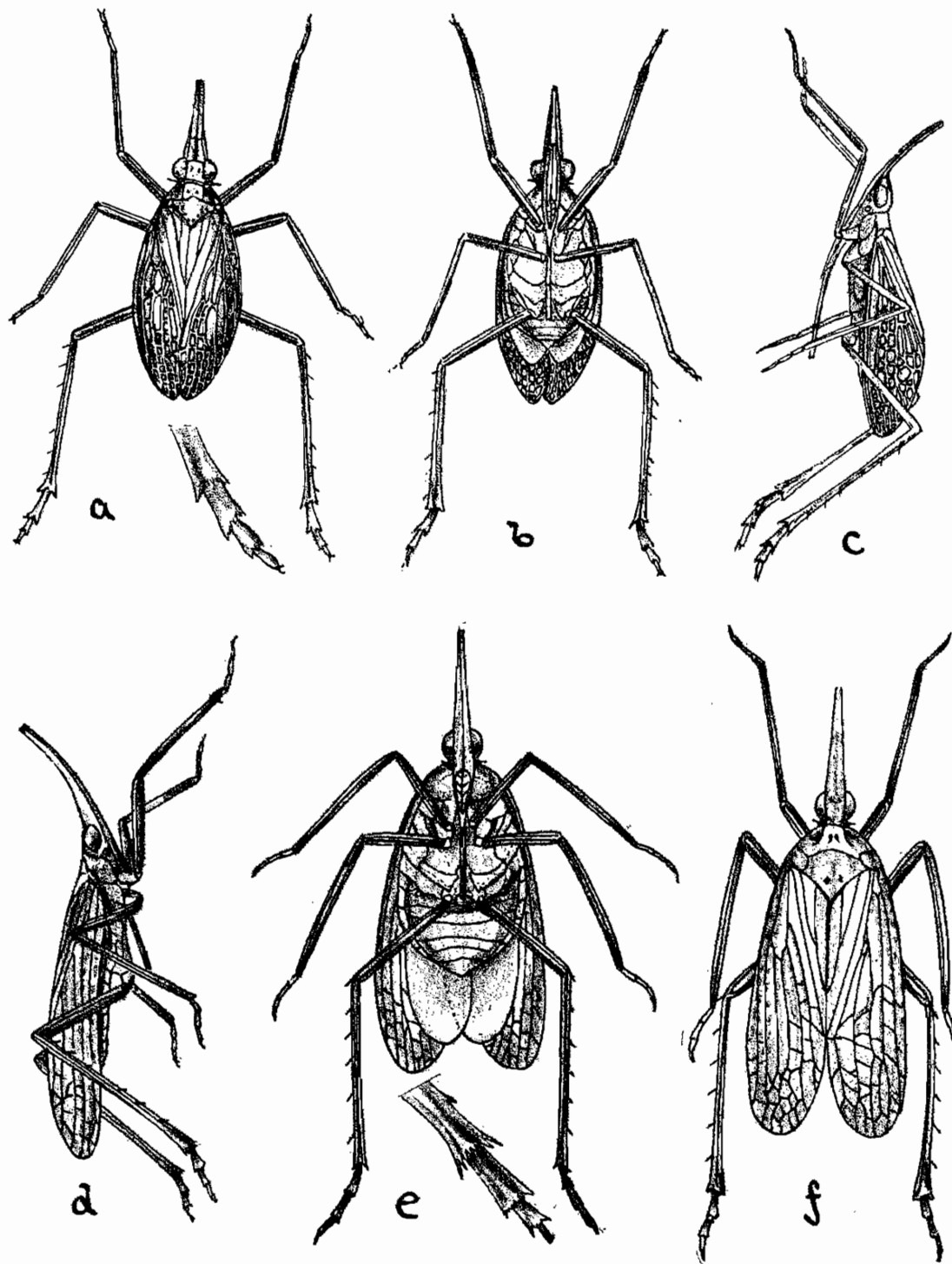


Fig. 3.—*Scolops sulcipes* a, dorsal; b, ventral; c, side view; d, e, f, macrop-terous form. (C. M. King del.)

This occurs in two forms, the long and short winged, the former having the elytra nearly flat and extending much beyond the tip of the abdomen, the latter with elytra distinctly convex and extending but slightly beyond the abdomen.

Specimens have been taken generally over the state. Records are for Columbus (H.O.), Castalia 7-13-'01 (H.O.), Steubenville '94 (H.O.), Rupels 8-15-'05 (H.O.), Apple Grove 8-15-15 (C.S.D.), Marietta (W. V. Balduf), Oxford and Dayton, and counties Adams 10-13-'36 (J.S.C.), Franklin 7-14-'34 (F.B.W.) 8-1-'34 (A.C.M.) 7-13-'31 (E.P.B.), Hocking 8-5 and 8-11-'34 (A.C.M., F.W., J.S.C.), Madison 7-29-'34 (F.B.W., A.C.M.), Marion 8-26-'34 (F.B.W.), Ross 8-18-'35 (J.S.C.), Pickaway 7-1-'36, 8-5-'34 (J.S.C.)

***Scolops pungens* Germ. (Fig. 4)**

*Flata pungens* Germar. Thons. Ent. Archiv II, p. 47, 1830

*Scolops spurcus* Uhler. Tr. Md. Acad. Sci. I, p. 403, 1900

*Scolops desiccatus* Uhler. Tr. Md. Acad. Soc., p. 407, 1900

*Scolops parvulus* Metcalf. Elisha Mitchell Sci. Soc., Vol. 38, p. 175

*Scolops pungens* Breakey. Kans. Univ. Sci. Bull., Vol. 18, p. 438, 1928

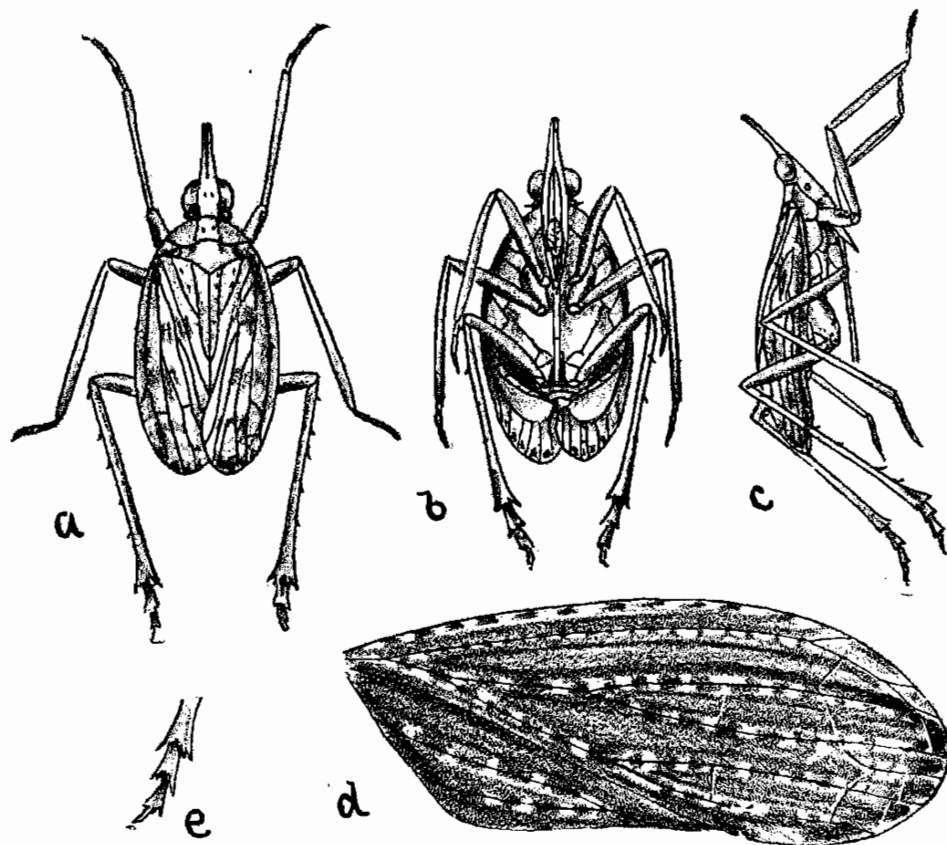


Fig. 4.—*Scolops pungens* a, dorsal; b, ventral; c, side view; d, elytra; e, tarsus. (C. M. King del.)

This is about the same size as *sulcipes* and also occurs in long and short winged forms but may be recognized by the lack of numerous areoles on the apical part of the elytra. The cephalic

process is long and curves upward. The color is dark gray, rather thickly mottled with fuscous. Length 5-6 mm.

Our specimens are from the south part of the state, Marietta 7-20-'02 (H.O.), Ross Co. 8-8-'37 (J.S.C.), Clermont Co. and north in Oak opening in Fulton Co. (H.O.).

### ***Scolops perdix* Uhl. (Fig. 5)**

*Scolops perdix* Uhler. Md. Acad. Sci. I, p. 405 (1900)

*Scolops perdix* Breakey. Kans. Univ. Sci. Bull., Vol. 18, p. 431, 1928

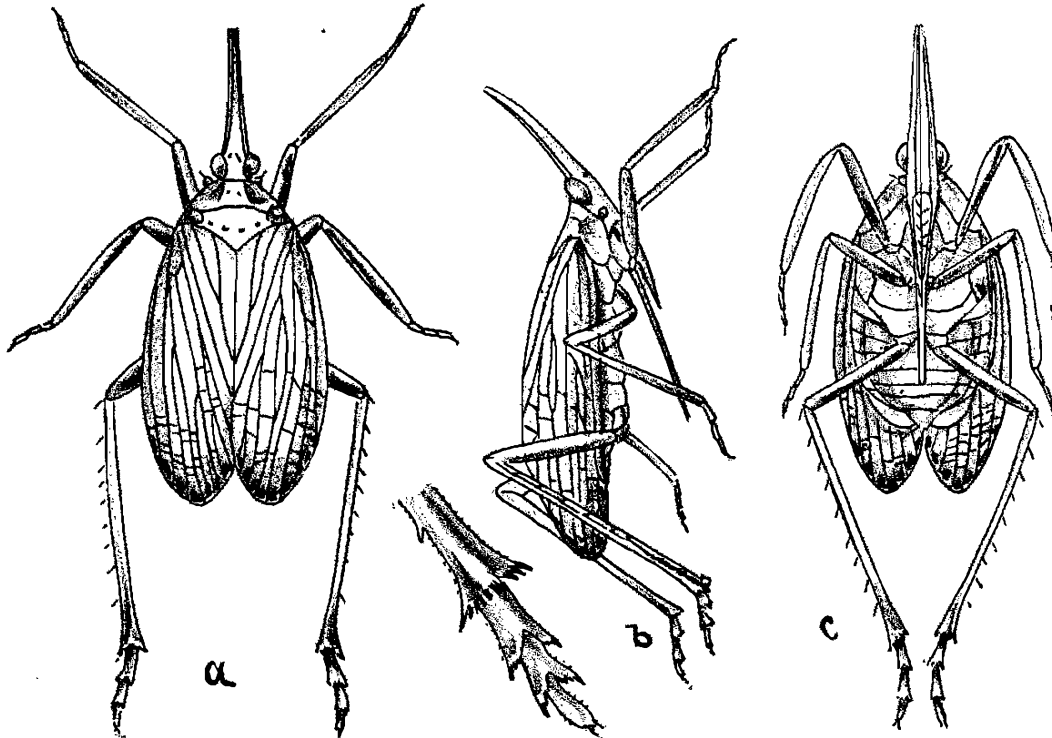


Fig. 5.—*Scolops perdix* a, dorsal; b, side; c, ventral view. (C. M. King del.)

Similar to *sulcipes* but with length of elytra and reticulations limited to apex. Length 6-6.5 mm. N. Kenova 8-24-'15, Gallia Co. 8-23-'15, Marietta 8-14-'15, Apple Grove 8-17-'15 (C.J.D.). Breakey gives localities from Massachusetts to Illinois and south to gulf. Ohio records are uncertain but the species should occur in southern part at least.

### ***Scolops angustatus* Uhl. (Fig. 6)**

Rather narrow with a very short cephalic process directed nearly forward. Dark gray with the costa of elytra whitish. Length 7 mm.

This species is recorded for Connecticut, New York, and also for the western states. It has been taken in Franklin, Licking, Adams, Marion, Champaign, Erie (A.M.), Pickaway (J.S.C.), Madison (J.S.C.), and Hocking (F.B.W.), counties in Ohio.



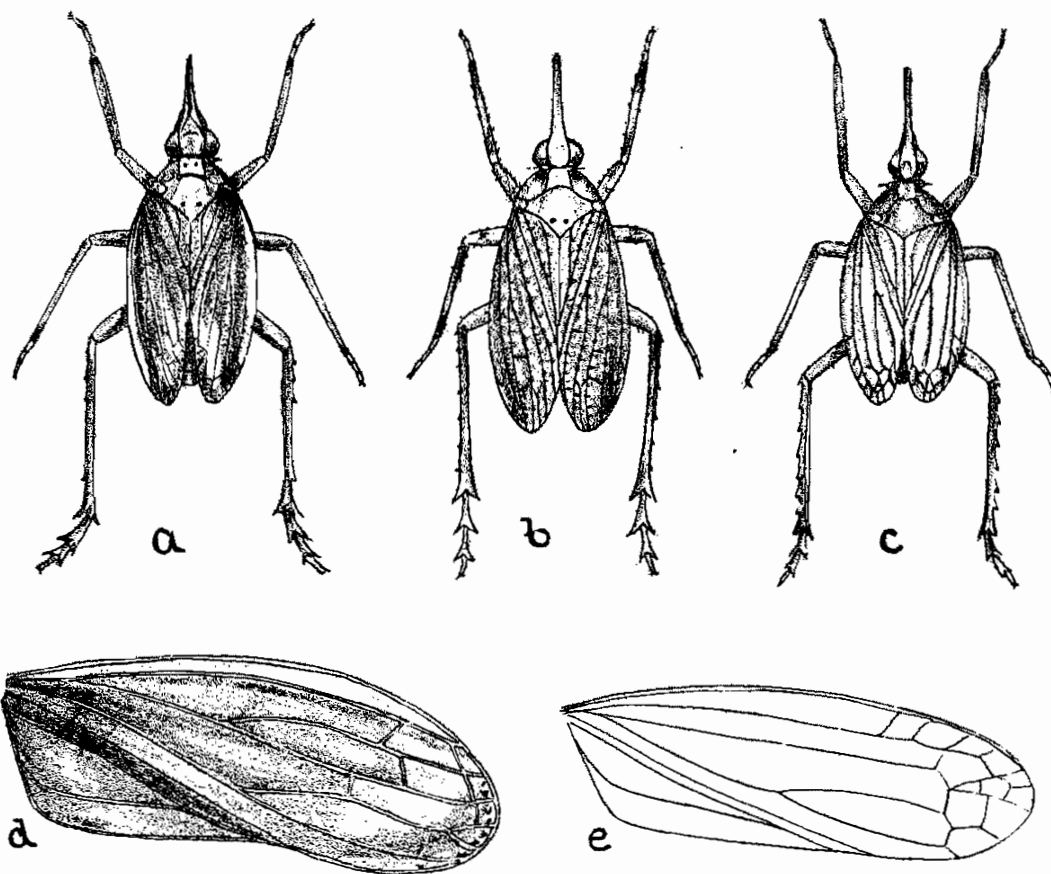


Fig. 6.—*Scolops angustatus*, a, dorsal; b, *pungens*; c, *pallida*; d, elytra of *angustatus*. (C. M. King del.)

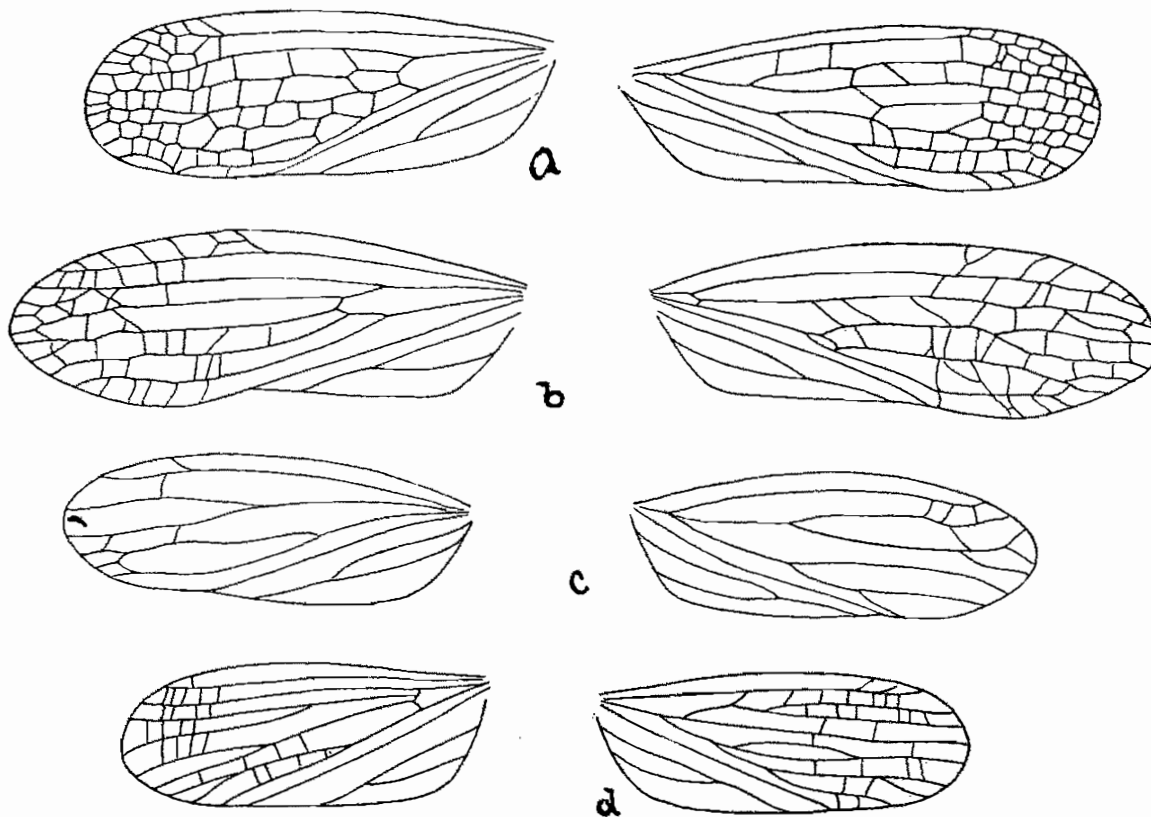


Fig. 7.—*Scolops* sps. elytra, a, *sulcipes*; b, *sulcipes* long; c, *pungens*. (C. M. King del.)

Genus *Phylloscelis* Germar

These are short, nearly hemispherical in form except for the long-winged form which occasionally occurs. The anterior femora are broad, leaf-like, and the other legs slender.

Key to Species of *Phylloscelis*

1. Elytra brown, nervures fuscous with pale dots.....*pallescent*  
Elytra black, nervures concolorous or pale, not dotted..... 2
2. Nervures concolorous, black.....*atra*  
Nervures pale.....var. *albovenosa*

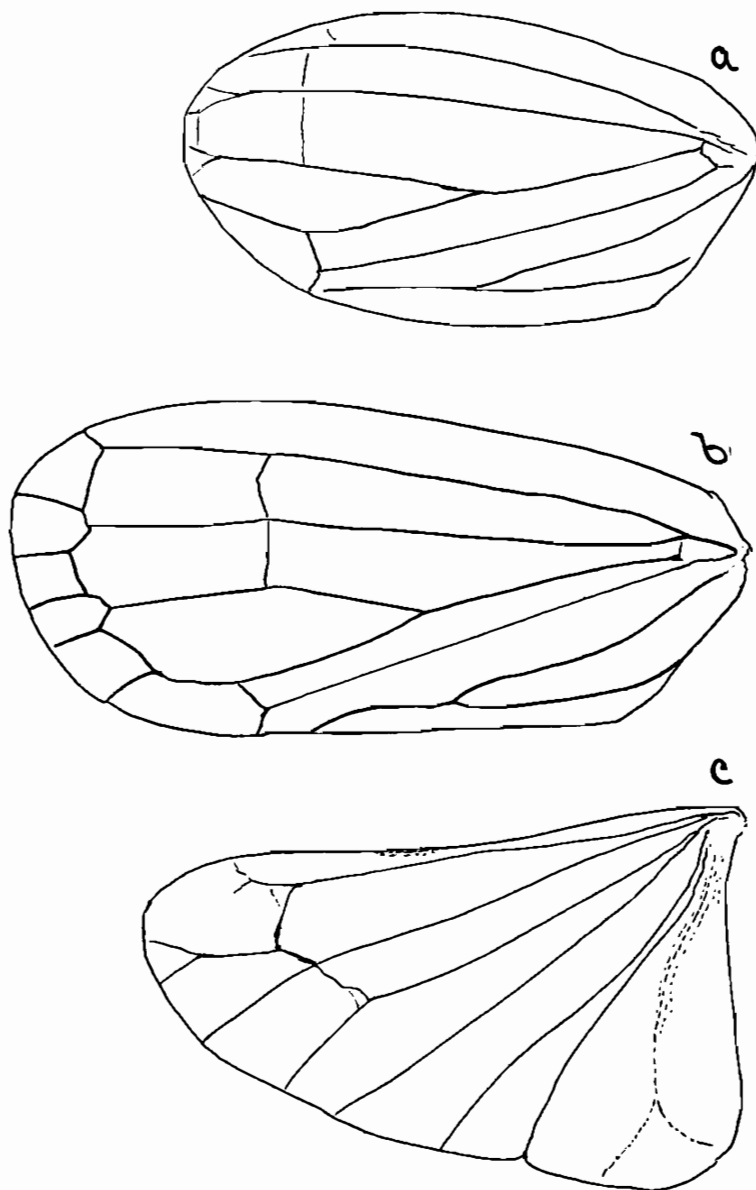


Fig. 8.—*Phylloscelis atra*, a, micropterous elytron; b, c, macropterous elytron and wing. (Authors illustration Ohio Nat.)

***Phylloscelis atra* Germar (Fig. 8)**

Black, head small; elytra broadly curved, convex in the short winged form, flattened and extending beyond abdomen in the long winged form.

Marietta 9-13-'05, Athens 9-12,'05, Rupels (H.O.), Castalia 8-13-'09, Adams Co. 9-1-'09 (H.O.), Marion and Franklin Cos. 8-30-'34 (A.C.M.), 10-13-'35 (J.S.C.), Hocking Co. 8-5-'34 (F.B.W.), 8-12-'34 (J.S.C., A.C.M.), Malta 8-12-'15, Apple Grove 8-17-'15 (C.J.D.), Ross Co. 8-8-'35 (J.S.C.).

***Phylloscelis atra* var. *albovenosa* Melichar**

This agrees with the black form except that the mesonotum and nervures of elytra are yellow or whitish.

Specimens have been taken at Marietta 9-3-'05 (H.O.), Marion 9-9-'31, Adams Co. 9-1-'31 (H.O.), 8-26-'34 (F.B.W.), Apple Grove 8-17-'15 (C.J.D.), Adams Co. 9-30-'34 (A.C.M.) 10-13-'35 (J.S.C.), Hocking Co. 8-5-'34 (F.B.W.), 8-12-'34 (J.S.C.), Ross Co. 8-8-'35 (J.S.C.).

***Phylloscelis pallescens* Germar**

Similar in size to *atra* but brown in color and with distinctly dotted nervures.

Reported as common for the eastern United States from Massachusetts to Florida and from western states and recently has been collected, 8-26-'34, at Marion by F. B. Whittington.

**Subfamily ACHILINAE**

These are elongated or oblong depressed insects with their folded elytra overlapping at the apex. The claval nervure is continued to the apex.

**KEY TO GENERA**

- Lateral compartments of pronotum at least as long as eyes, occasionally longer.....*Epiptera*  
Lateral compartments shorter than eyes.....*Catonia*

**Genus *Epiptera* Metcalf**

This genus includes species with broad wings lying flat over the back; the head more or less produced; the lateral spaces of the pronotum as long as the eye; colors usually gray but in *opaca* quite dark.

Two species have been taken in Ohio, *opaca* and *variegata*, but others are likely to occur and have been included in the key. Most of the species appear to be associated with coniferous forests.

**KEY TO SPECIES**

1. Color uniform black or blackish..... 2  
Color gray or brownish or variegated..... 3
2. Vertex short, as broad as long, face banded.....*opaca*  
Vertex long, twice as long as broad.....*colorata*
3. Face black, with cross band white or whitish.....*brittoni*  
Face without distinct white cross band..... 4

4. Clypeus distinctly darker than frons..... 5  
Clypeus not distinctly darker than frons..... 6
5. Vertex longer than width at base, small, 7 mm.....*floridae*  
Vertex shorter than width at base, larger, 10 mm.....*pallida*
6. Vertex very short, broader than long..... 7  
Vertex as long as broad, frons dusky at base.....*slossoni*
7. Vertex obtusely angulate, face brownish, dotted with white.....*obtusa*  
Vertex very short, rounded; face irrorate; elytra maculate with gray  
.....*variegata*

### **Epiptera opaca (Say)**

A rather large species, the upper and under surface black but a striking yellowish white band across the face occupying the lower half of the front and extending as a broad stripe each side across the cheek, pro- and meso-thorax, including the ocelli, antennae, lower part of propleura and base of coxae. Length to tip of elytra 11 mm.

A specimen of this species from Jefferson, Ohio, Sept. '08, collected by J. R. Sim.

### **Epiptera variegata (Van Duzee) (Fig. 9)**

Dull gray; the face uniformly brownish, minutely dotted with

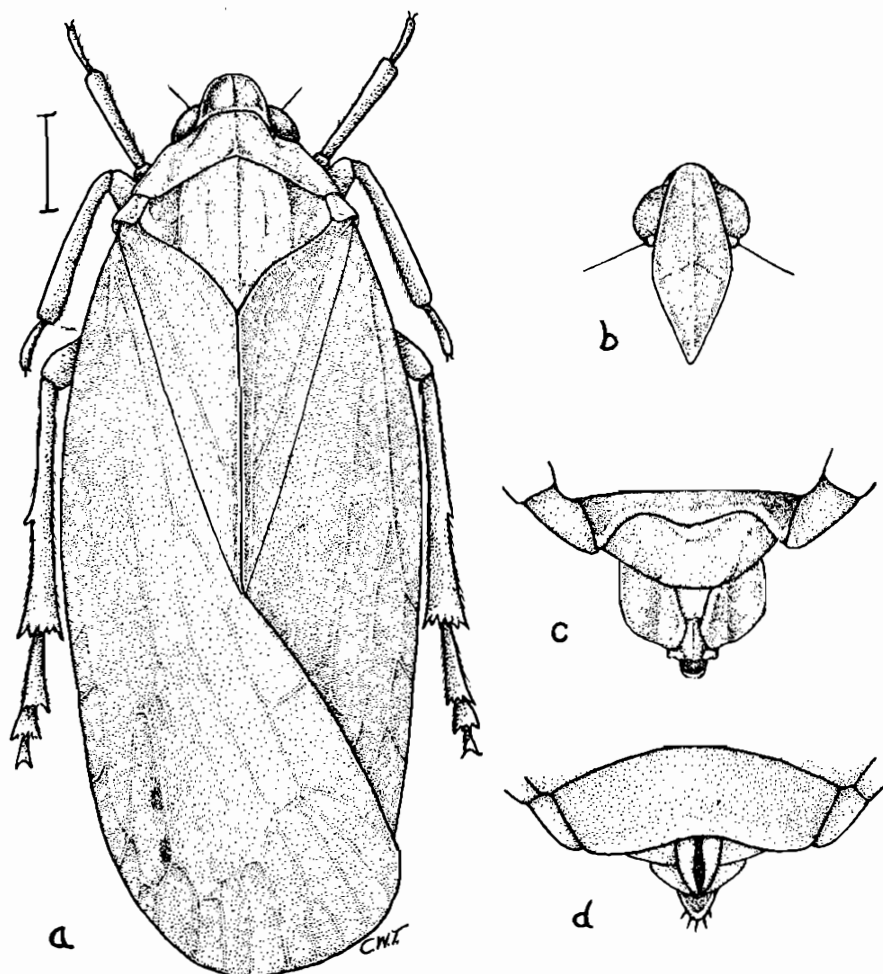


Fig. 9.—*Epiptera variegata*, a, dorsal view; b, face; c, d, genitalia. (Celeste Taft del.)

whitish; the propleura with black stripe, edged with white; upper surface gray; elytral veins distinct, alternately dotted, the areoles somewhat splashed with light gray. Length 10 mm.

Two specimens from Sugar Grove, October 4, 1919; Rockbridge 10-2-'31 (H.O.), Adams Co. 9-30-'34 (A.C.M.) 10-13-'35 (J.S.C.). Specimens from Hocking Co. through Oct. (J.N.K. and J.S.C.), Scioto Co. 10-13-'35 (J.S.C.), Fairfield Co. 10-12-'35 (J.S.C.).

***Epiptera slossoni* (Van D.) (Fig. 10)**

No records for Ohio but the species has been taken under

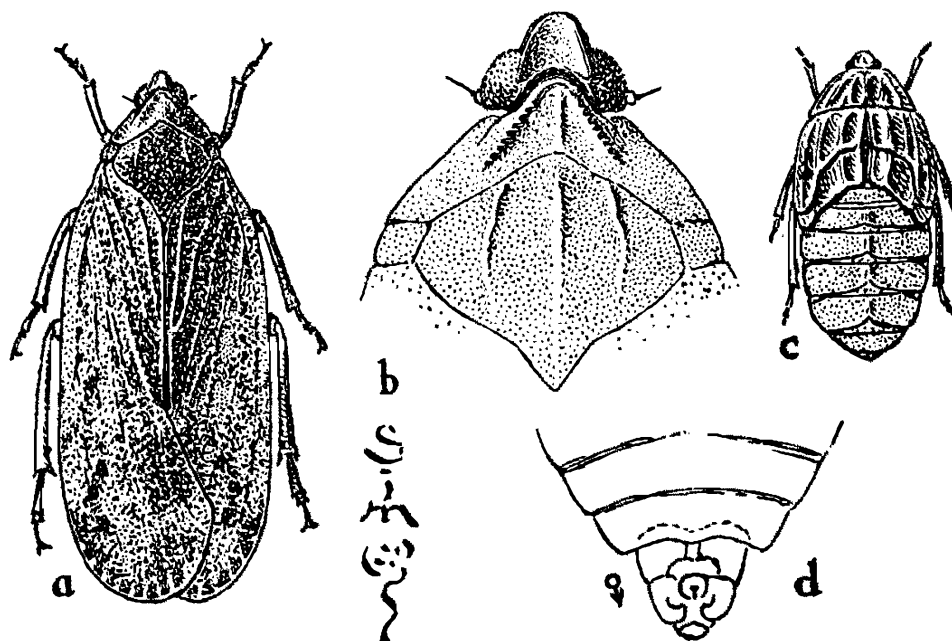


Fig. 10.—*Epiptera slossoni*. Authors illustration, N. Y. School of Forestry, Bull. 16. (R. J. Sim del.)

spruce bark in New York and should be found in Ohio in sections where native conifers occur.

**Genus *Catonia* Uhl.**

Smaller and narrower than *Epiptera*; the pronotum short and its lateral compartment shorter than the eye.

**KEY TO SPECIES**

- |   |                   |
|---|-------------------|
| 1. Face distinctly transversely banded.....   | 2                 |
| Face without transverse bands.....  | 8                 |
| 2. Front black; clypeus white; elytra testaceous, almost immaculate. <i>dimidiata</i>                   |                   |
| Front banded with black or brown and white.....   | 3                 |
| 3. Front whitish on basal one-half, fuscous on apical half; disk of mesonotum with a fuscous cloud..... | <i>nava</i>       |
| Front blackish or brown with a white transverse median band.....  | 4                 |
| 4. Elytra almost uniformly testaceous.....  | <i>impunctata</i> |
| Elytra varied with whitish and brown or fuscous.....  | 5                 |
| 5. Discal compartment of mesonotum fuscous with four pale dots; elytra fuscous varied with whitish..... | 6                 |

- Mesonotum castaneous; elytra varied with ferruginous and pale.....*picta*
6. Bands of face black and white.....*cinctifrons*  
 Bands of face pale brown or fulvous and white..... 7
7. Border of frons black and white. Transverse band broad.....*lunata*  
 Border of frons not sharply black and white. Frons fulvous with narrow white band between antennae.....*bicinctura*
8. Median compartments of the mesonotum marked with an ocellate spot at apex; elytra whitish testaceous varied with fuscous and marked with white transverse veinlets.....*grisea*  
 Median compartments of the mesonotum without eye-spots; elytra whitish testaceous, obscurely varied with white veinlets.....*pumila*

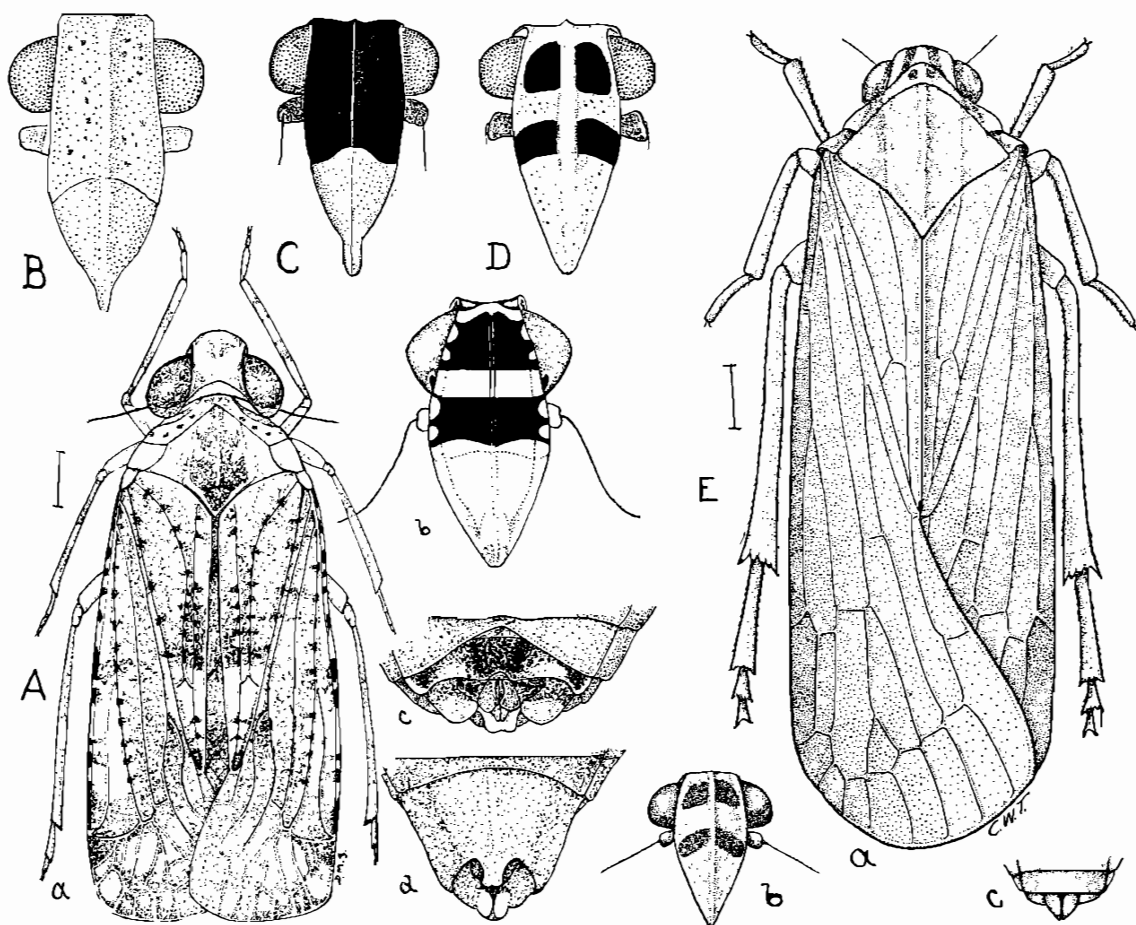


Fig. 11.—A. *Catonia lunata*, a, dorsal view; b, face; c, female; d, male genitalia (Dorothy M. (Johnson) Knull del). *Catonia* sps. B, *grisea*; C, *dimidiata*; D, *impunctata* (J. S. Caldwell del). E, a, dorsal view; b, face; c, female; d, male genitalia (Celeste Taft del.)

***Catonia dimidiata* Van Duzee (Fig. 11c)**

Similar to *impunctata* but with the face black down to the base of clypeus; clypeus white; elytra impunctate, uniformly pale brownish. Length 5 mm.

Hocking Co. 8-25-'35 (J.S.C.).

***Catonia impunctata* (Fitch) (Fig. 11D, 12c)**

Similar to *dimidiata* but with a distinct white band separating the black spots of the front; the vertex has a triangular spot each

side of the middle carina; carinae, front, vertex and mesonotum are pale; patagia black; mesonotum, except carina, fulvous; elytra brown fuscous; veins distinct but not punctate. Length 5 mm.

This is a common species in the eastern states and I have a number of specimens from New York and Pennsylvania. It appears to be rare in Ohio. Specimens have been taken in Hocking in September (J.N.K. and J.S.C.), The Brown Fruit Farm, Adams Co. 7-13-'34 (J.N.K.), Franklin Co. 8-16-'31 (E.P.B.).

***Catonia cinctifrons* (Fitch) (Fig. 12D)**

A small species with black on the front crossed by a distinct white band; the lateral carinae alternating black and white; dorsal surface varied with fuscous and whitish; elytral veins punctate, apical veins whitish. Length 4 mm.

An eastern species taken in Ohio at Brown Fruit Farm near Worthington 8-21-'23 (C. C. B. Mayer), Adams Co. 9-1-'31 (E.P.B.), Hocking Co. 10-10-'31 (E.P.B.) 10-7-'36 (J.N.K.) Licking Co.

***Catonia picta* Van Duzee**

Slightly larger than *cinctifrons*; mesonotum distinctly ferruginous; the front black with a broad white band; elytra light gray with a broad brownish band on basal third followed by a whitish band, the apical part brownish with white veins. Length 4 mm.

This species has been recorded from New Jersey to Florida and will probably be found in the pine sections of Ohio.

***Catonia grisea* Van Duzee (Fig. 11B, 12F)**

Dark gray; the face white or with a faint dusky band at base; the carinae light; mesonotum and elytra varied with light fuscous and whitish, the veins mostly white. Length 6 mm.

One specimen from Medina, Ohio; Others Flint 8-4-'28, Adams Co. 7-13-'34 (J.N.K.), Ross Co. 9-15-'37, and Ashland 7-28-'35 (J.N.K.).

***Catonia pumila* Van Duzee (Fig. 12A)**

Similar to *grisea* but smaller and with the mesonotum more distinctly fulvous; face pale, unbanded or with bands very faintly indicated, carinae pale; elytral veins punctured, veins of membrane white. Length 4 mm.

This species is known from the Atlantic coast to Nebraska but Ohio specimens have been taken only at Marietta, Sept. 13, 1905 (H.O.) and at Athens, Sept. 17, 1929 (C.C.B.Mayer).

***Catonia nava* (Say) (Fig. 12B)**

A rather large species, with the upper surface varied with fus-

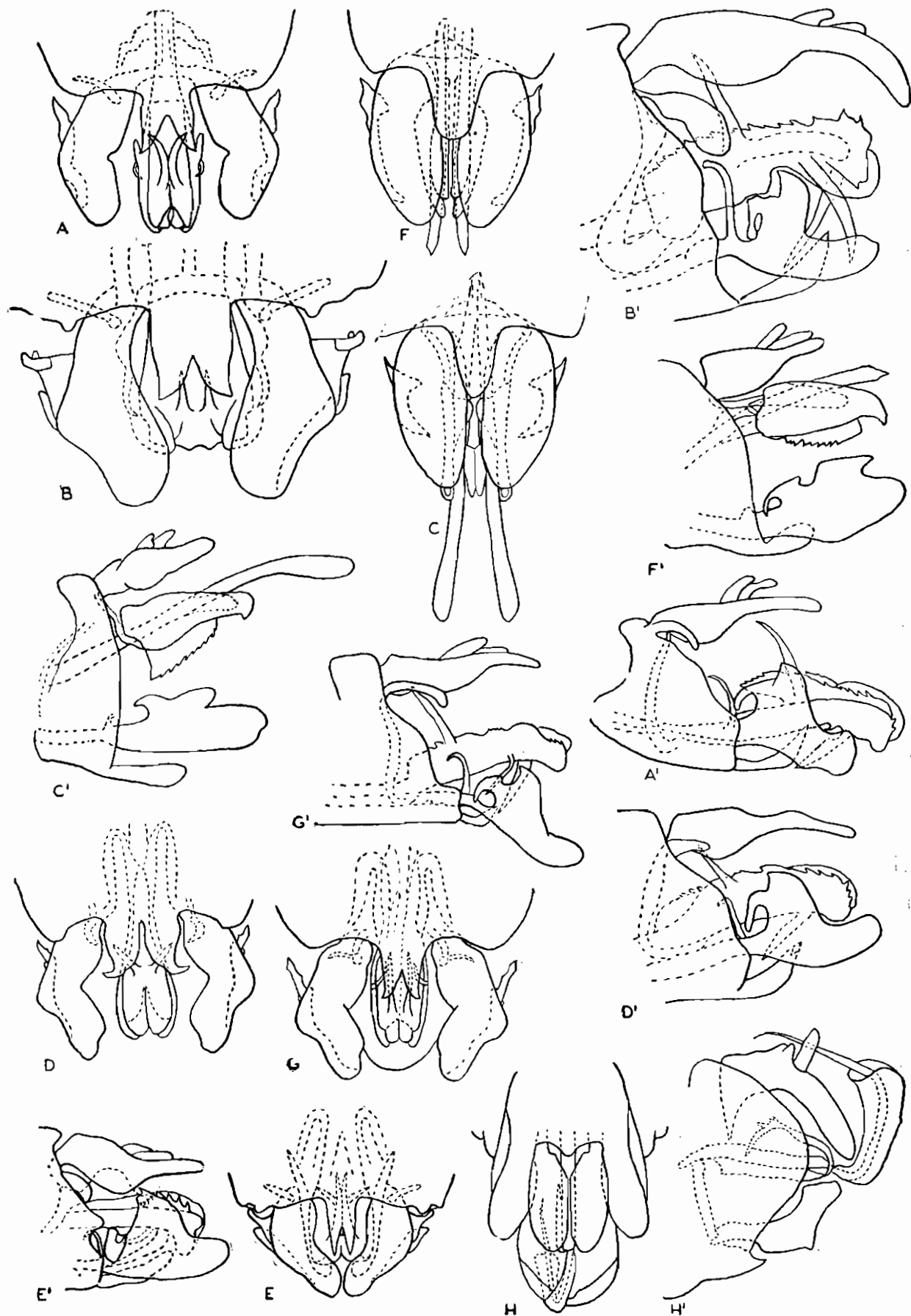


Fig. 12.—Internal genitalia of *Catonia*, A, *pumila*; B, *nava*; C, *impunctata*; D, *cinctifrons*; E, *bicinctura*; F, *grisea*; G, *lunata*; H, *Bothriocera tinealis*. (J. S. Caldwell del.)



cous and gray with a tint of rosy on the mesonotum and central part of the costal border. Face banded, clypeus dusky on the disk but with white margins; base and apex of elytra light gray, veins of disk punctate with black, apical veins white.

The species is known from the Atlantic coast west to the Missouri River probably associated with pine forests and while not common in Ohio specimens were taken in Williams Co. 9-5-'31 (E.P.B.) and Champaign Co. 10-9-'34 (J.S.C.).

**Catonia lunata** Metcalf (Fig. 11A, 12G)

A small, rather narrow species with the face light brown banded with white at middle of front and apex of front and base of clypeus. Above light gray, central part of mesonotum darker and a smoky patch on clavus across disk of corium and another at base of membrane. Veins punctate with black, the apical ones white. Length 4 mm.

A single specimen of this interesting little species was taken at Columbus, October 6, 1919 (H.O.). Others from Hocking Co. 9-23-'34, Ross Co. 9-12-'37 (J.S.C.), Hocking Co. 10-15-'35 (J.N.K.).

**Catonia bicinctura** Van D. (Fig. 12E)

A small species with fuscous brown color, the vertex, pronotum middle of anterior margin and apex of scutellum paler. Male smaller and darker.

Described from Florida but later records include Miss., Tenn., and Maine. Other records are: Adams Co. 9-1-'31 (H.O.), Hocking Co. 8-12-'34 (F.B.W.).

Subfamily CIXIINAE

These are somewhat flattened forms with large, rather broad elytra, usually transparent and with conspicuous waxy, white mass of threads attached to the end of the abdomen.

KEY TO THE GENERA OF CIXIINAE

1. Margin of frons produced and earlike as seen from above.....*Bothriocera*  
    Margin of frons not produced or earlike..... 2
2. Posterior tibiae with two or three conspicuous spines..... 3  
    Posterior tibiae without spines..... 4
3. Vertex at base angularly excavate; mesonotum with five carinae...*Oliarus*  
    Vertex at base roundly concave; mesonotum with three carinae...*Cixius*
4. Vertex very narrow, wedge-like, widened to tip, scutellum 5-carinate.....*Oecleus*  
    Vertex narrowing anteriorly. Scutellum 3-carinate.....*Myndus*

Genus *Oliarus* Stål

Vertex longer than broad, about as wide as the eyes, with the base angularly excavated; the mesonotum with five carinae.

## KEY TO SPECIES OF OLIARUS

1. Elytra entirely hyaline or with scattered spots or dots..... 2  
    Elytra in part or entirely suffused with blackish..... 5
2. Elytra with blackish dots or patches..... 3  
    Elytra entirely hyaline..... 4
3. Front uniformly brown; clypeus piceous; elytra clouded at base  
    .....*quinquelineatus*  
    Front with carinae pale; clypeus lighter; elytra spotted at tip....*vicarius*
4. Larger; front with yellow patch each side at tip.....*aridus*  
    Smaller; front without yellow patches at tip.....*franciscanus*
5. Elytra with smoky patch on apical third.....*humilis*  
    Elytra suffused with fuscous throughout.....*cinnamomeus*

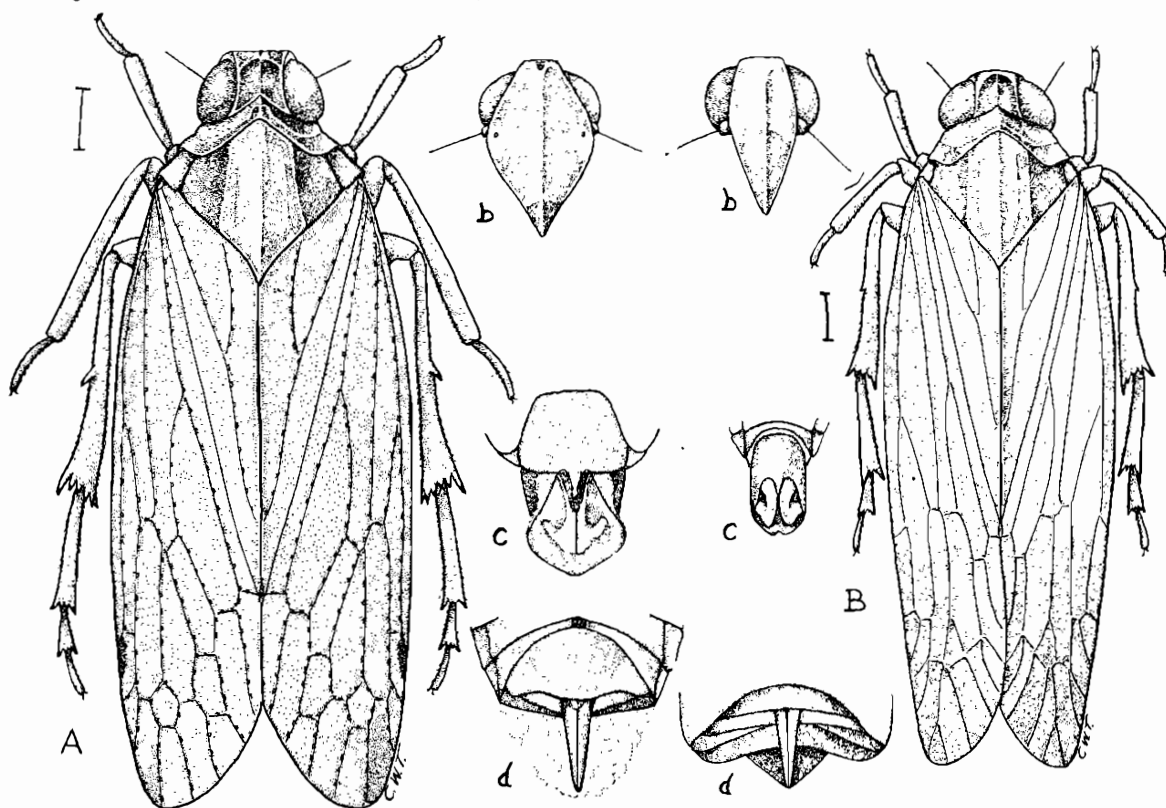


Fig. 13.—A, *Oliarus aridus*; B, *Oliarus humilis*; a, dorsal view; a<sub>1</sub>, b, b<sub>1</sub>, face; c, female; d, male genitalia. (Celeste Taft del.)

### *Oliarus aridus* Ball (Fig. 13A, 14E)

A large species with elytra milky hyaline, veins slender, minutely punctate; the face with a conspicuous yellowish spot each side at base of clypeus. Length 8 mm.

Specimens for Ohio are from Blendon Twp., Franklin Co. 9-11-'01 (H.O.), Columbus 9-11-'01 (H.O.), Crown City, Gallia Co. 8-23 and Apple Grove 8-17-'15 (C. J. Drake), Berea 7-10-'05, Dayton 8-15-'09, Champaign Co. 7-29-'34, Franklin Co. 7-14-'34, Madison Co. 7-29-'34 (A.C.M., J.S.C., F.B.W.), Pickaway Co. 7-1-'34 (J.S.C.), 8-5-'34 (A.C.M.), Clyde 8-26-'34 (F.B.W.).

### *Oliarus quinquelineatus* (Say) (Fig. 14A)

A rather large species; mesonotum black; elytra milky hyaline,

clouded at base, a light band across the middle and another more distinctly smoky, at base of apical cells; veins distinctly punctate; clypeus brownish except at tip which is piceous. Length 7 mm.

A common species throughout the United States east of the Rockies. Our specimens are from Berea 7-10-'15, Hocking Co. 6-23-'35 (A.C.M.), 6-9-'31 (E. S. Thomas), Jackson Co. 6-30-'35 (A.C.M.).

***Oliarus vicarius* Walker**

Similar to *quinquelineatus* in size and general appearance; dark brown; the face with carinae a lighter brown; elytra milky hyaline with fuscous dots at the tip and a dark stigmal spot; veins white, rather sparsely punctured with black. Length 6 mm.

No specimens referred to this species from Ohio.

***Oliarus placitus* Van Duzee (Fig. 14B)**

This is one of the larger species of the genus and similar to *vicarius* or *5-lineatus* in general appearance. It is dark brown to blackish in color the carinae paler, elytra milky white with pale nervures dotted with black. The male genitalia are distinct, the segment with a median tooth long and broad, expanded and bilobed at tip, the plates narrow and curved at base abruptly expanded and the pygofer with a slender tooth dorsally, the aedeagus and internal structures are shown in Fig. 14B.

Length to tip of elytra, male 7.50-9.50; female, 9-11 mm. Ohio specimens are in hand for Green Island 7-18-'15, Clyde 8-26-'34 (A.C.M. and F.B.W.), Put-in-Bay 7-5-'36 (R.C. Osburn and J.N.K.).

***Oliarus franciscanus* (Stål) (Fig. 14c)**

Small, black; pronotum whitish; elytra milky hyaline, veins especially toward apex, distinctly black. Length 4.5 mm.

This is a widely distributed species, reported from Maine to California and South American tropics. Ohio specimens are from Vinton 6-12-22-'01, Berea 7-10-'15, Catawba Island 7-7-'12 and 7-29-'29, Franklin Co. 8-10-'23 (H.O.), Lawrence Co. 6-24-'31 (J.S.C.), Licking Co. 6-16-'34 (J.S.C.), Pickaway Co. 7-1-'36 (J.S.C.), Adams Co. 9-1-'33 (E.P.B.), Ashtabula 6-24-'31 (E.P.B.), Delaware Co. 6-2-'31 (E.P.B.), Trumbull Co. 6-24-'31 (C.C.B.M.), Whipple Ridge, Cuyahoga Co. 7-10-'15 (H.O.).

***Oliarus humilis* (Say) (Fig. 13B, 14D)**

About the size of *franciscanus* but with a shorter vertex and with apical third of elytra distinctly cloudy or black. Length 5 mm.

A quite common species in the eastern states. Our specimens are from Berea 10-16-'15, Chippewa, Summit Co. 7-27-'00, West

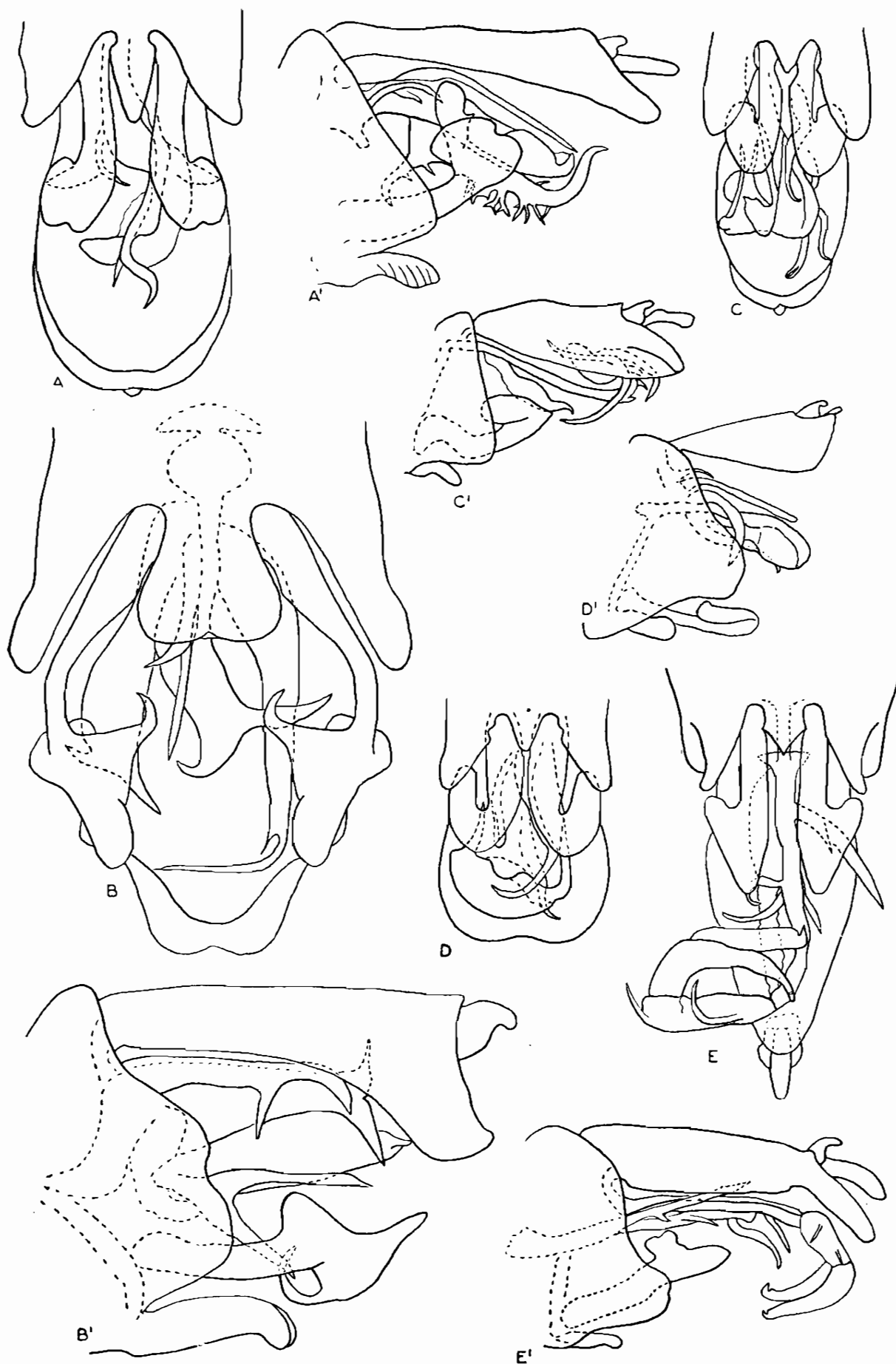


Fig. 14.—*Oliarus* internal genitalia. *A*, *5-lineatus*; *B*, *placitus*; *C*, *franciscanus*; *D*, *humilis*; *E*, *aridus*. (J. S. Caldwell del.)

Sister Island 7-22-'....., Cedar Point, Green Island, Vermilion (H.O.), Champaign Co. 7-29-'34 (J.S.C., F.B.W.), Franklin Co. 7-22-'34 (F.B.W.), 7-30-'35 (J.N.K.), Madison Co. 7-29-'34 (F.B.W.), Berea 10-16-'15 (H.O.), Hancock Co. 7-4-'33 (D.M.J.).

### **Oliarus cinnamomeus** Van Duzee

A northeastern species with elytra entirely suffused with fuscous, said to occur in bogs where blueberries grow and may be looked for in blueberry association.

### Genus **Cixius** Latreille

Similar to *Oliarus* but the vertex in most species is distinctly shorter, usually wider than long, and the hind border rounded but not angularly excavated. Mesonotum with three carinae.

#### KEY TO SPECIES OF CIXIUS

1. Front and clypeus black, carinae pale, clypeus as long as front..... 2  
Front black, clypeus usually paler, carinae pale, clypeus shorter than front, vertex broader than long..... 3
2. Vertex nearly as long as broad.....*misellus*  
Vertex distinctly broader than long.....*angustatus*
3. Elytra not spotted, tinged with fulvous or testaceous nervures dotted..*pini*  
Elytra whitish hyaline, maculate or with fuscous areas..... 4
4. Larger; at least 7 mm. long, elytra in part fuscous..... 6  
Smaller; not over 6.25 mm..... 5
5. Elytra not fuscous at base.....*coloepeum*  
Elytra fuscous at base.....*stigmatus*
6. Elytra fuscous on basal third.....*basalis*  
Elytra fuscous on basal two-thirds, apex hyaline.....*apicalis*

### **Cixius basalis** Van Duzee (Fig. 17c)

Face brown, the discal areas and front blackish; pronotum brown; mesonotum black with three strongly elevated carinae; elytra milky hyaline with the basal bands in females, dusky splashes on cross veins and a conspicuous stigmal spot; veins conspicuous with alternating black and white dots, without hairs. Length 6.5 mm.

Distributed generally in the United States and Canada. Our specimens are from Columbus 8-26-'00 and 8-27-'31, Castalia 6-25-'00, and many other points.

### **Cixius misellus** Van Duzee (Fig. 15b, 17B)

Similar to *basalis* but lacking the basal dusky area of elytra and with the clypeus black with pale carinae.

This species is credited to northern United States and Canada but no specimens that can certainly be referred to it have been taken in Ohio.

**Cixius coloepeum** Fitch (Fig. 17A)

Vertex quite short, distinctly transverse; front and clypeus broad, pitchy black; pronotum brown; mesonotum black; central carinae brownish; elytra whitish hyaline with smoky spots, the veins white, alternating black, without hairs. Length 5 mm.

A common species for eastern United States and Ohio. Specimens are from Columbus 5-9-'99 (H.O.), Ashland Co. 5-22-'26 and Gambier 6-6-'05 (H.O.), Champaign Co. 6-5-'36 (J.S.C.), Scioto Co. 5-10-'36 (J.S.C.), Hocking Co. numerous records, St. Boro 9-21-'28 (C.C.B.M.).

**Cixius umbrosus** Walley

*Cixius umbrosus* Walley. Canad. Entom., Vol. 64, p. 22, 1932

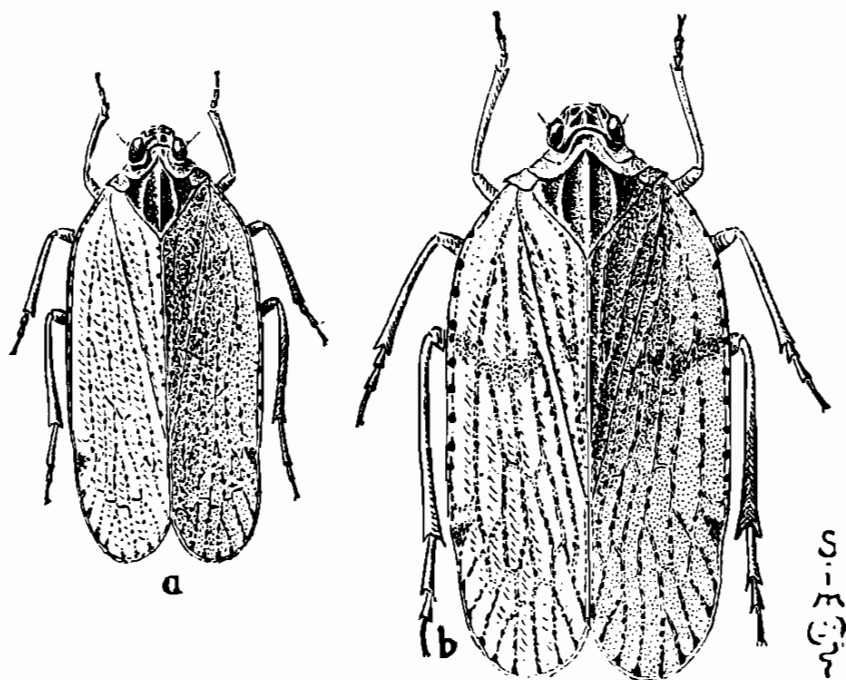


Fig. 15.—a, *Cixius pini*; b, *Cixius misellus* (R. J. Sim del.)

Close to *coloepeum* but the elytra are black throughout and opaque except a small whitish area next the stigma.

A specimen of this species taken along with *coloepeum* in Hocking Co. 5-31-'38 (J.N.K.).

**Cixius angustatus** Caldwell (Fig. 16B)

*Cixius angustatus* Caldwell. Ohio Jour. Sci., Vol. 38, p. 45, 1938

This species has an obscure band on elytra half way from base to stigma. The stigma distinct and faint smoky areas at base and apex. The frons is broad, vertex short, and male genital plates as shown in figure.

Length to tip of elytra 5.2 mm.

Described from a male specimen taken in Scioto Co. 5-10-'35 (J.S.C.).

**Cixius pini** Fitch (Fig. 15a, 17d)

Similar to *coloepeum* but with the elytra distinctly suffused with fulvous and without the dusky spots usually present in the other species. Length 3.5-4.5 mm. To tip of elytra 5.25-6.25.

A common species in the northern states and Canada and said to live on huckleberry. Franklin Co., Adams Co. Taken on *Juniperus* (E.P.B.)

**Cixius apicalis** Metcalf

Distinctly separated from the other species of the genus by

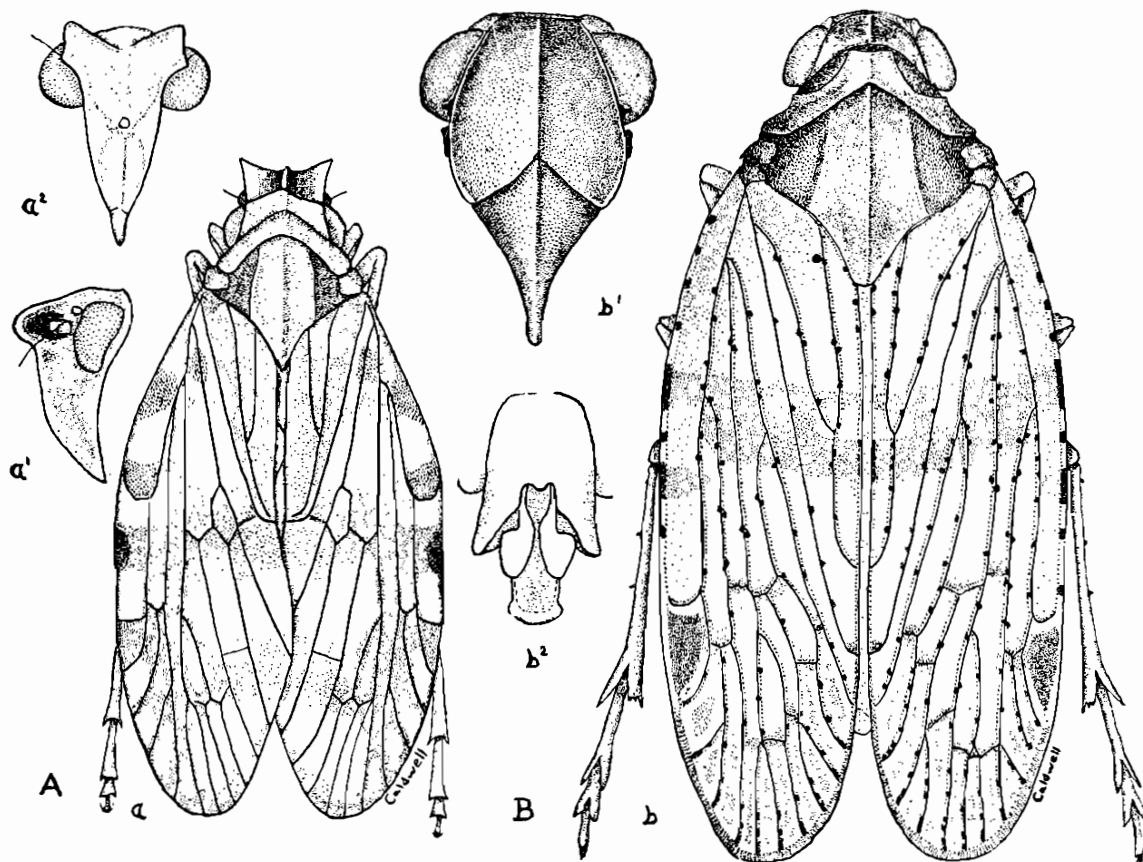


Fig. 16.—A, *Bothriocera tinealis*; B, *Cixius angustatus*, b, dorsal view; b<sub>1</sub>, face; b<sub>2</sub>, male genitalia (J. S. Caldwell del.)

having the basal two-thirds of the elytra smoky black and opaque. Length 4 mm., to tip of elytra 6.25 mm.

One specimen from Vinton, Ohio, 6-19-22-'01 (J.S.H.). Also two females from Hocking Co. in DeLong collection and one female Hocking Co. 6-5-'38 (J.N.K.).

**Cixius stigmatus** (Say) (Fig. 17F)

Black, the frontal carinae pale. Elytra white with a dark band near the base. Stigma black margined before with white, nervures white dotted with black and set with setae.

Originally described by Say from "Missouri" and probably widely distributed in the central states.



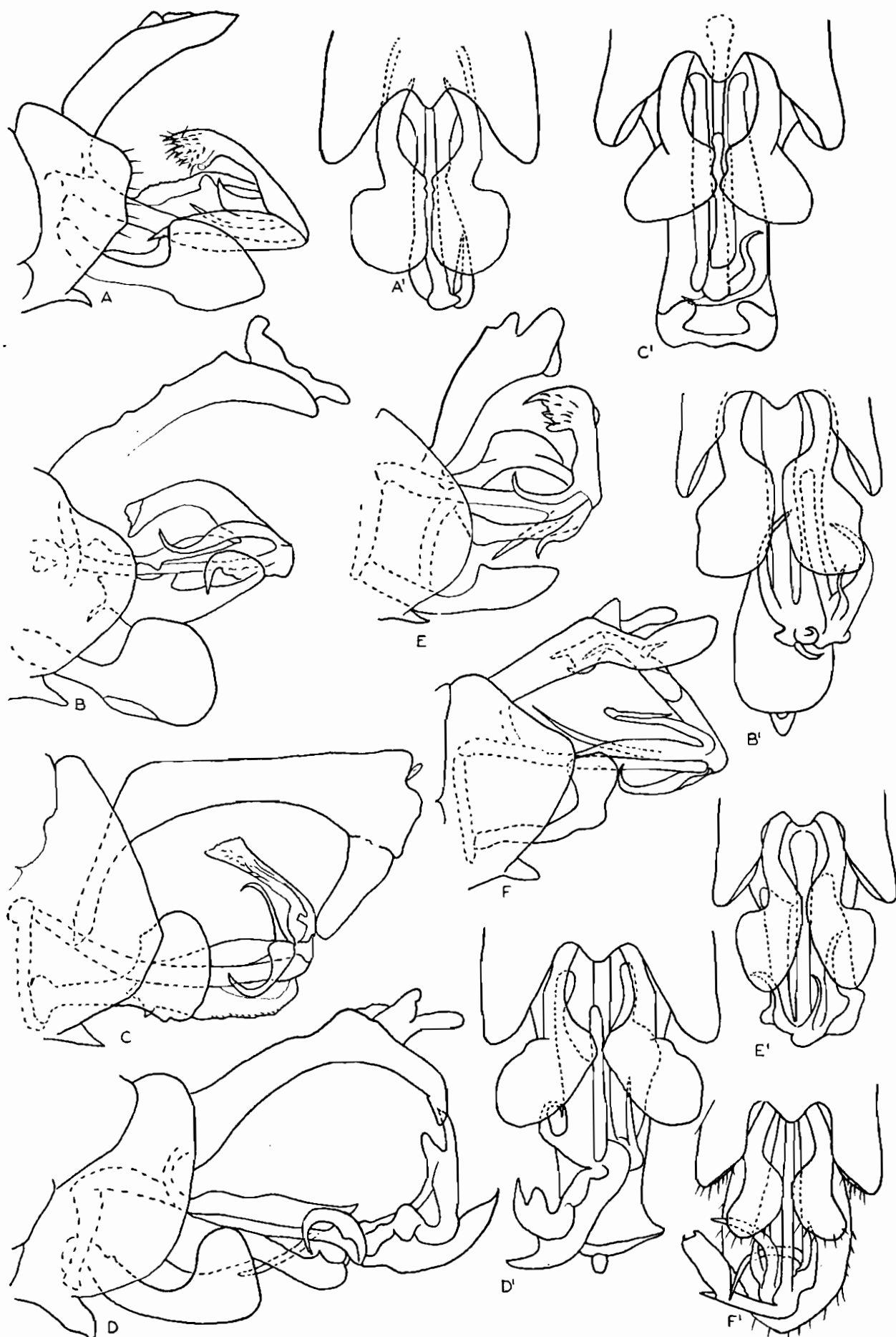


Fig. 17.—Internal genitalia of *Cixius*. A, *coloepeum*; B, *misellus*; C, *basalia*; D, *pini*; E, *angustatus*; F, *stigmatus* (J. S. Caldwell del.)



Our records include Champaign Co. 7-29-'35 (J.S.C.), Franklin Co. 8-11-'34 (F.B.W.), Marion Co. 8-26-'34 (F.B.W.).

Dozier records are given as Columbus 10-20-'21 (A. E. Miller), Sandusky 10-6-'21 (H. L. Dozier).

#### Genus **Bothriocera** Burmeister

This is a tropical and sub-tropical genus represented especially in Central America, Mexico, West Indies, and the gulf states. A single species has been found in Ohio.

#### **Bothriocera tinealis** Burm. (Fig. 16A, 12H)

This is a small pale species with rather obscure dusky patches on the elytra. Length 4.5-6 mm.

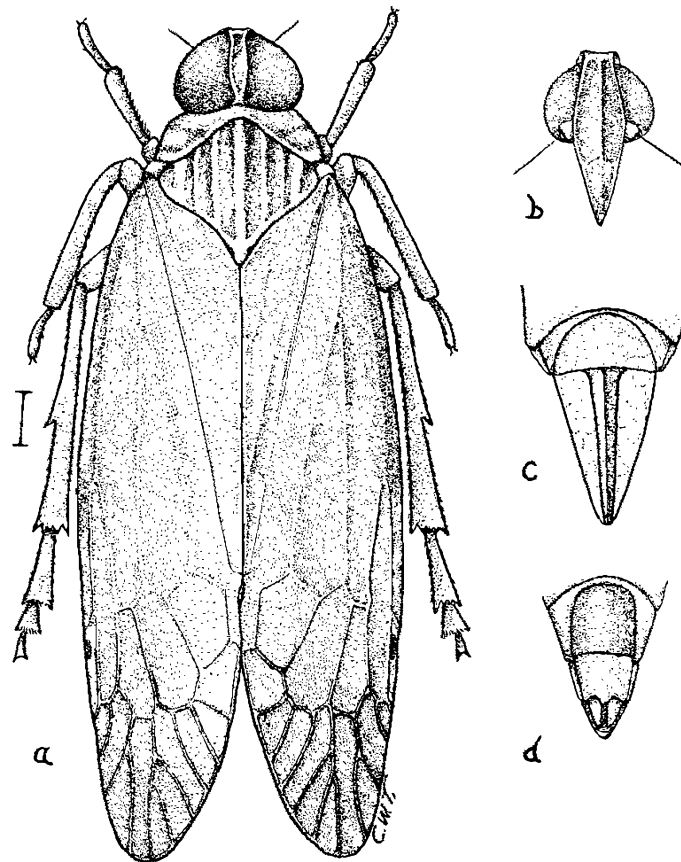


Fig. 18.—*Oecleus borealis*. a, dorsal; b, face; c, female; d, male genitalia. (Celeste Taft del.)

Our specimens agree well with those from southern states and Mexico. The species was described as from S. Am., "Bahia und Para" and its occurrence in Ohio extends its range for the United States as previous records are confined to gulf states and North Carolina.

#### Genus **Oecleus** Stål

The insects of this genus are small slender species with rather broad hyaline or slightly tinged elytra, recognized primarily by the

very narrow vertex, wider at tip than at base, and globular, prominent eyes. One species only is known to occur in Ohio.

**Oecleus borealis** Van Duzee (Fig. 18)

Head nearly globular, eyes hemispherical; vertex, narrow, almost closed at base and widening at tip; pronotum short, sinuate behind; mesonotum with five carinae. Color black, the carinae and a lateral stripe on mesonotum fulvous; tibiae and tarsi pale. Length, female 5 mm., male 4.5 mm. At Griggs dam, Columbus 7-8-'28 (H.O.), Columbiana Co. 7-22-'31 (E.P.B.), Adams Co. 7-12-'34 (J.N.K.), Auglaize Co. 7-17-'36 (J.S.C.), Hocking Co. 7-19-'36 (J.S.C.) and 6-5-'38 (J.N.K.).

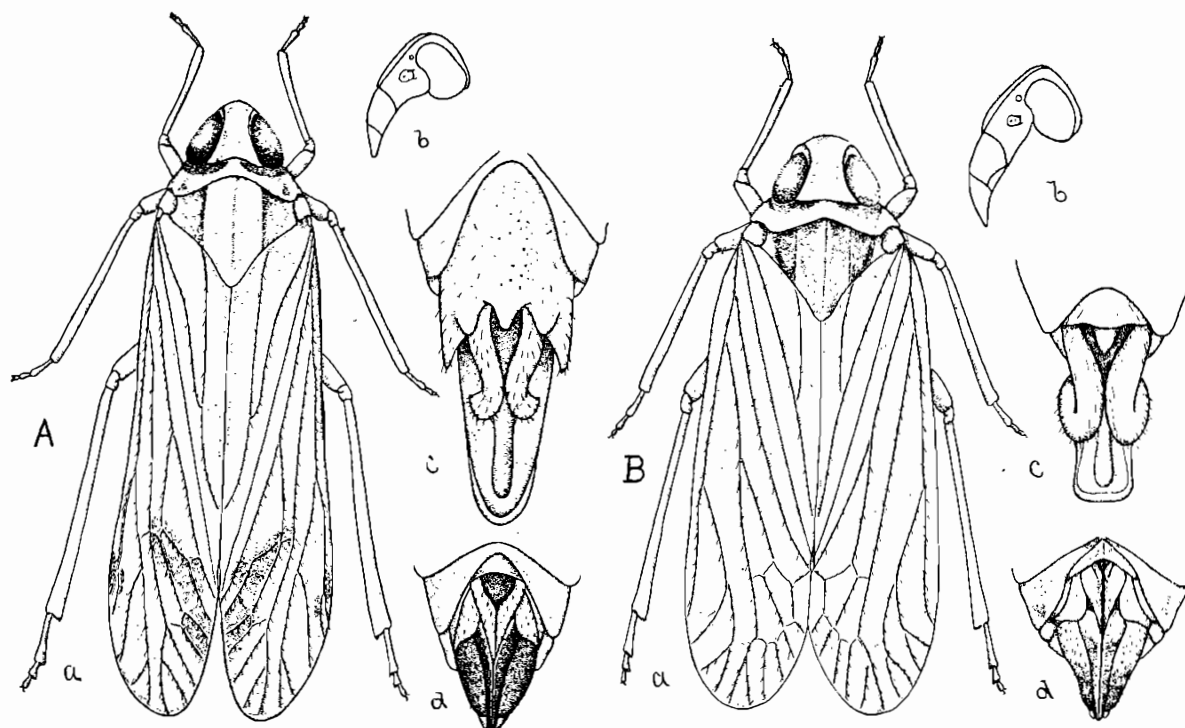


Fig. 19.—A, *Myndus pictifrons* and B, *sordidipennis*; a, dorsal; b, face; c, male; d, female genitalia. (Celeste Taft del.)

**Genus *Myndus* Stål**

Vertex as broad as the eyes, narrowing toward apex; mesonotum tricarinate, the hind tibiae without spines. These have been taken in very small numbers and since the species *radicis* was found living underground it is possible that other species pass nymphal and possibly part of adult life in this manner and so escape observation or collection.

KEY TO SPECIES OF MYNDUS

1. Front not banded or spotted..... 2
- Front banded or spotted..... 3
2. Color uniformly fulvous.....*fulvus*
- Color uniformly light green.....*viridis*

3. Front with quadrate black spots.....*radicis*  
Front with black band at base and apex..... 4
4. Color pale green elytra unmarked, veins brown.....*delicatus*  
Color varied with fulvous or fuscous, not concolorous..... 5
5. Elytra without a fuscous vitta at inner apex.....*sordidipennis*  
Elytra with curved fuscous vitta at inner apex.....*pictifrons*

### ***Myndus pictifrons* Stål (Fig. 19A, 20A)**

Face marked with a distinct black band at base and apex of front. Pronotum dusky with light borders; mesonotum pale, lateral areas dusky. Elytra hyaline, veins dotted with black, a brownish stripe, curved to touch the border, lies on the inner apex covering four or five of the apical cells. Length 5 mm.

Our Ohio specimens are from Vinton 6-5-12-'00 (J.S.H.), Iron-  
ton, 5-26-'....., Columbus, 8-.....-'26 and 8-6-'31, Urbana bog, 8-6-'31,  
Champaign Co., Columbiana Co., Hocking Co., Indian Lake, Salt  
Creek, Jackson Co. (C.H.K.), Hancock Co. 6-23-'34 (Mary Auten),  
Lawrence Co. 6-29-'34 (J.S.C.), Franklin Co. 7-14-'34 (F.W.), Pick-  
away Co. 6-12-'34 (J.S.C.), Auglaize Co. 7-3-'31 (E.P.B.).

### ***Myndus sordidipennis* Stål (Fig. 19B)**

Similar to *pictifrons* but paler, light fulvous; elytra milky, almost opaque, veins brownish, without the curved fascia at apex.

Dr. Caldwell finds no differences in the internal genitalia of males for *pictifrons* and *sordidipennis*, and the color differences are not constant but the external genitalia differ as indicated in Figure 20 and it seems best to retain this species as distinct. If proven identical *pictifrons* would be retained.

Supposed to occur more commonly in the southern part of the state, but only one specimen from Vinton is at hand. Records also for Worthington 8-4-'28 (C.C.B.M.), Adams Co. (J.N.K.), Frank-  
lin Co. 7-13-'34 (F.B.W.), Hocking Co. 8-11-'31 (F.B.W.), Pickaway  
7-1-'36 (J.S.C.).

### ***Myndus delicatus* Van Duzee (Fig. 20E)**

Smaller, more slender than *sordidipennis*, pale; the front with black band at base and apex; the elytra milky whitish, veins brown. Length 4 mm.

Our Ohio specimens are from along the Ohio River, Ironton May 28, and Apple Grove August 17, 1915 (C.J.D.), and Pickaway Co. 6-15-'34 (J.S.C.).

### ***Myndus fulvus* Osborn (Fig. 20B)**

Light orange or yellow orange, immaculate; vertex quadrate, carinae indistinct; front broad, widening to near apex, then narrow-

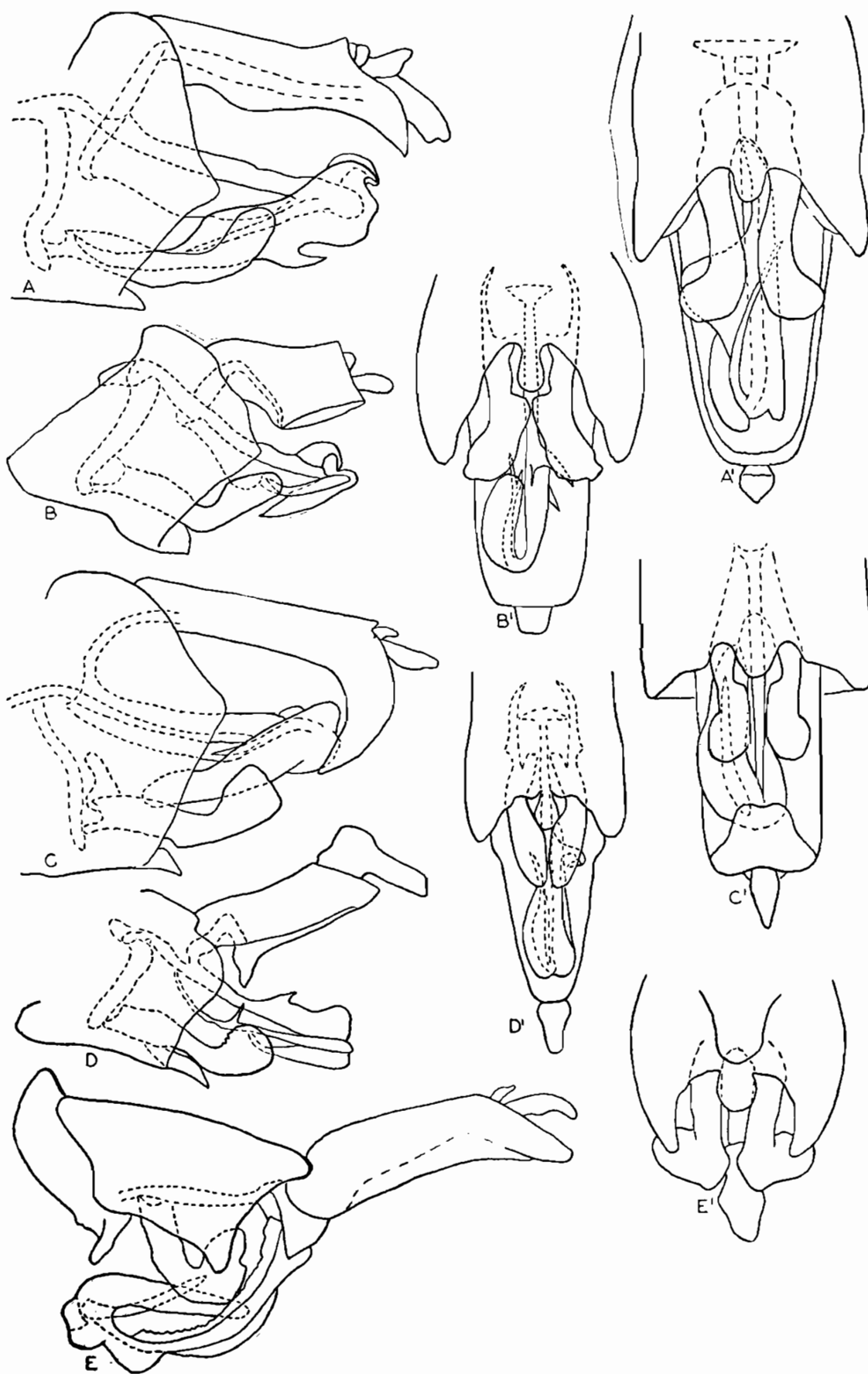


Fig. 20.—*Myndus* Internal genitalia; A, *pictifrons*; B, *fulvus*; C, *radicis*; D, *viridis*; E, *delicatus*. (J. S. Caldwell del.)

ing abruptly to clypeus; pronotum shorter than vertex; elytra hyaline tinged with tawny; tips of spines and tarsal claws black; male styles long, expanded on apical half, bent at about the middle. Length, female 4.5, male 4 mm.

Taken at Sandusky and Castalia in late June and in July (H.O.), Hocking Co. 7-9-'31 (H.O.), Lawrence Co. 6-24-'34 (J.S.C.).

### ***Myndus radialis* Osborn (Fig. 20c)**

Greenish or pallid; vertex unmarked; front with black spots just below vertex, a band across its apex, yellowish or infuscated, sometimes blackish; scutellum with faint fuscous markings outside carinae and sometimes on disk; elytra hyaline, veins infuscated, a faint stigmal and post claval spot, apical portion of elytron slightly smoky; ovipositor black; male pygofer nearly truncate; a minute median process, styles broadly expanded at apex, outwardly curved, inner borders touching. Length of female 4 mm., to tip of elytra 5.5 mm.

Taken at Columbus where it was found inhabiting roots of nettle and grasses in May, larvae occurring during this month and adults appearing the last of the month and early in June. Pickaway 7-1-'36 (J.S.C.), Ross Co. 8-8-'35 (J.S.C.).

### ***Myndus viridis* Ball (Fig. 20D)**

This species is uniformly light green with no dark spots or bands on front or elytra.

A specimen referred to this species was taken by the writer near Sandusky and a specimen is in hand collected by Mary Auten in Union Co., June 23, 1934.

### **Subfamily ISSINAE**

Our members of this subfamily are robust, short-winged insects of small size and are represented here by but a few species.

#### **KEY TO GENERA**

1. Head produced downward more or less snout like..... 2  
    Head not produced downward, broad, vertex short.....*Thionia*
2. Black, head sloping, distinctly snout like or bulbous..... 3  
    Pale brown or greenish, face nearly vertical.....*Aphelonema*
3. Produced snout-like head, compressed.....*Bruchomorpha*  
    Produced head terminating in bulbous expansion.....*Fitchiella*

### **Genus *Thionia* Stål**

Small robust insects with well developed but short wings. The head is short and broad and the face broad, the front being nearly as wide as long.

## KEY TO SPECIES

1. Frons with a single median keel..... 2  
     Frons quadrate with three carinae, the outer ones bent.....*bullata*
2. Color green or brownish yellow, elytra twice as long as broad.....*simplex*  
     Color dark brown, spotted; elytra nearly as broad as long.....*elliptica*

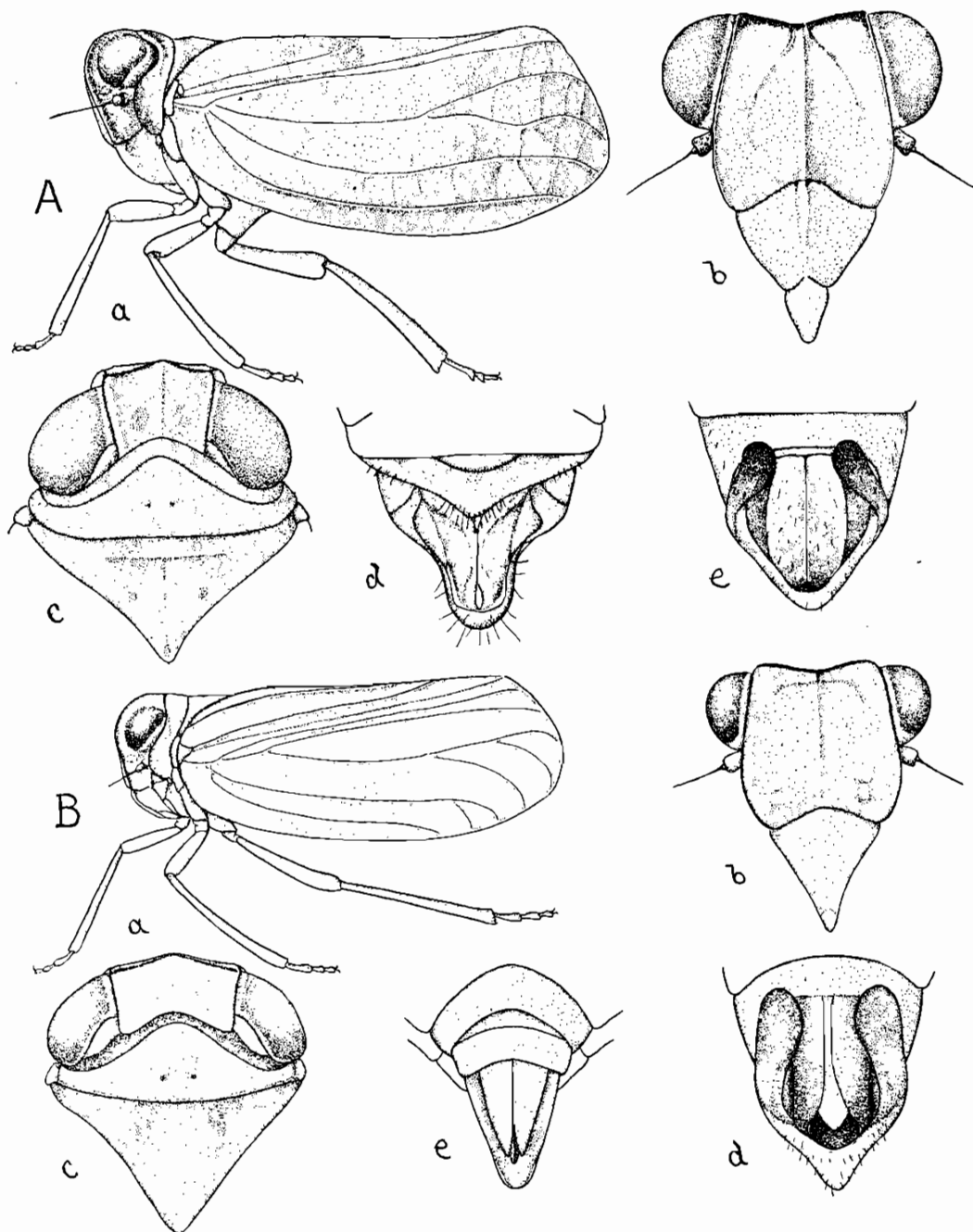


Fig. 21.—A, *Thionia bullata*. a, side; b, face; c, vertex; d, female; e, male genitalia. B, *Thionia simplex*. a, side; b, face; c, vertex; d, male; e, female genitalia. (Celeste Taft del.)

### *Thionia bullata* (Say) (Fig. 21A)

*Flata bullata* Say. Acad. Nat. Sci., Phil., vi:241, 1830

LeConte, Say, Comp. Writ., ii:375, 1859

*Thionia bullata* Van Duzee. Psyche v:389, 1890

Short, robust; vertex nearly square; front flattened with a

median and two discal carinae, the latter curved and meeting median carina at tip of vertex; elytra with two claval veins and five veins on the corium, the discal veins being somewhat rugose. Color dull greenish with minute flecks of brownish on the legs and brown or blackish spots on the elytra, mostly between the veins, but broader ones form two rather indefinite oblique bands, one just in front of the middle and the other toward the apex. In some cases the brown color suffuses most of the elytra. Length to tip of elytra 6 mm.

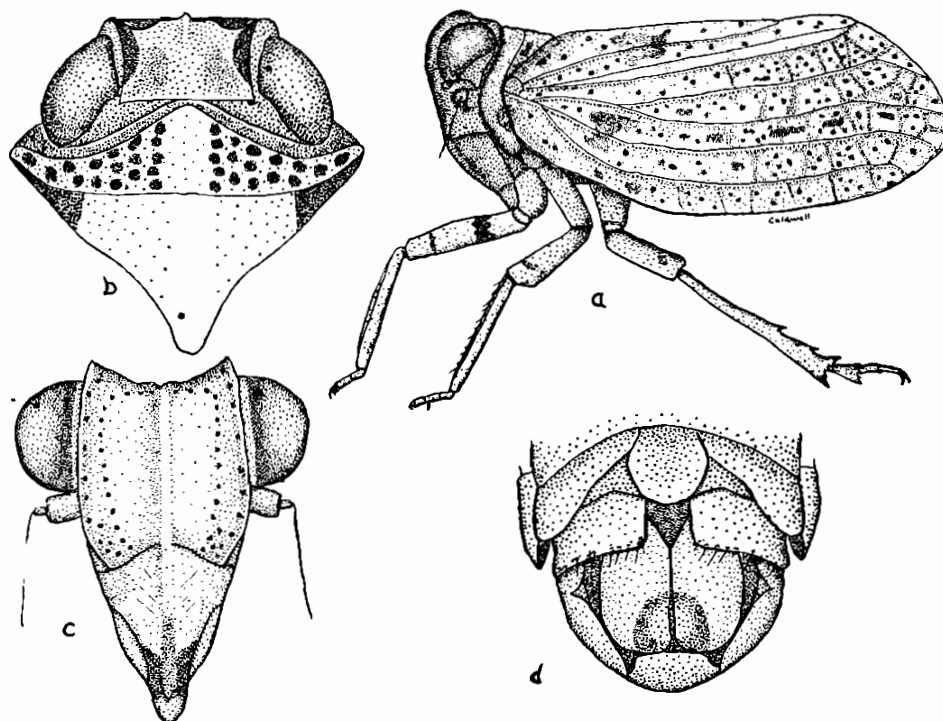


Fig. 22.—*Thionia elliptica*. a, side; b, vertex; c, face; d, male genitalia (J. S. Caldwell del.)

A rather rare species. It has been taken at Medina, Bellaire 8-28-'00 (H.O.), Athens 9-12-'05, and in Franklin Co. 8-18-'31 (E.P.B.), Brown Fruit Farm (H.O.), Sandusky 7-12-'99, Hancock Co. (M.A.), Pickaway Co. 7-27-'36 (J.S.C.), 7-14-'34 (A.C.M.), Adams Co. 7-13-'34 (J.N.K.), Champaign Co. 7-29-'34 (J.S.C.).

### ***Thionia simplex* (Walker) (Fig. 21B)**

*Issus simplex* Walk. Hom. Mus., Suppl., p. 92, 1858

Short, robust; uniformly light greenish tinged with faint brownish. Vertex nearly rectangular, slightly broader than long; front with the lateral keel slightly expanded, widening a little toward the apex, contracting to the clypeus with prominent median and lateral keels and a faint obsolete discal keel meeting the median keel a little below the apex of the vertex. Pronotum very short.

lateral margins expanded to cover base of elytra. Elytra with nearly parallel sides about two and a half times as long as broad; cross-veins few; keels of vertex and some faint patches on the prothorax and elytral veins brownish, otherwise somewhat greenish. Length 6 mm. to tip of elytra.

This has been a quite rare species in our collecting. Single specimens having been secured at Dayton and Ashtabula by R. C. Osburn and at Milan (H.O.), N. Kenova, Apple Grove, Crown C Gallia Co. (Drake), Marietta (H.O.), Hocking Co. 8-11-'34 (J.S.C., A.M., Tiffin), 8-26-'34 (F.W.), Ashtabula, 7-19-'99, Franklin Co. 8-12-'34 (A.M., F.W., J.S.C.).

### ***Thionia elliptica* Germar (Fig. 22)**

This is a broad, robust species, with the elytra less than twice as long as broad, somewhat rough and opaque, spotted with black. Length to tip of elytra 7.5 mm.

This is a rare species said to occur in N. J., D. C., N. C., Ga., Ky., and Mo., and it occurs in Ohio. A. Miller, Ross 7-28-'34. Hocking Co., J. Polivka.

### **Genus *Aphelonema* Uhler**

These are robust, nearly cylindrical species with the face nearly vertical and the elytra usually abbreviated although occasional long-winged forms are found. One species should be found in Ohio.

### ***Aphelonema simplex* Uhler**

Head short, vertex broad, four or five times as broad as long; elytra truncate, in brachypterous forms reaching only on to base of abdomen; abdomen bent abruptly downward near apex. Color pale brown. Length, female 3.5 mm., male 2.5.

This species is recorded for northern localities from Connecticut to Iowa and should certainly be found in suitable habitats in Ohio.

### **Genus *Bruchomorpha* Newman**

Our species in this genus are polished black, usually short-winged, the head produced and narrowed to a blunt tip.

#### **KEY TO SPECIES**

1. Body and wings black, legs black.....*tristis*  
Body with dorsal stripe or line, legs pale..... 2
2. A yellow dorsal stripe from head to tip of abdomen.....*dorsata*  
Dorsal stripe narrow or obscure..... 3
3. Head anteriorly compressed, narrowed at middle.....*oculata*  
Head process not narrowed at middle, legs bright yellow.....*nasuta*



**Bruchomorpha tristis Stål**

This species is entirely black; robust and broader than the other species of the genus. The elytra in short winged forms reach only to second segment of abdomen and are distinctly rugose as is also the dorsal surface of the abdomen; the head is not greatly elongated but compressed to a sharp keel at tip. Length, female 3.5 mm.

The species is said to occur from New York to Wisconsin and south to the gulf states and Central America. No specimens have been taken in Ohio but it probably will be found within the state; I have a specimen from Nebraska.

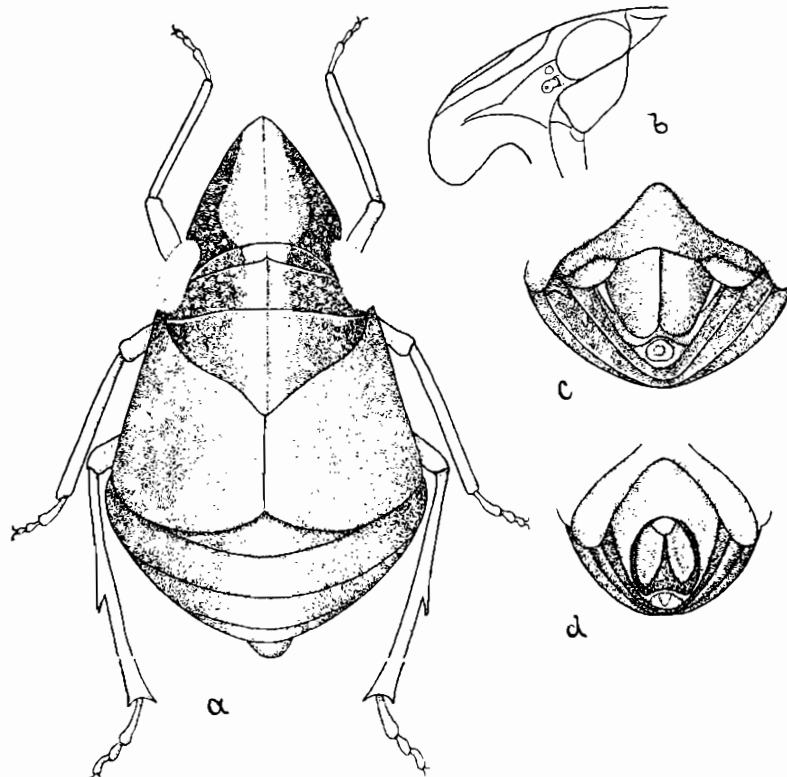


Fig. 23.—*Bruchomorpha oculata*. a, dorsal view; b, profile of head; c, female; d, male genitalia (Celeste Taft del.)

**Bruchomorpha oculata Newman (Fig. 23)**

Head produced into a distinct snout, shorter than in *dorsata*, somewhat compressed anteriorly; front and cheeks carinate. In the macropterous form the elytra pass the end of the abdomen; wings nearly as long as elytra; elytra strongly veined especially with cross-veins at end of corium; five or six apical cells; venation irregular; micropterous form with elytra reaching base of abdomen, rugose, without distinct venation. Color pitchy black; elytra and wings in macropterous form smoky; legs brownish piceous, the femora slightly darker. Length to tip of abdomen 3 mm., to tip of elytra of macropterous form 4.5 mm.

This is an abundant species, probably the most common of the genus in this region and occurring especially in the short-winged form. A considerable number of long-winged specimens were taken during the autumn of 1903, apparently many more than the usual proportion. These were swept from grasses in meadows or pastures, the adults occurring during August and September. Larvae have been taken as late as August 27 at Buckeye Lake. Our records include Columbus, Cedar Point, Sandusky, Buckeye Lake, Rocky Fork, Bellaire, Athens, Marietta, Cincinnati, Steubenville, and many other localities.

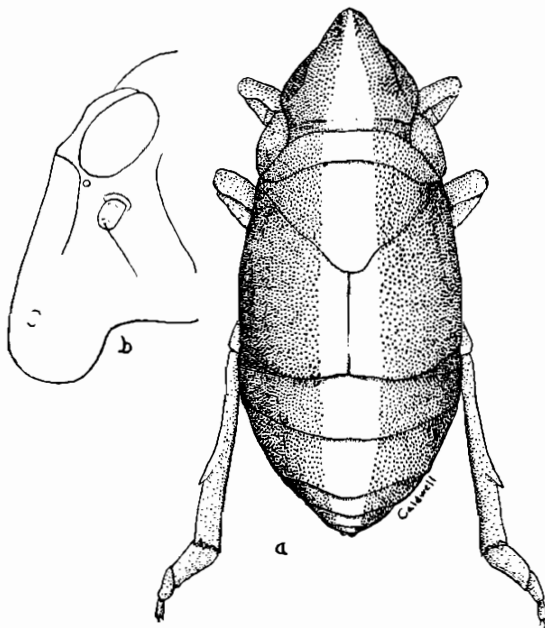


Fig. 24.—*Bruchomorpha dorsata*.  
a, dorsal view; b, profile of head  
(J. S. Caldwell del.)

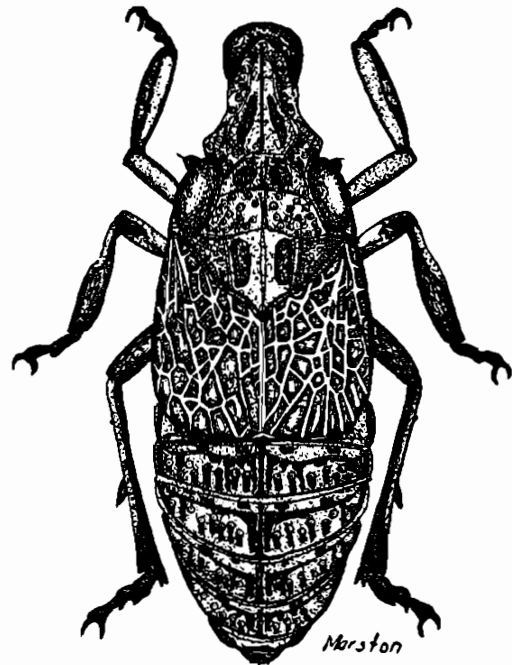


Fig. 25.—*Fitchiella robertsoni*  
(After Dozier, Marston del.)

### *Bruchomorpha nasuta* Stål

This species differs from *oculata* in having the snout not compressed at the middle, the frons acutely angled and the median carina below prominent, pectinate; the median line above on frons rusty brown and the legs bright yellowish with faint dusky streaks. Length, male 2.5, female 4 mm.

This species is recorded for Pennsylvania and Wisconsin and has been taken near Serpent Mound, Adams Co., in a prairie association, Sept. 1, 1931 (H.O.).

### *Bruchomorpha dorsata* Fitch (Fig. 24)

Head prolonged, compressed at apex with a prominent median carina; genae and pronotum strongly punctured; elytra in microp-  
terous form extending to basal segment of abdomen, meeting on

dorsal line, rugose, without distinct venation. Color pitch-black, with a dorsal line from apex of front passing over pronotum and base of elytra, sometimes to tip of abdomen, yellow; legs pitchy brown. Length 3 mm. Adams Co. 10-13-'35 (J.S.C.), 7-13-'34 (J.N.K.)

### Genus *Fitchiella* Van Duzee

Distinguished by the prominent produced bulb-like polished snout. Includes only one species.

### *Fitchiella robertsoni* (Fitch) (Fig. 25)

Gray with lighter lines, the bulbous snout polished jet black. Length, male 2.5, female 4 mm.

Collected in Adams County, July, 1934, by J. N. Knull.

### Subfamily ACANALONIINAE

These have broad wings folded down at the sides and without sub-costal cross veinlets. One genus and two species are known in our fauna.

### Genus *Acanalonia*

1. Head broad, vertex not conical. A double stripe running from back of eyes, across pronotum and along sutural border of elytra.....*bivittata*  
Head distinctly conical, no stripes.....*conica*

### *Acanalonia bivittata* (Say) (Fig. 26A)

Short, rather robust; head broad, the front slightly convex, short; elytra very broad, two-thirds as broad as long, outer posterior border rounded, sutural borders straight; head, anterior and middle legs and two stripes running from the eyes back over the prothorax and extending along the sutural border of the elytra, dark brown; sides of pronotum, all of elytra except the sutural edge, hind legs and abdomen, green. Length to tip of elytra, 7 mm., width of elytra 4 mm.

One of our most abundant species and may be found in every locality by a little careful collecting. Its food plants are cranberry, goldenrod, and a great variety of small shrubs, weeds, etc. Definite localities are Medina, Castalia, Sandusky, Vermilion, Columbus, Bellaire, Ashtabula, Steubenville, Athens, Marietta, Rupels, Cincinnati, Champaign Co., and Adams Co.

### *Acanalonia conica* Say (Fig. 26B)

Head produced in front into a distinct angle; light green; head and prothorax somewhat yellowish; elytra very broad with numerous branching veins, truncate at apex. Length to tip of elytra 10 mm.

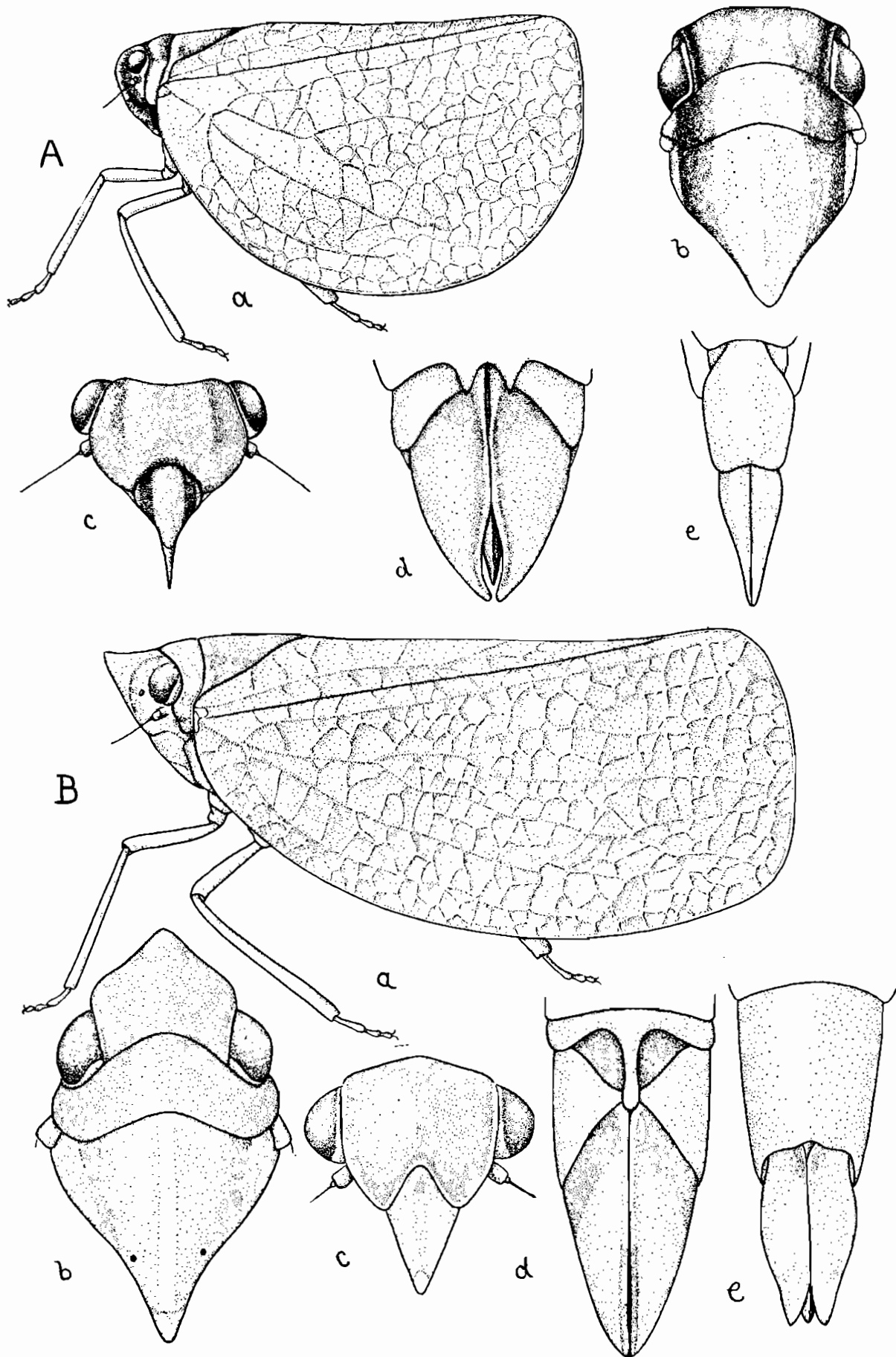


Fig. 26.—A, *Acanalonia bivittata*. a, side; b, dorsal; c, face; d, female and e, male genitalia. B, *Acanalonia conica*. a, side; b, dorsal; c, face; d, female; e, male genitalia. (Celeste Taft del.)

A fairly common species occurring on osage orange, lilac, corn, ragweed, and sugar beet. It has been taken in Ohio at Sandusky, Cincinnati, Columbus, Adams Co., Franklin Co., and Williams Co. 9-15-'31 (E.P.B.), and may be expected to occur throughout the state.

### Subfamily FLATINAE

In this family the subcostal area is crossed by numerous veinlets. One genus, *Ormenis*.

### Genus *Ormenis*

1. Color dark gray, the elytra with fuscous dots, but usually, especially when fresh, densely covered with pruinosity.....*pruinosa*  
Color light green, without dots..... 2
2. Elytra obliquely truncate at tip.....*septentrionalis*  
Elytra rounded at tip.....*venusta*

### *Ormenis pruinosa* (Say) (Fig. 27A)

Head in front nearly square with expanded edges; vertex very short; pronotum extending forward; elytra broad with numerous costal veinlets; dark gray above, beneath pale, the whole body often more or less obscured by whitish powder.

One of our most common species and occurring doubtless in every part of the state as it has a very long list of food plants. These include a number of common forest trees, orchard trees, grape, and numerous shrubs. Records are in hand for nearly every locality in the state where any attempt has been made to collect Hemiptera.

### *Ormenis septentrionalis* (Spinola) (Fig. 27B)

Dull green throughout, the tarsi and tarsal claws only slightly dusky; head broad, margin of front with moderate keels; pronotum projected forward; elytra long, apex very squarely truncated, anal angle nearly rectangular. Length to tip of elytra 9 mm.

Records for Ohio include Medina, Georgesville, Wauseon, Columbus, and Sandusky, and it occurs generally over the state. Food plants are climbing bittersweet, dogwood, plum, grape, prickly ash, red oak, hawthorne, and black alder.

### *Ormenis venusta* Melichar (Fig. 28)

*Ormensis venusta* Melichar. Ann. K. K. Nat. Hofm. Wein xvii:84, 1902

*Ormenis venusta* Dozier. Tech. Bull. Mississippi Agr. Exp. Sta., No. 14, 1926

This is a pale green species a little smaller than *septentrionalis* which it resembles but the elytra are broadly rounded at tip and are bordered with a narrow brownish or yellowish margin. Length to tip of elytra 6-9 mm.

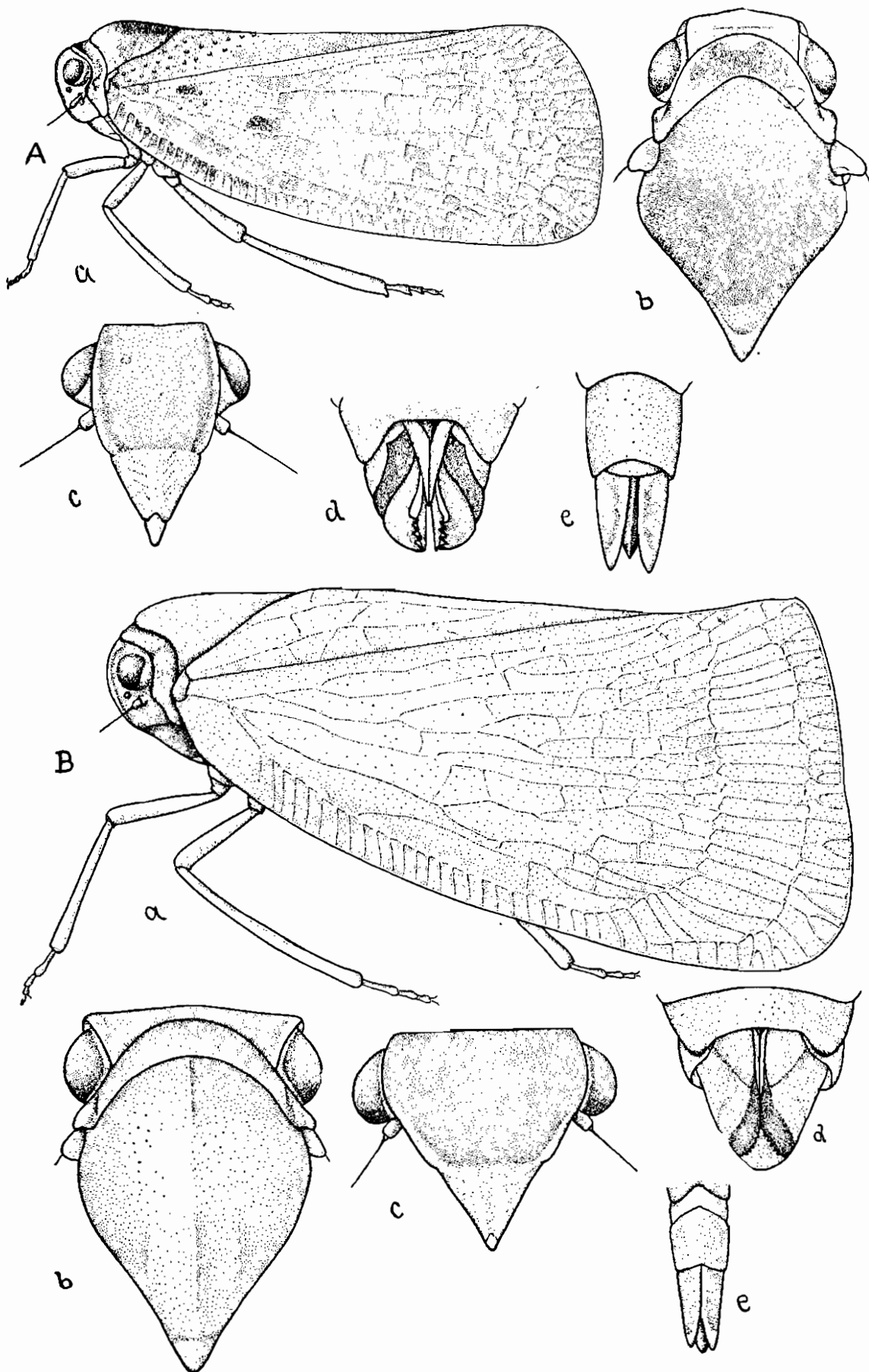


Fig. 27.—A, *Ormenis pruinosa*. a, side; b, dorsal; c, face; d, female, e, male genitalia. B, *Ormenis septentrionalis*. a, side; b, dorsal; c, face; d, female; e, male genitalia (Celeste Taft del.)

Ohio specimens have been taken at Apple Grove and Crown City; on *Malus* in Adams Co., and Adams Co. 7-13-'34 (J.N.K.) 7-1-'37 (E.P.B.), Ashland 7-28-'35 (A.C.M.), Gallia Co. 8-3-'35 (A.C.M.).

#### Subfamily DERBINAЕ

These are delicate, fragile insects, having in some species a decided resemblance to small moths or to caddice flies. The head is compressed and the wings in most of the species very long and expanded toward the tip.

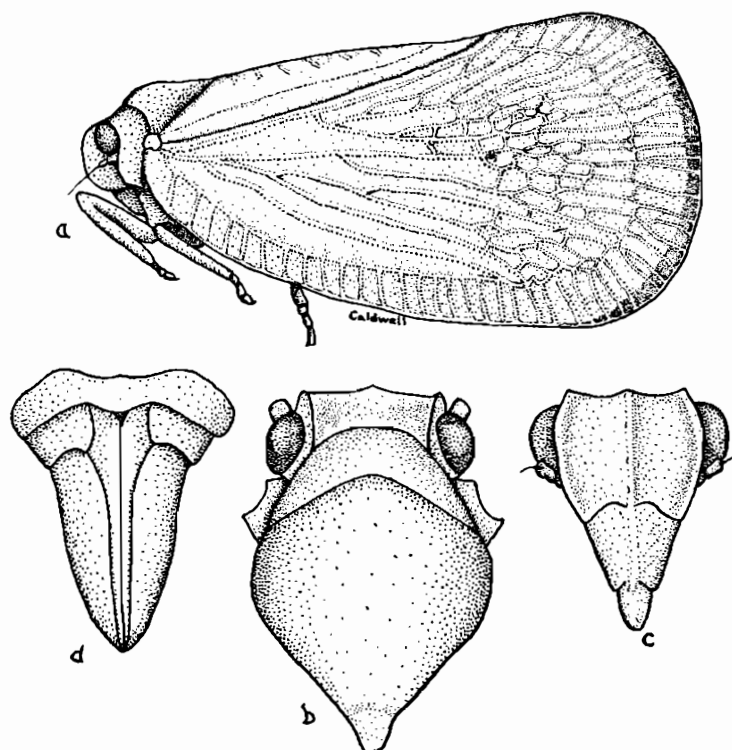


Fig. 28.—*Ormenia venusta*. a, side; b, dorsal; c, face; d, female genitalia (J. S. Caldwell del.)

#### KEY TO OHIO GENERA

- |  |                                  |
|--|----------------------------------|
| 1. Outer segment of antennae not branched.....   | 2                                |
| Outer segment of antennae with two or more branches.....   | 8                                |
| 2. Vertex and front with nearly parallel borders: subantennal process well developed .....                 | <i>Cedusa</i>                    |
| Vertex and front very narrow and converging to apex of vertex, subantennal process not well developed..... | 3                                |
| 3. Second segment of antenna not greatly elongate.....   | 4                                |
| Second segment of antennae elongate—flattened.....   | 5                                |
| 4. Front narrow with a median carina.....  | <i>Neocenchrea</i>               |
| Front without median carina.....   | <i>Patara</i> = <i>Cyclokara</i> |
| 5. Second antennal segment scarcely more than twice as long as broad .....                                 | <i>Phaciocephalus</i>            |
| Second antennal segment much more than twice as long as broad.....   | 6                                |
| 6. Ocelli present, costal veinlets forming stigma.....   | <i>Amalopota</i>                 |
| Costal veinlets scattered, no stigma.....  | 7                                |



7. Antennae shorter, ocelli wanting.....*Anotia*  
    Antennae longer, ocelli present.....*Sayiana*
8. Head sharply angled.....*Apache*  
    Head not sharply angled..... 9
9. Head bluntly angled.....*Otiocerus*  
    Head rounded.....*Shellenius*

### Genus *Cedusa* Fowler

These are small, mostly dark blue or blackish species with the margins of vertex in front separated forming a nearly rectangular space; the elytra opaque and veins mostly concolorous. The species are separated especially by the male genitalia and cannot well be differentiated by a key based on other characters.

It is quite certain that other species than those recorded here will be found in Ohio and the key presented must be considered purely tentative. Reference to papers by McAtee, Metcalf, Dozier, and Ball may be consulted for further study.

#### KEY TO SPECIES IN OHIO

1. Elytra distinctly maculate.....*maculata*  
    Elytra not maculate..... 2
2. Color quite uniformly brownish.....*edentula*  
    Color uniformly blackish or blue-black..... 3
3. Frons with a fairly distinct median carina.....*bedusa*  
    Frons with median carina very faint or wanting..... 4
4. Elytra with apical margin rounded.....*vulgaris*  
    Elytra with apical margin angular or obliquely truncate..... 5
5. Small, male plates deeply incised near base.....*incisa*  
    Larger, male plates not deeply incised, hooks large..... 6
6. Male hook of genital plate large, blunt.....*kedusa*  
    Hook of male plate, strongly recurved.....*cedusa*

### *Cedusa maculata* (Van Duzee) (Fig. 29B)

This species is easily distinguished by the distinct whitish spots on the areoles of the elytra. Length 5 mm.

This species has been taken along the Atlantic coast from New York to Florida and in Ontario, Canada, usually in huckleberry or blueberry associations so we may expect to find it in similar habitats in Ohio. The writer took a good series on Long Island near Cold Spring Harbor, August, 1904, in hillside forest, not "coast of North Carolina" as stated by Dozier.

A typical specimen was collected from an oak leaf at Mineral Springs, Adams Co., Aug. 31, 1931 (H.O.), which gives us the most westerly record of which I am aware.

### *Cedusa edentula* (Van Duzee) (Fig. 29D)

This small species is readily distinguished by the brown color



which is quite uniform for the body and the basal part of the elytra, the latter being slightly infusate especially toward the tip; the front has a very faint median carina and the lateral carinae are very slightly paler; the male plates are without terminal tooth; the length to tip of elytra, female 3.5 to 4 mm., male 3 to 3.5 mm.

Ohio specimens of this species have been taken at Columbus, June 29, 1921, Marietta, July 20, 1921, Hocking Co. 8-12-'34 (J.S.C.) 10-10 (J.N.K.).

***Cedusa incisa* (Metcalf) (Fig. 29F)**

*Herpis incisa* Metcalf. Jour. Elisha Mitchell Society Res. Bull. No. 1, p. 195, 1923

*Cedusa incisa* McAtee. Annals. Ent. Soc. Am. Vol. 17, p. 182, 1924

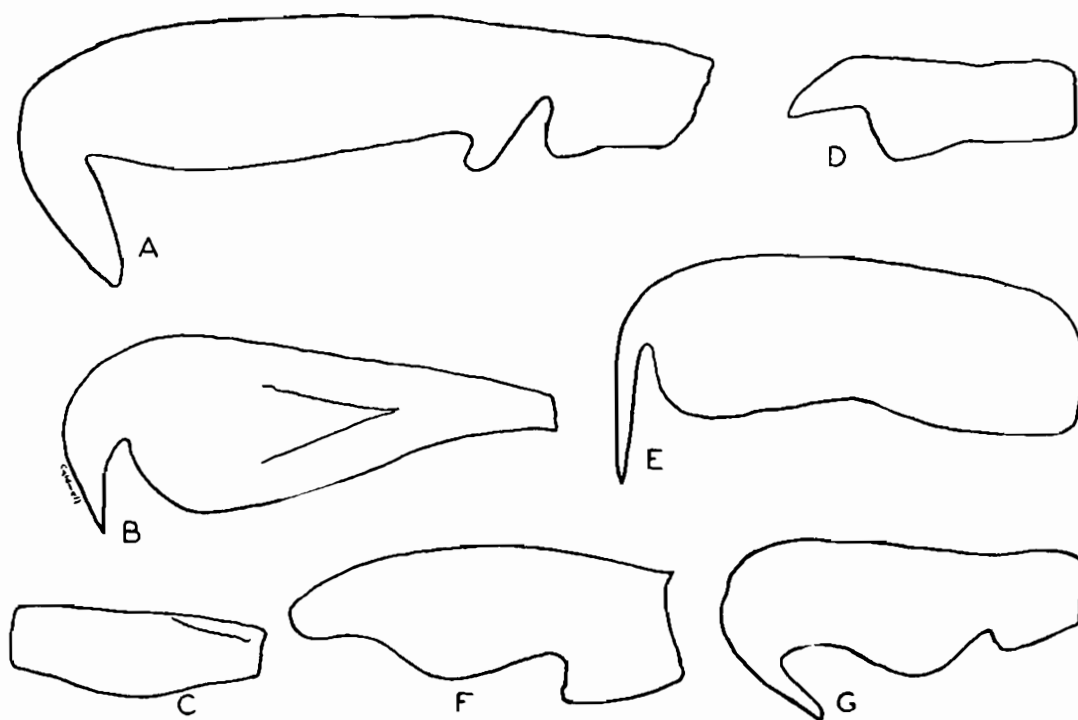


Fig. 29.—*Cedusa*, genitalia of males. *B*, *maculata*; *E*, *vulgaris*; *A*, *cedusa*; *G*, *kedusa*; *D*, *edentula*; *F*, *incisa*. (J. S. Caldwell del.)

Blackish, elytra somewhat paler, smoky toward the tip; lateral carina of front pale; male genital plate with a distinct incision of about one-third its length; terminal hook short, acute. Length female 3.5 mm., male 3 mm.

The species is credited to eastern United States, Connecticut to Iowa, and I have specimens from Florida but only one, which is without definite locality, from Ohio, and one male, Franklin Co. 7-9-'34 (F.B.W.).

***Cedusa bedusa* McAtee (Fig. 29c)**

*Cedusa bedusa* McAtee. Ann. Ent. Soc. Am. Vol. 17, p. 182, 1924

Blue black, distinctly pruinose; the elytra smoky fuscous at

tip; the front slightly expanded to clypeus; lateral carinae pale; legs whitish; male plates broad, inner margin slightly convex, apical tooth acute and recurved. Length male 4 mm.; female 5 mm. *Castalia* 7-23-'04 (H.O.).

***Cedusa vulgaris* (Fitch) (Fig. 29E)**

Black, often covered densely with pruinosity; the head rather narrow; lateral keels of the front narrow; front elongated; clypeus and front of about equal length; elytra elongate, apex circular; smoky black, the lateral keels of the front are pallid and legs throughout are usually rather pale. Male plates parallel-sides, slightly concave at middle. Length to tip of elytra 5 mm.

A widely distributed species occurring probably in every part of the state and having a large number of food plants among them, willow, thorn, beech, oak, hickory, grape, alder, wild cherry, and skunk cabbage. Definite records are in hand for its occurrence at Wauseon, Sandusky, Columbus, Yellow Springs 7-9-'28, Columbiana Co., Ashtabula Co. 6-24-'31 (E.P.B.), Summit Co. 6-23-'31 (C.C.B.M.), Delaware Co., Athens 9-11-'20, Franklin Co. 7-13-'31 (E.P.B.), Hocking Co., Ashland 7-28-'35 (A.M.), Clermont 6-6-'22 (A. F. Braun), and Scioto Co. 8-27-'15 (C.J.D.).

***Cedusa kedusa* McAtee (Fig. 29G)**

*Cedusa kedusa* McAtee. *Annals E.S.A.*, Vol. 17, p. 184, 1924

Blue-black; elytra shining blackish, smoky toward the tips; apical cross nervures narrowly white; male plate with inner margin doubly excavate, leaving prominent tooth at middle; the apical hook broad, blunt, and distinctly recurved. Front black, a faint median carina, lateral carina pale, nearly parallel, legs whitish. Length of male 4 mm.

Columbus 7-8-'28, Yellow Springs 7-6-'28, Hocking Co. 8-12-'34 (J.S.C.), Jackson Co. 6-30-'35 (A.M.), Licking Co. 6-16-'34 (J.S.C.) 6-30-'34 (D.M.J.), Pickaway 7-1-'36 (J.S.C.).

***Cedusa cedusa* McAtee (Fig. 29A)**

*Cedusa cedusa* McAtee. *Ann. Ent. Soc. Am.*, Vol. 17, p. 182, 1924

Similar to *kedusa* in color; blue-black; elytra shining except pruinosity; lateral keels of front brownish; legs whitish; femora dusky above; male genital plate with the inner border sinuous, the hook strongly recurved and acute at tip. Length of male 4 mm.

Yellow Springs (Noskir), and Clermont Co. 6-6-'22 (Annette F. Braun).

Genus *Neocenchrea* Metcalf

This genus includes delicate, mostly light-colored species with small head, antennae short and protected in a small cup-like structure attached to the pronotum. One species occurs in our territory.

*Neocenchrea heidemanni* (Ball) (Fig. 30A, B)

*Cenchrea heidemanni* Van Duzee. Catalogue, p. 758 (1917)

*Neocenchrea heidemanni* Metcalf. Jour. Mitchell Soc., p. 165, 1923

Uniformly white with fulvous tinge to head and pronotum, dusky for the carina and a slight darkening of the tarsi; the claws and spines blackish. Length to tip of elytra 7.5 mm.

This species is known to occur in the eastern United States, especially in the vicinity of Washington, D. C., but a single specimen was taken at Buena Vista, Ohio, August 3, 1929, by Mr. C. C. B. Mayer.

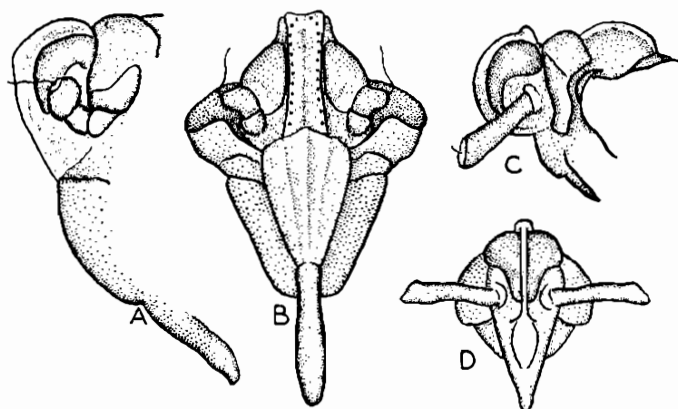


Fig. 30.—*Neocenchrea heidemanni*. A, profile; B, face; C, *Patara vanduzeei* profile of head; D, face. (J. S. Caldwell del.)

*Phaciocephalus* Kirkaldy*Phaciocephalus uhleri* (Ball)

*Cenchrea uhleri* Ball. Canadian Entomologist, Vol. 24, p. 261, 1902

*Phaciocephalus uhleri* Metcalf. Jour. Elisha Mitchell Soc. Res. Bull. No. 1, p. 165

This species is smaller than *heidemanni*; the head and legs are pale straw color; the mesonotum fulvous; the elytra milky hyaline with a dusky line along border of clavus, another on the subcostal nerve and with the apex infusate, the apical margin reddish and a dirk stigmal dot. Length 5 mm.

Our specimens are from Chevy Chase, Maryland, and Anacostia, D. C., but as it is said to be distributed from New York to Kansas it was expected to occur in Ohio and was taken in beating grape vine and other vegetation at Mineral Springs, Adams Co., August 31, 1931 (H.O.).

Genus *Patara* Westwood = *Cyclokara* Muir

Only one species in Ohio.

*Patara vanduzei* Ball (Fig. 30c)

*Patara vanduzei* Ball. Canadian Entomologist, Vol. 34, p. 260 (1902)

*Cyklokara vanduzei* VanDuzee. Catalogue Hemip., p. . . ., 1916

*Patara vanduzei* Metcalf in Elisha Mitchell Scientif. Society Res. Bull. No. 1, p. 148 (1923)

Head not greatly produced, less than one-half the depth of the eye; vertex with margins slightly elevated; second antennal joint very broad, thin; prothorax about one-fourth as long as broad, posterior margin slightly concave; elytra broad, discal cells large. Color brown; vertex of the head, carina, and borders of pronotum, carinae of mesonotum, base of claval vein, spot at apex of clavus and broken spot on inner apical border, whitish; elytra veins dark

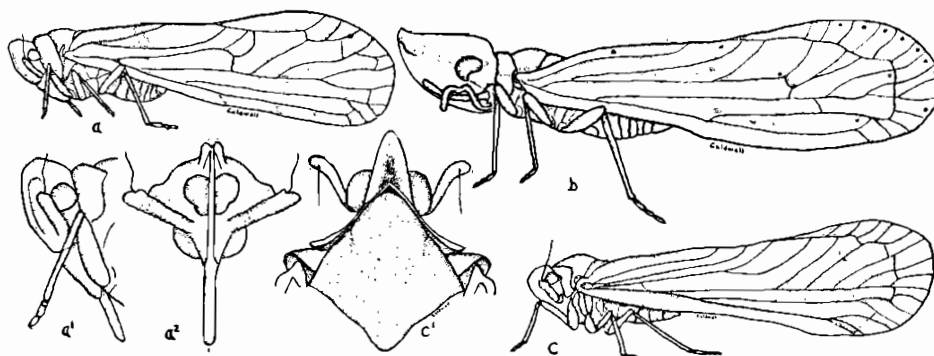


Fig. 31.—a, *Anotia burneti*. sideview; a<sub>1</sub>, profile of head; a<sub>2</sub>, face; b, *Otiocerus wolffi*; c, *Amalopota uhleri*; c<sub>1</sub>, *uhleri* dorsal view (J. S. Caldwell del.)

red; legs light yellow and whitish. Outer lobes of male genitalia very broad, spoon-shaped. Length to tip of elytra 4.5 mm.

Collected at Wauseon (J.S.H.), at Athens 8-12-'05 (H.O.), Worthington, Brown Fruit Farm 8-21-'28 (C.C.B.M.).

Genus *Amalopota* Van Duzee

Only two species known in Ohio.

*Amalopota fitchi* Van Duzee

A delicate whitish species with elytral veins posteriorly bordered with fuscous; costal margin towards apex and some of apical veins red; discal cells of elytra subhyaline; legs white, touched with red at the tips of femora; tarsi brownish. Length to tip of elytra 6 mm.

This very handsome little species was found in considerable numbers at Castalia, Ohio, July 23, 1904. It was found close to the ground among the stems of a rank grass which grew in large clumps

on level land, moist but not swampy (H.O.). It was taken in Champaign Co. on *Prunus* 8-26-'31 (E.P.B.). Ball, Canad. Ent., Vol. 60, p. 197 has placed this species as equivalent to *Anotia venustula* Fowler. Biol. Cent. Am. Homoptera, Vol. I.

### ***Amalopota uhleri* Van D. (Fig. 31c)**

This is a delicate little species about the size of *fitchi* and differing from that species in having dusky or fuscous patches on base and apex of the elytra. Length to tip of abdomen 3 mm., to tip of elytra 8 mm.

Our only record is based on specimens from Hocking Co. 9-9-'34 (J.N.K.).

### **Genus *Anotia* Kirby**

Only two species noted in Ohio.

### ***Anotia burnetii* Fitch (Fig. 31a, $a_1$ , $a_2$ )**

This is a delicate little species distinguished by absence of ocelli and a black stripe above along the first three segments of the abdomen.

### ***Anotia westwoodi***

Credited to Ohio by Dr. Dozier. No specimens available at present. The species is described as having white elytra with no trace of yellow.

### **Genus *Otiocerus* Kirby**

Antennae conspicuously branched; head angled at tip, not or but slightly upturned.

#### **KEY TO SPECIES**

1. Elytra dark reddish or brown, not spotted.....*stollii*  
Elytra subhyaline, spotted or banded..... 2
2. Elytra with numerous spots, sometimes faintly banded..... 3  
Elytra with distinct, oblique bands..... 4
3. Spots small, wanting at base.....*abbotii*  
Spots of various sizes and faint, oblique bands.....*francilloni*
4. Elytral bands broad, faint, five spots on basal half.....*reaumurii*  
Elytral bands narrow, oblique..... 5
5. Elytral bands scarlet.....*coquebertii*  
Elytral bands brown..... 6
6. Head with black dash at tip.....*wolfi*  
Head without black dash.....*amyotii*

### ***Otiocerus stollii* Kirby**

Smaller than *degeerii* and somewhat darker colored; the head with lower portion generally transparent, above polished brownish tinted with ochre, margins dark lined; elytra dark brown with

apical spot yellowish, the veins bright rose-red; wings dusky; body beneath and legs yellow. Length to tip of elytra 8 mm.

Occurs on oaks. Athens 9-17-'29 (C.C.B.M.), Franklin Co. 8-18-'34 (F.W.) 9-5 (J.N.K.).

**Otiocerus abbotii Kirby**

The range of the species is given as north of Connecticut. Taken in Franklin Co. July, 1931 (E.P.B.).

**Otiocerus francilloni Kirby**

One of the larger species; light yellowish with dusky spots on the elytra and a faint fuscous band across the membrane. Taken at the Brown Fruit Farm near Worthington (C.C.B.M.).

**Otiocerus reaumurii Kirby (signoretii Fitch)**

The elytra are marked with broad fuscous bands and there are five fuscous spots in the basal part. Length 10 mm.

This is found in New York and Iowa and south to Texas and should certainly occur in suitable habitats in Ohio. Columbus (J.N.K.).

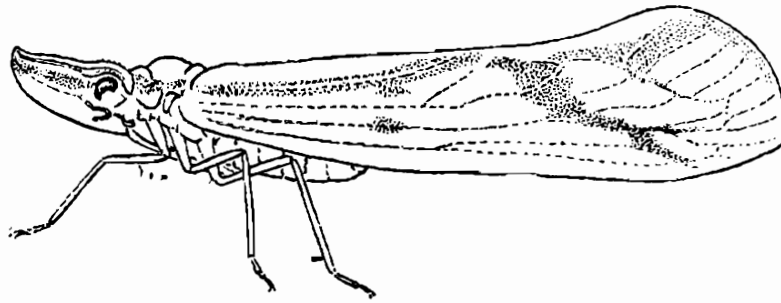


Fig. 32.—*Otiocerus coqueberti*, side view (Authors illustration N. Y. Forestry School. Bull. 16, R. J. Sim del.)

**Otiocerus coquebertii Kirby (Fig. 32)**

Bright yellow with a very distinct narrow scarlet band from base of costa to tip of clavus and back to costa at apex. Length to tip of elytra 9.5 mm.

The range of the species is from New England to Iowa and it should occur commonly in Ohio but has been taken only at Ashtabula (E.P.B.), Franklin Co. 6-22-'35, and in Hocking Co. June, '38 (J.N.K.).

**Otiocerus coqueberti var. rubida. n. var.**

A brilliant red insect which agrees pretty closely with *coqueberti* in genitalia but differs markedly in the lack of separate stripes or bars on the elytra. The entire insect is suffused with the brilliant red coloration, possibly a seasonal coloration. The head is slightly shorter and the profile of vertex less curved and the genitalia are

not quite as wide, the tips scarcely meeting. Length to tip of elytra 9 mm.

A male (holotype) was taken by Prof. J. N. Knull in Hocking Co. May 24, '38, and additional specimens (paratypes) all males secured by Prof. and Mrs. Knull May 31 and June 2 agree with the first in all respects. These were taken on *Cornus* and beech and associated with *coqueberti* of the usual coloration pattern.

In the absence of females of same coloration it seems best to consider this a variety although the form seems quite distinct.

### **Otiocerus wolfii Kirby (Fig 31b)**

Pale straw yellow with a narrow, dusky band running obliquely from near base of costa to apex of clavus and back to end of costa; a distinct black dash from tip of head on each side near the upper border. A specimen, without locality data, was probably taken in Ohio, as the range of the species should include this state. Taken at Cedar Swamp (A.C.M. and J.S.C.).

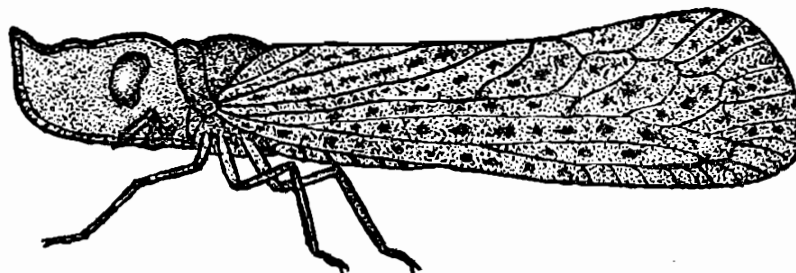


Fig. 33.—*Apache degeerii* (After Dozier Tech. Bull. Miss. Exp. Sta. No. 14.)

### **Otiocerus amyotii Fitch**

Light yellow with a conspicuous red stripe from apex of head back to the eye and a distinct fuscous stripe running from behind the eye along the central part of elytra to tip of clavus where it touches the sutural border and from whence it extends obliquely to the apex. The veins are slightly darker and there are distinct black dots at the end of the discal veins and at tips of apical veins. Length to tip of elytra 9 mm.

R. Fork, Franklin Co. 10-1-'98 (H.O.), Adams Co. 7-1-'31 (E.P.B.).

### **Genus Apache Kirkaldy**

One species occurs in Ohio.

### **Apache (Otiocerus) degeerii (Kirby) (Fig. 33)**

*Otiocerus degeerii* VanDuzee. Cat. Hemiptera, p. 760, 1917.

*Apache degeerii* Ball. Can. Ent., lx, p. 196, 1928

A delicate rose color with the lower margins of head yellow,

crossed with black lines. The rose color of the elytra is most pronounced on the veins. Length to tip of elytra 11 mm.

This appears to be our most abundant species of the *Otiocerus* group. Specimens are in hand from Columbus, Wauseon, Worthington, Athens, and Franklin Co. It occurs during August and September on oak, hickory, willow, and other trees and will doubtless be found in all parts of the state during early fall, where its host plants occur.

### Genus *Shellenius* Ball

Two species are included in the genus.

Head short, dorsum curved.....*schellenbergii*  
Head long, straight.....*balli*

### *Shellenius schellenbergii* (Kirby)

*Otiocerus schellenbergii* VanDuzee. Cat. Hemiptera, p. 761, 1917.

*Shellenius schellenbergii* Ball. Can. Ent., lx, p. 196, 1928

The rounded front of the short head and the curved upper border with fine dots on a yellowish ground distinguish the species. It is recorded from New Jersey south to Mississippi and Florida and may occur in the southern part of Ohio.

### *Shellenius balli* McAtee

*Otiocerus balli* McAtee. Proc. Biol. Soc., Wash., Vol. 36, pp. 45-46, 1923

*Otiocerus balli* Dozier. Miss. Ag. Exp. Sta. Tech. Bull. No. 14, p. 136, 1926

*Shellenius balli* Ball. Canad. Ent., Vol. 60, p. 197, 1928

Described from specimens taken in Maryland and likely to occur in Ohio.

### Subfamily DELPHACINAE

This group of minute species is at once separated from all other *Fulgoridae* by the movable spur at the end of the hind tibia. Many present dimorphic forms, macropterous and brachypterous or micropterous, and hence care must be taken in recognition of these dimorphs as well as of the sexes which frequently differ so much as to be easily mistaken for distinct species.

The only extended papers dealing with the North American species are those by Mr. E. P. Van Duzee (1897), and his section of *Fulgoridae* in the Hemiptera of Connecticut (1923), Crawford (1914), and Muir and Giffard (1924). As these papers must be consulted by anyone making any careful studies of our species, I have condensed descriptions and references here more than in some of the other groups. The species are so small that only those especially interested in the group are likely to give them any attention. The great abundance of some of the species must render them of some importance to the plants they infest.



## KEY TO THE GENERA OF DELPHACINAE

1. Color green or yellowish green.....*Pentagramma*  
Color not green or yellowish green..... 2
2. Calcar subulate, cross-section rounded or angular; antennae long,  
with two joints foliaceous.....*Copicerus*  
Calcar not subulate; antennal joints short, not foliaceous..... 3
3. Calcar thick, convex on each side with teeth on hind margin.....*Stobaera*  
Calcar thin, or if thick with no teeth on hind margin..... 4
4. Head and pronotum with numerous pits.....*Laccocera*  
Head and pronotum not pitted..... 5
5. Front femora foliaceous.....*Phyllodinus*  
Front femora not foliaceous..... 6
6. Vertex produced in front of eyes and narrowed apically..... 7  
Vertex scarcely produced before eyes..... 8
7. Vertex nearly as wide at apex as at base.....*Kelisia*  
Vertex narrowed apically.....*Stenocranus*
8. Head distinctly narrower than thorax..... 9  
Head not much narrower than thorax..... 10
9. Pronotal carinae in line with mesonotum.....*Megamelus*  
Pronotal carinae not continuous; elytra usually brachypterous.....*Pissonotus*
10. Pronotal carinae curved; median carina of face simple or forked only  
at base..... 11  
Median carina of face forked a third or more from the base.....*Dicranotropis*
11. Lateral compartments of vertex continuous.....*Liburniella*  
Lateral compartments not continuous.....*Delphacodes*

Genus *Copicerus*

This genus is distinctly marked by the greatly elongated antennae with a foliaceous segment. The species is distinctly tropical and occurrence in Ohio may be counted rare.

*Copicerus irroratus* Schwarz (Fig. 34)

This is a small species hitherto known in the United States only from the gulf states but examples were collected at Antiquity, Meigs Co., Sept. 16, 1929, by Mr. C. B. Mayer. It is a common species in Central America and the West Indies. Van Duzee gives distribution as "Fla. (West Indies)". I have taken it in Mississippi where it has been recorded by Dozier but the occurrence in Ohio marks a wide extension of its range. Our collections include a fine series from Davis Mts., West Texas, collected by Prof. J. N. Knull.

Genus *Stenocranus* Fieb.

Vertex produced beyond eyes; carinae prominent; bodies rather slender; elytra long, narrow.

*Stenocranus dorsalis* Fitch (Fig. 35a)

Almost uniform fawn color with a pale dorsal line; elytra

nearly transparent, marked with a straight brown line in central part of the apex and covering the fourth apical vein.

A quite common species at different points in the state. Recorded from Columbus, Sandusky, Vinton, Newark, Hocking Co., and Franklin Co. Occurs commonly on sedges.

***Stenocranus lautus* Van Duzee (= var. *vittatus* Stål)**

Closely related to *dorsalis* but described as brownish fuscous marked with a conspicuous pale yellow vitta from the apex of the

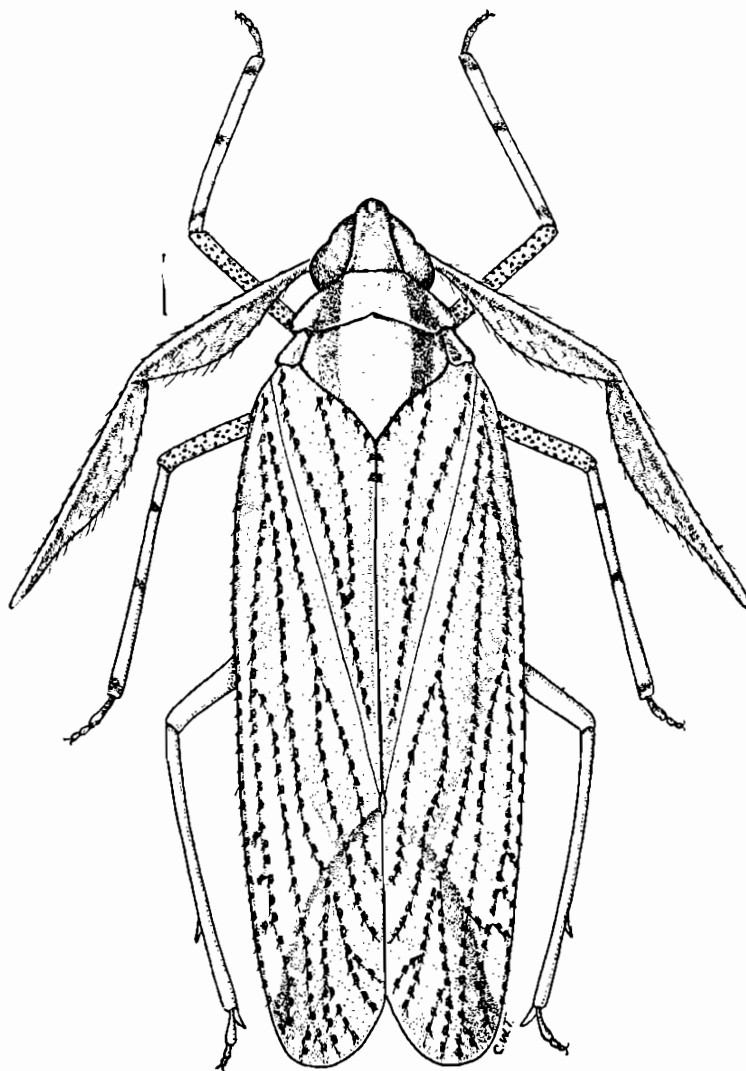


Fig. 34.—*Copicerus irroratus*. (Authors illustration. N. Y. Acad. Sci. Survey, Porto Rico and Virgin Is. Vol. 14, part 2, p. 235 (1935)).

head to the tip of the clavus; front and clavus deep black with the carinae pale; apical elytral areoles dark. Length 5 mm. Including the variations of this and *dorsalis* it is rather difficult to separate the two species and it may be that they will be found to represent simply variations of one species.

Specimens recorded for this form have been collected at Sandusky, Columbus, Rocky Fork, Georgesville, and Athens. It occurs on sedges. Nymphs noted as abundant during June.

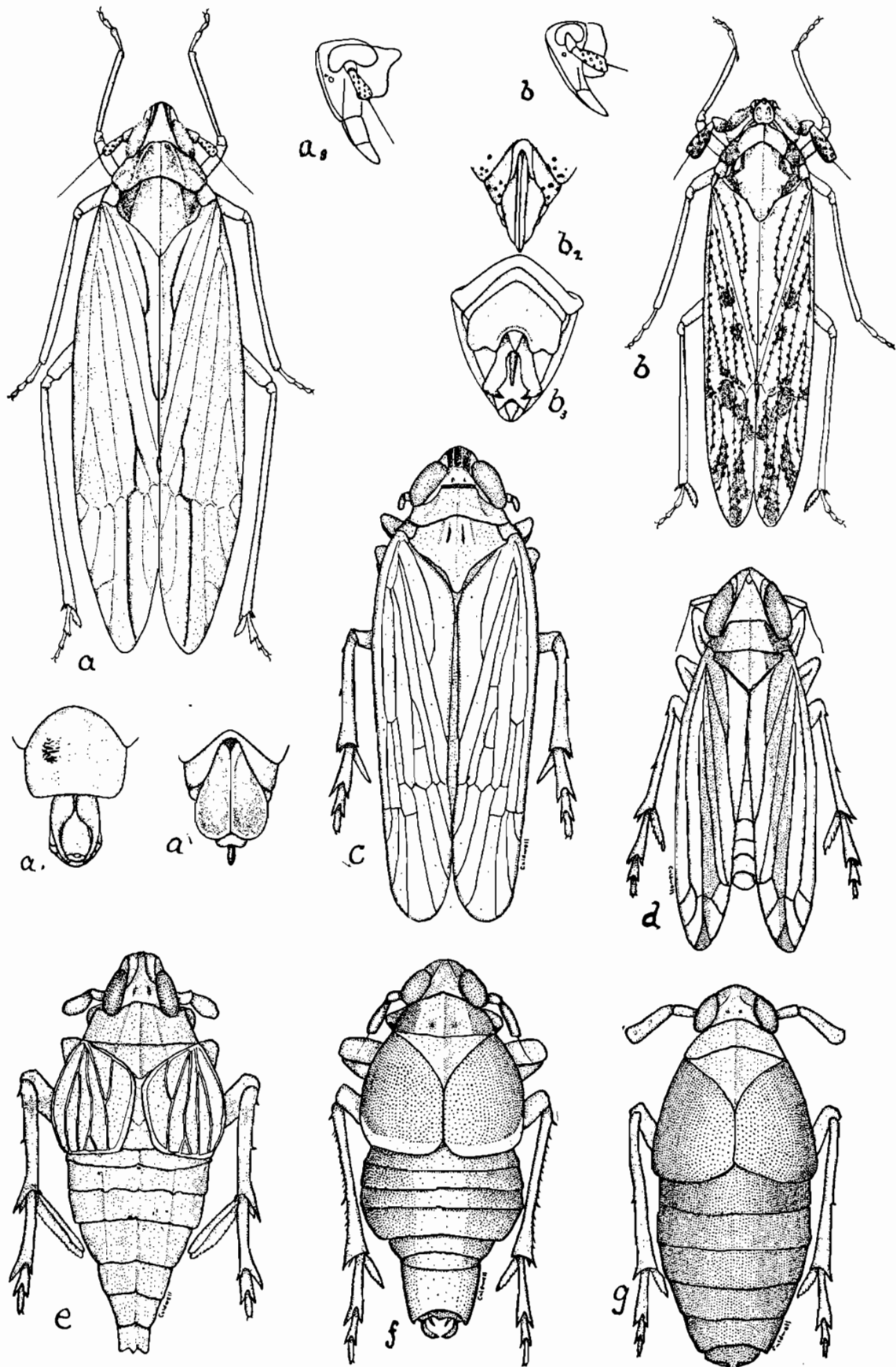


Fig. 35.—a, *Stenocranus dorsalis*; a<sub>1</sub>, profile; a<sub>2</sub>, female; a<sub>3</sub>, male genitalia; b, *Stobaera 3-carinata*; b<sub>1</sub>, profile; b<sub>2</sub>, female; b<sub>3</sub>, male genitalia (D.M.J. del.); c, *Delphacodes foveata*; d, *Kelisia axialis*; e, *Megamelus angulatus*; f, *Pissonotus dorsalis*; g, *Pissonotus ater* (J. S. Caldwell del.)

Genus *Kelisia* Fieber

Like *Stenocranus* in having narrow elongate elytra and projecting vertex, but face is broader and carinae are reduced on the apex of head.

*Kelisia crocea* Van D.

Similar to *Stenocranus dorsalis* in general appearance but smaller and with a broader front and lacking the prominent dark line on the elytra along the second inner apical nervure. Pale yellowish or croceus in color, elytra narrow, vertex somewhat produced. Length 4.5 mm.

A little larger than *axialis* and without the conspicuous dark stripes on elytra.

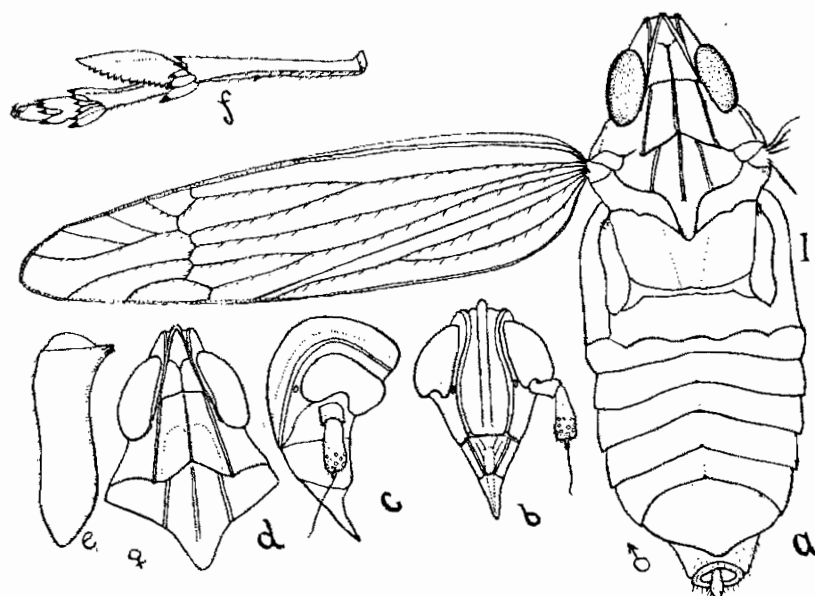


Fig. 36.—*Prokelisia setigera*; a, dorsal view male; b, face; c, side view of head; d, vertex of female; e, aborted wing; f, hind leg. (Author's illustrations. Ohio Naturalist.)

Described from Iowa and probably distributed throughout northern states in suitable localities. Evidently rather rare. Van Duzee ('17) gives "Mass., Ia., Kans." Ohio record is Resaca, Madison Co. 8-27-'28 (C.C.B.M.).

*Kelisia axialis* Van Duzee (Fig. 35d)

A quite conspicuous little species; piceous brown above, beneath pale, dull testaceous with a wide yellow stripe extending from near the apex of the vertex to the second abdominal segment. Elytra nearly hyaline with a conspicuous central brown stripe. Length 4 mm.

An abundant species at different localities in the state and has been collected at Columbus and Athens. Most abundant in moist, sedgy spots in woodland and probably feeds upon the sedges. Larvae occur commonly in August; adults late August and September.

Genus *Liburniella* Crawford

Front narrow, resembling that of *Stenocranus*; carinae of the pronotum curved behind the eye; elytra banded with fuscous.

*Liburniella ornata* (Stål) (Fig. 38)

This is a small species superficially resembling *Stobaera tricarinata* but smaller and with a very distinctly marked white dorsal stripe on the middle dorsum bordered with black lines. Front black, carinae white; elytra with a broad fuscous oblique band from the middle of costal border to the inner border behind clavus and bent to extend to middle of apex and the apical nervures bordered with fuscous. Length 3 mm.

This is a common and widely distributed species and will be found throughout the state. Records include Athens, Marietta, Hocking Co., Portsmouth, and Apple Grove by many collectors. An interesting micropterous form was collected by Prof. and Mrs. Knull in Hocking Co. June 14, '38.

Genus *Stobaera* Stål

Elytra distinctly spotted, nervures punctate; antennae pustulate, lateral carinae diverging behind the eye. One species occurs in Ohio.

*Stobaera tricarinata* (Say) (Fig. 35b)

Vertex slightly projected before the eye, carinae conspicuous, face banded with whitish and fuscous; disk of mesonotum pale fulvous or yellowish; elytra hyaline with broad bands of fuscous, the nervures alternating black and white; legs white, lined and spotted with black. Length 4 mm.

Common to the eastern United States and Canada. Our Ohio specimens have been taken at Columbus, Wooster, Marietta, Athens, Bellefontaine, Milan, Norwalk, Dublin, Rupels, Crown City, and in Summit County.

Genus *Megamelus* Fieber

Vertex distinctly produced before the eyes, carinae elevated and distinct over the head, the front widened to base of clypeus.

## KEY TO SPECIES

1. Yellowish, marked with brown or fuscous, face marked with a transverse blackish band over base of clypeus and lorae.....*notulus*  
Darkish or dark fuscous with pale lines or spots..... 2
2. Mostly black, clypeus blackish, elytra smoky.....*piceus*  
Paler, clypeus pale yellow, elytra lined with yellowish.....*angulatus*

*Megamelus notulus* (Germar)

Upper part of face, vertex, scutellum and base of elytra mostly

pale yellowish; clypeus, lower cheek, base of coxae with a dark blackish band; apical part of elytra, sides of abdomen varied with brown and fuscous. Length, female 3 mm., male 2 mm., long winged form 4 mm.

Taken at Columbus, Ohio, Oct. 2, 1905, by Albert Koebele. A short winged male at Columbus and two long winged males at Sandusky, July 2, 1904 (H.O.).

### **Megamelus piceus** Van Duzee

Polished, piceous; clypeus dark piceous; propleura and most of abdomen a shiny dark brown to piceous; tip of scutellum pale; elytra suffused with brown, veins and outer margin dark. Length 3 mm.

Taken at Cedar Point, August 7, 1901.

### **Megamelus angulatus** Osborn (Fig. 35e)

Pale yellowish; sides of the pronotum, outer angles of scutellum, stripes on the elytra, basal bands on abdomen and lines on the femora, black or dark fuscous. Length 3.5 mm.

This species was described from specimens taken on "spatter dock" in Delaware and it was collected at Malta, August 12, 1915, by C. J. Drake. Also specimens are in hand from White Plains, New York, and Gainesville, Florida.

### **Genus *Pissonotus*** Van Duzee

#### KEY TO BRACHYPTEROUS FORMS

1. Polished, fulvo-testaceous to piceous-black; elytral nervures concolorous and indistinct..... 2  
 Opaque brown species with elytral nervures usually pale..... 6
2. Color piceous or almost black..... 3  
 Color fulvous or fulvo-piceous, at least on elytra..... 5
3. Apical margin of the elytra pale..... 4  
 Apical margin of elytra concolorous, piceous.....*ater*
4. Anterior and intermediate tibiae black or nearly so.....*marginatus*  
 Anterior and intermediate tibiae pale, lineate with brown.....*pallipes*
5. Head concolorous or paler than pronotum and elytra.....*delicatus*  
 Head and pronotum black or nearly so.....*guttatus*
6. Face with a broad white band crossing the apex of the front, base of front maculated.....*aphidioides*  
 Face without white band across the usual transverse black band..... 7
7. Lower surface and a broad longitudinal vitta on the tergum pale yellowish; elytral nervures concolorous.....*dorsalis*  
 Coxae and apex of the front only, pale; median vitta of the tergum not obscurely pale.....*brunneus*

***Pissonotus marginatus* Van Duzee (Fig. 37)**

Dark brown to pitchy black; head reddish; the front and middle tibiae blackish; apical margin of the elytra whitish. Length 2 mm.

Common to United States and Canada and probably occurring throughout the state. Columbus, Bellaire 8-31-1900.

***Pissonotus pallipes* Van Duzee**

Brown; legs entirely pale, more delicately lined with brown. Length 1.75 mm.

Taken at Columbus.

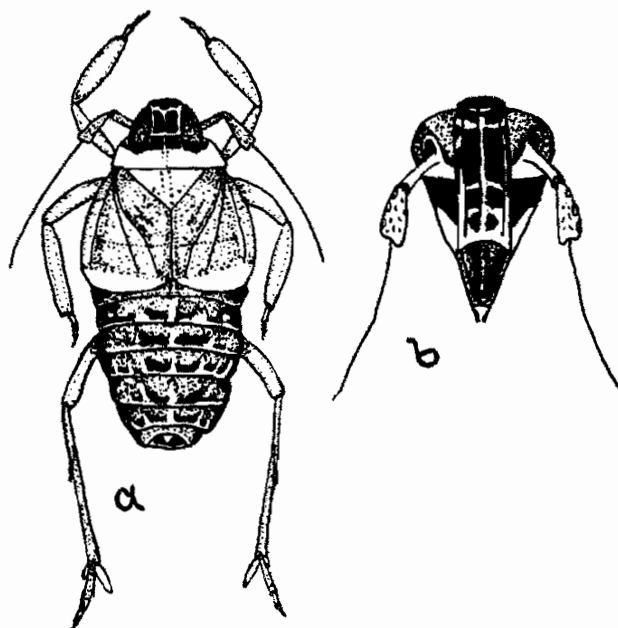


Fig. 37.—*Pissonotus marginatus*. a, dorsal view; b, face (D. M. J. del.)

***Pissonotus ater* Van Duzee (Fig. 35g)**

Dark brown or blackish; abdomen usually darker than the fore part of body and polished piceous; elytra not or very slightly margined with whitish; legs pale. Length, female 2.5 mm., male 2.25 mm.

Ohio specimens from Columbus and Duncan and said to occur from New York to Florida.

***Pissonotus delicatus* Van Duzee**

Small, rather narrow; head somewhat paler than pronotum and elytra; posterior margin of elytra whitish; legs pale, lined with brown. Length 2.5 mm.

Reported as occurring from New Jersey to California and taken in Ohio, Hocking Co. 7-9-'31 (H.O.).

**Pissonotus guttatus** Spooner

Head and front border of pronotum blackish; scutellum and elytra, and disk of abdomen brown; hind border of elytra white; lateral margins of abdomen fuscous; legs pale brown. Length 2.5 mm.

Specimens from Lakeside and Athens and doubtless distributed over the state.

**Pissonotus dorsalis** Van Duzee (Fig. 35f)

Rather broad; less polished than in preceding species; brown; hind border of elytra in the males rather broadly white; disk of abdomen pale brown; lateral borders fuscous, the light area in the male divided by a dusky patch except for median line. Length female 3 mm., male 2.5 mm.

Taken at Columbus and Indian Lake.

**Pissonotus brunneus** Van Duzee

Recognized quite readily by the white veins of the elytra and the light carinae on the blackish or dark brown color; the sides of the abdomen in females with whitish dash on segments three to five. Length females 3 mm., males 2.5 mm.

Columbus and Dublin, Ohio. Occurs on Juneberry. Columbiana Co. 7-22-'31 (E.P.B.), Marion boggy prairie 9-9-'31 (H.O.).

**Pissonotus aphidioides** Van Duzee

Large, broad, resembling an aphid in shape, the head black with white carinae; prothorax and scutellum pale; elytra fuscous with whitish veins; abdomen dark brown with margins of segments and lateral border fuscous; the posterior segments with whitish dashes laterally. Length female 4 mm.

**Genus Delphacodes**

## KEY TO SPECIES\*

\* Adapted from Van Duzee. Hemip. Conn.

1. Frontal carinae prominent and continued over the apex of the head to connect with those of the vertex..... 2  
Frontal carinae interrupted at the apex of the head, not continuous with those of the vertex..... 9
2. Front pale with the carinae bordered by a black line; insects pale yellowish-testaceous; tergum black, at least in part.....*detecta*  
Frontal carinae not bordered by black line on a pale ground..... 3
3. Front black with pale carinae..... 4  
Front pale..... 7
4. Larger (3 mm. to tip of abdomen); vertex and pronotum white; body black varied with fulvous.....*pellucida*



- Small (2 mm. to tip of abdomen) ..... 5
5. Apex of the clavus with a short fuscous line; pronotum white posteriorly.....*puella*  
Apex of the clavus without a fuscous line..... 6
6. Color mostly dark brown or black, the base of the tergum with a fulvous vitta; frontal carinae slenderly pale.....*basivitta*  
Pale colors more extended; vertex, pronotum, and scutellum whitish, the former with two black points; basal fulvous band of the tergum carrying a median black spot and behind the band a pale dorsal line; frontal carinae conspicuously white against black spaces.*foveata*
7. Color of the scutellum fulvous or with the basal angles black in the male; tergum without a dorsal pale vitta.....*osborni*  
Color, including scutellum, soiled or testaceous-yellow; dorsal line of the tergum pale..... 8
8. Tergum brown or blackish brown, darker along the sides; margin, apex, and slender dorsal line pale yellowish.....*lateralis*  
Tergum black; margin, apex, and broad dorsal vitta whitish.....*kilmani*
9. Front narrow, the sides straight, parallel or nearly so; color pale yellowish, female nearly immaculate, male with the basal angles of the scutellum and disk of the pleural pieces black, the abdomen deep orange, marked with black.....*campestris*  
Front broad, its sides distinctly arcuated..... 10
10. Color black in the male, pale yellowish in the female with the frontal carinae margined with pale.....*lineatipes*  
Color obscure brown varied with paler in both sexes..... 11
11. Male stiles but little divergent, their slender tips approximate above .....*lutulenta*  
Male stiles above strongly divergent, their apical two-thirds broad and nearly horizontal.....*vanduzeei*  
Male stiles small divergent; apices short not oblong.....*andromeda*

### **Delphacodes pellucida (Fabricius) (Fig. 38A)**

Broad, rather stout, blackish, with pronotum and carinae white. Vertex and face black, elytra hyaline or slightly suffused with fuscous. Length 3 mm.

This species occurs in both Europe and America and may have been introduced from the Old World at an early date. It is common in meadow land and may be abundant enough to cause considerable injury. Our Ohio specimens are from Wooster, Ironton, Georgesville, and Columbus and the species no doubt will be found throughout the state.

### **Delphacodes puella (Van Duzee) (Fig. 38c)**

A very small species, mostly black, with conspicuous carinae on head and pronotum and a white tip on mesonotum. The elytra are milky hyaline with a white border at the base of the clavus and a conspicuous black elongate spot in its apex. Length 2.5 mm.

Widely distributed and very common; has been collected at many different points in the state.

***Delphacodes basivitta* (Van Duzee) (Fig. 41)**

Similar to *puella* but carinae of the head and the hind margin of pronotum darker, and there is no dusky spot at tip of clavus.

Occurs commonly throughout the eastern states; less frequently met with than *puella*. The type locality for the species is

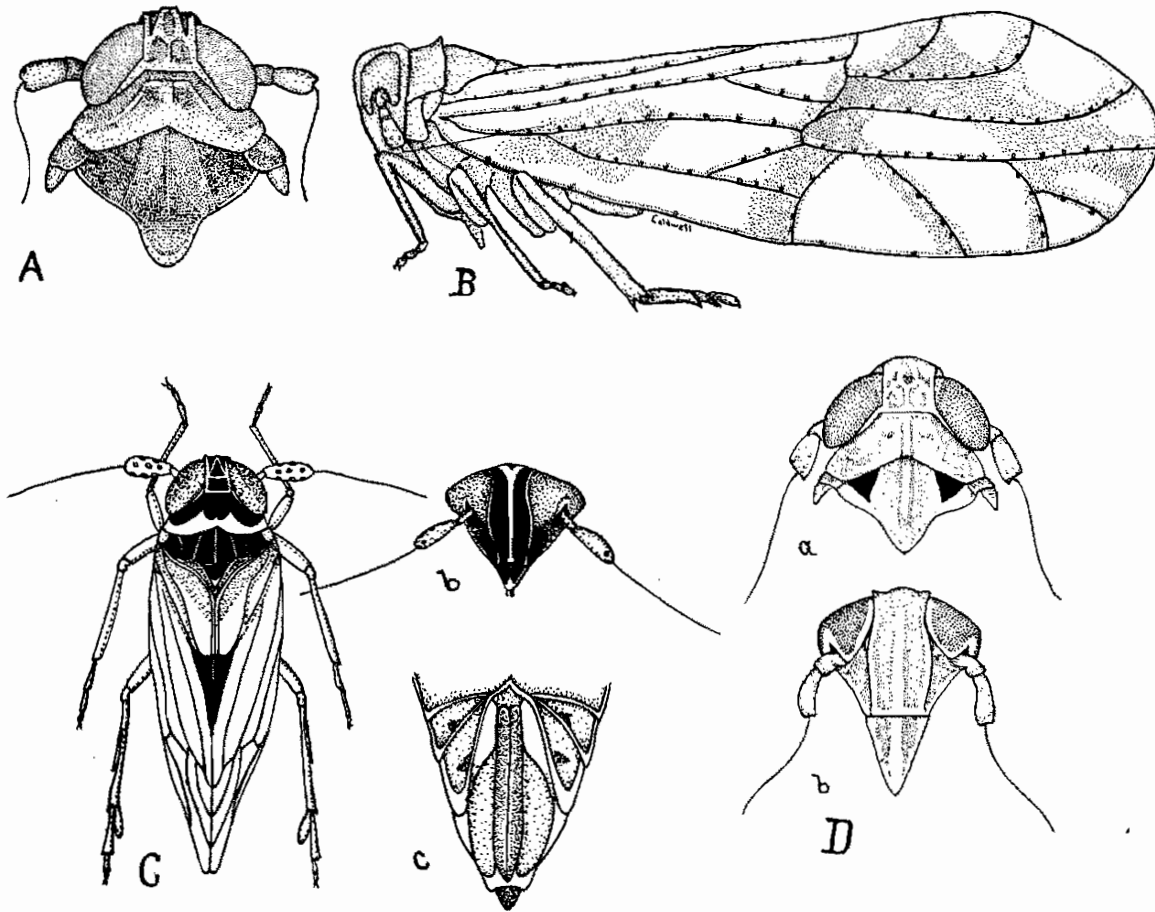


Fig. 38.—A, *Delphacodes pellucida*; B, *Liburnilla ornata* (J. S. C. del.) C, *Delphacodes puella*; b, face; c, female genitalia; D, a, *Delphacodes campestris* (D. M. J. del.)

given as Milan, Ohio. One specimen from Wooster, 10-29-'26, and another from Columbiana Co. are referred to this species. The latter taken by E. P. Breakey.

***Delphacodes foveata* (Van Duzee) (Fig. 35c)**

Mostly pale straw color; the spaces of vertex and front black, contrasting with the white carinae. Length, short winged form, 2.5 mm.; long winged form 4 mm. to tip of elytra.

Specimens of both long and short winged forms taken at Columbus, Ohio.

**Delphacodes osborni** (Van Duzee) (Fig. 39)

Light colored, pale fulvous, the elytra milky hyaline with dusky veins, especially toward the tip. The frontal carinae are distinct;

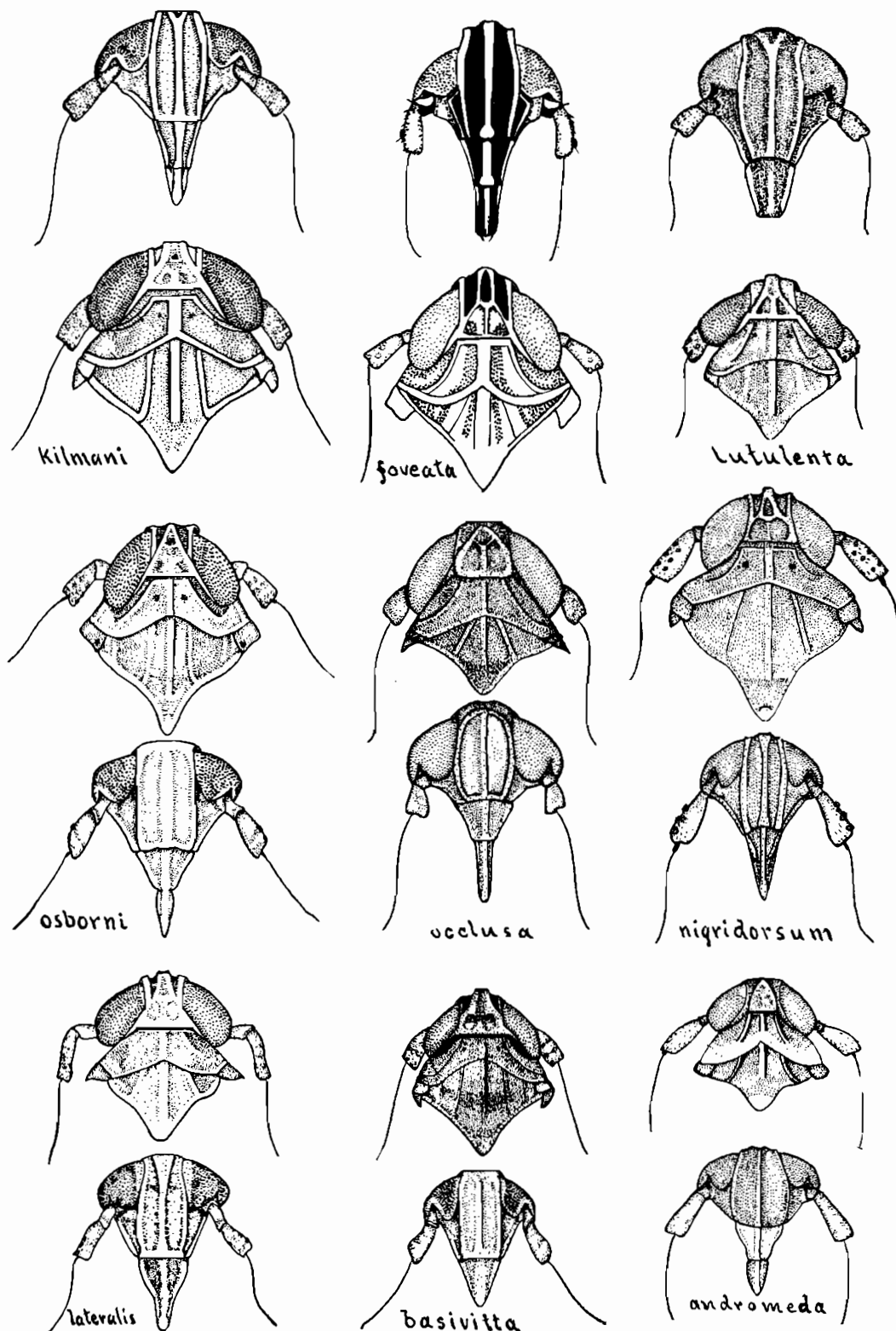


Fig. 39.—*Delphacodes*. Names given (D. M. Johnson del.)

angles of the scutellum in the male blackish. Length to tip of elytra 4 mm.

Apparently rather rare; our Ohio specimens were taken at Buckeye Lake.

***Delphacodes campestris* (Van Duzee) (Fig. 38*d*, 40, 41)**

This is one of our most abundant species and may be found in meadows in great numbers and must be of distinct economic importance in spite of its minute size. It is light yellowish in color,

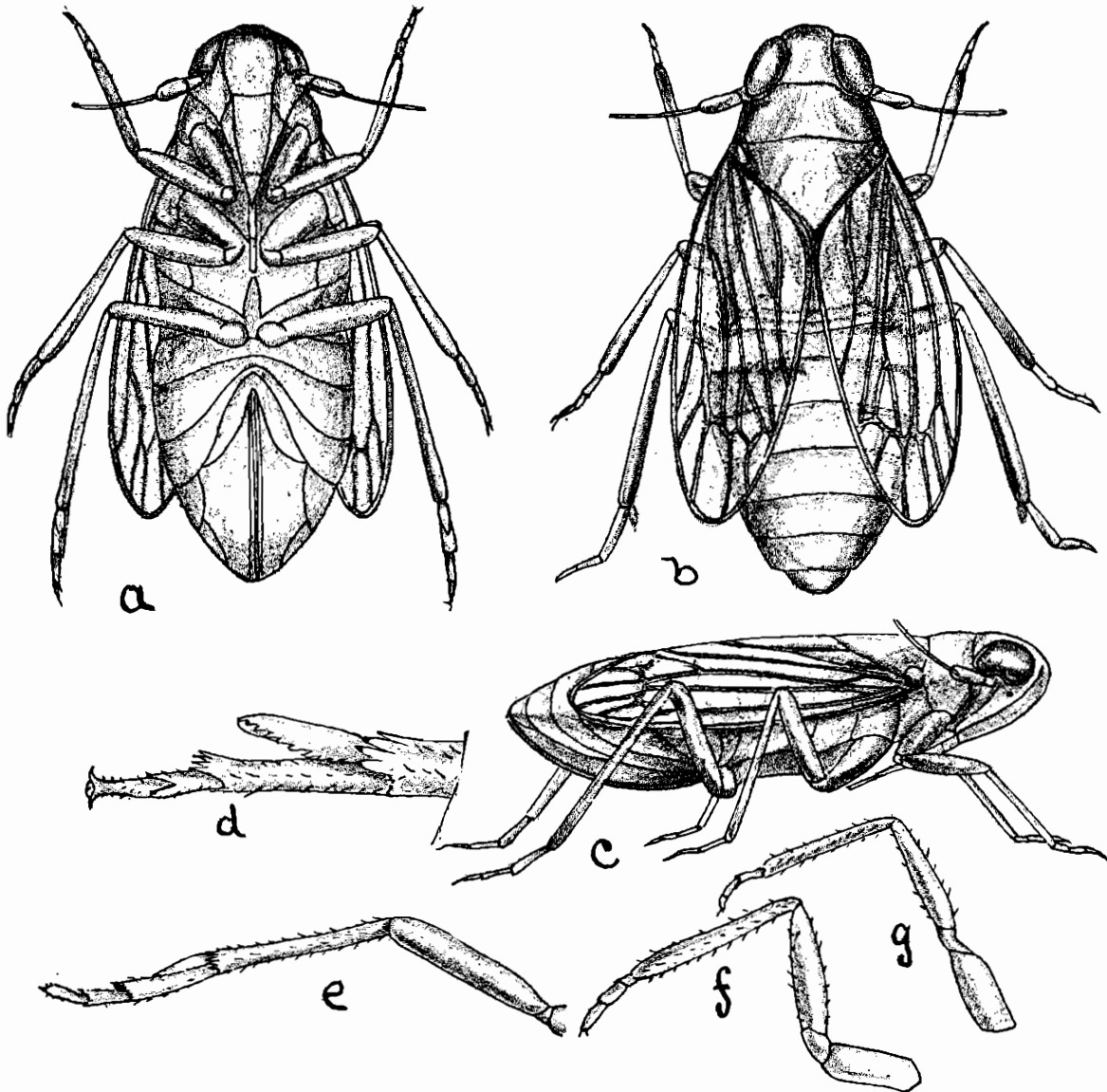


Fig. 40.—*Delphacodes campestris*. *a*, ventral; *b*, dorsal; *c*, side view; *d*, tarsus; *e*, *f*, *g*, legs (R. L. Shields del.)

the female almost unmarked and the male with a conspicuous black spot in the angles of the scutellum. It occurs in both long and short winged forms, the former measuring 2 mm. for the female and a little less than 2 mm. for the male. The long winged form is a trifle over 3 mm. to tip of elytra.

This may be collected anywhere in the state and our records show a long list of localities.

***Delphacodes lineatipes* (Van Duzee) (Fig. 41)**

Males black or blackish and females paler, light brownish or yellowish; the frontal carinae in both sexes margined with whitish; legs are light testaceous, delicately lined with brown. Length 2.5 mm.

Distributed throughout the northern United States and should be found throughout most of Ohio, although recorded only for Columbus and by Swezey as "Cedar Point on rushes south of boat landing."

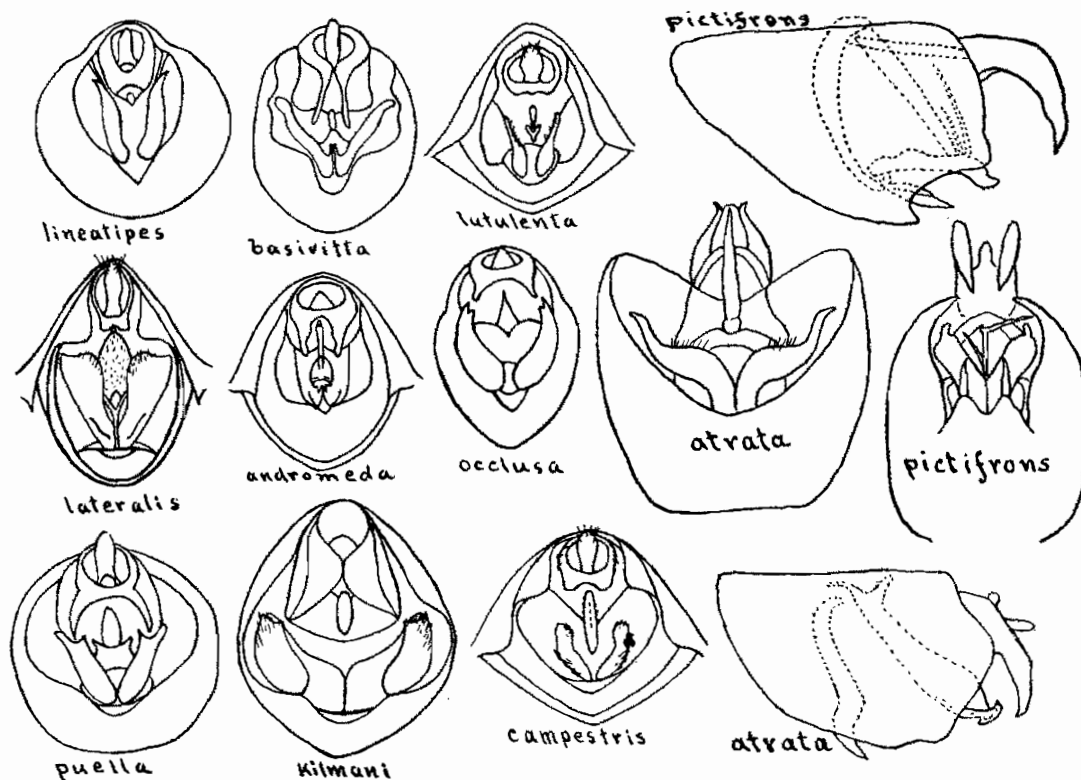


Fig. 41.—*Delphacodes* spp. Views of pygofer and included genitalia with names attached. (Dorothy M. Knull del)\* *atrata* and *pictifrons* (J. S. C. del.)

***Delphacodes lutulenta* (Van Duzee) (Fig. 39, 41)**

Small, dull brown, somewhat varied with paler; the front rather broad, the carinae narrowly lined with blackish. Length 2 mm.

This has been taken in large numbers at many points in the state, always of the short winged variety and in these the elytra extend over about two-thirds the length of the abdomen.

***Delphacodes lateralis* (Van Duzee) (Fig. 39)**

Brownish; the frontal carinae margined narrowly with blackish; tergum a pale brown with darker stripes up the side with a

\* These figures differ in some detail from those of Muir and Giffard, especially for *kilmani*, but probably due to slight difference in plane in which the parts are seen.

whitish median line; elytra hyaline, tinged with brown, margin narrowly whitish. In the short winged forms (the only ones in hand) the elytra reach tip of abdomen and are separated for most of the dorsal line. Length of short winged form, 2 mm.

Our Ohio specimens were taken at Columbus, Castalia, and Buckeye Lake. Also Hocking Co. (E.P.B.), Ashtabula 7-20-'99.

***Delphacodes kilmani* (Van Duzee) (Fig. 41)**

Similar to *lateralis* with pro- and meso-notum pale; a broad dorsal stripe on the back and the margin of the elytra whitish. Newark 5-16-'08, Chitook, Ashland Co. 5-22-'26.

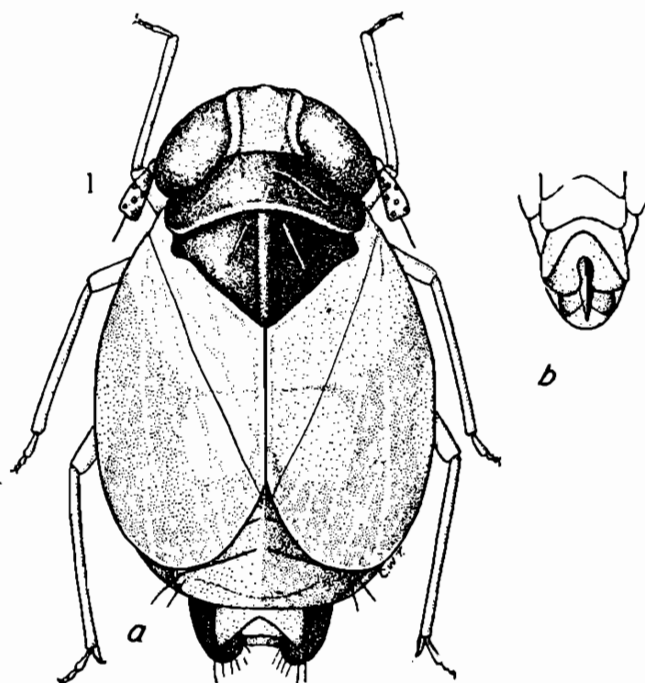


Fig. 42.—*Delphacodes andromeda* (Author's illustration. N. Y. Acad Sci.)

***Delphacodes andromeda* (Van Duzee) (Fig. 41, 42)**

Very small, occurring in two distinct forms; the long winged female form being mostly hyaline with hind border of pronotum and tip of scutellum whitish, abdomen mostly black, elytra milky hyaline, margin black; the short winged males have the head, pronotum, most of scutellum, third and fourth and terminal segments of abdomen black; mesothorax, base of abdomen a dark orange; fifth and sixth segments of abdomen fulvous, elytra orange yellow at base, hyaline apically. Female 1.5 mm. to tip of abdomen, 2 mm. to tip of elytra. Males 1.25 mm.

This handsome little species occurs in enormous numbers in moist locations throughout the southern states and in tropical America and has been taken at Columbus and Marietta, Ohio.

**Delphacodes rotundata** (Crawford)

*Megamelus rotundatas* Crawford. Proc. U. S. National Museum, Vol. 46, p. 618, 1914

*Liburnia rotundata* VanDuzee. Catalogue of Hemiptera, p. 779, 1917

Described as soiled whitish on head pronotum and scutellum; abdomen dark brown except rufous dorsad on middle of last three segments and pygofer, pleura and metanotum brown, legs, antenna and venter of thorax light to whitish. Length 2.3 mm.

This species was described from a specimen from Alabama. Ohio specimens referred here are from Franklin Co. and from Buckeye Lake 8-27-'04 (H.O.), and Pickaway Co. 9-1-'36 (J.S.C.).

**Delphacodes atrata** n sp.

Similar to *basivitta* but with distinct male genitalia and more uniformly dark. Black or dark fuscous, the antennae, clypeus, frontal carinae and pronotum and legs in large part dark brown or fuscous, the elytra milky hyaline with nervures infusate. The frontal carinae are nearly parallel, converging to apex of vertex and to base of clypeus. The elytra extend well beyond tip of abdomen. Length to tip of abdomen 2.6 mm.

The male genitalia are somewhat like *basivitta*, the pygofer broad hind border above and below evenly curved. The styles more slender than in *basivitta* and longer and distinctly sinuous, the anal segment with long curved spines and the aedeagus long, compressed and with hooked expansion at tip. See Fig. 41.

One male (holotype) Ashland Co., May 22, 1926, probably collected by C. B. Mayer. Dissection and figure of genitalia by J. S. Caldwell.

**Delphacodes pictifrons** n sp.

Black, shining, the segment of antennae dirty white, frons black at base merging into brown and yellowish with white apex. Clypeus shining black with white tip, beak and legs white or pale, the femora and tibiae with black lines. Elytra passing abdomen, milky white. Frons narrow the carinae parallel. Carinae of pronotum obscure. Length 3 mm.

Male genitalia: Pygofer long emarginate above, bilobed on ventral border and with slender spine like processes on diaphragm. Styles thick, diverging from base, sides nearly parallel and contracted near apex to form a short spur or tooth; aedeagus complex with large base and connective and slender forked terminal. Anal segment with long curved spines and central spur. See Fig. 41.

One male (holotype) Deer Creek, Madison Co. (H.O.).



**Delphacodes oclusa** (Van Duzee) (Fig. 39, 41)

*Liburnia oclusa* Metcalf. Jour. Elisha Mitchell Soc. Vol. 38, p. 171, 1923

*Delphacodes oclusa* Muir and Giffard. Bull. 15, Ent. Ser. Exp. Sta. H.S.P.A., p. 21, 1924

A small dark colored species with dark brown or black elytra which extend nearly to tip of abdomen. The carinae of face are obscure at base, the lateral carinae bowed outward so the frons is less than twice longer than broad. The genital styles are short and taper to tip. Length 2 mm.

Duncan 8-22 (H.O.), Ross Co. 10-2-'35 (J.S.C.)

**Delphacodes nigradorsum** (Crawford) (Fig. 39)

*Megamelus nigradorsum* Crawford. Pr. U. S. Natl. Mus., Vol. 46, p. 620, 1914

*Liburnia nigradorsum* Metcalf. Jour. Elisha Mitchell Soc., p. 171, 1923

Somewhat like *occlusa*, the head and front of prothorax dark and the elytra shining black; the frontal carinae and hind border of pronotum pale. The elytra reach the tip of the abdomen. Length of body 2.7 mm.

Specimens referred to this species are from Athens, Sept. 12, 1905, and Milan, Sept. 1, 1905 (H.O.).

**Delphacodes nitens** Muir & Giffard

*Delphacodes nitens* Muir and Giffard. Bull. No. 15, Ent. Ser. Exp. Sta. H.S.P.A., p. 27 (1924)

A detailed description is cited above and the species is characterized as "Shiny black, antennae, clypeus, legs, base of abdomen and anal style yellow."

Length male, brachypterous, 2.3 mm.; female brachypterous 2 mm.

"Described from three males and one female from Columbus, Ohio (Koebele 2201), the type and allotype being a pair from the Koebele series in the collection of the H.S.P.A. Experiment Station, Honolulu."

We do not have specimens recognized as this species and it should be taken certainly in the vicinity of Columbus and probably elsewhere in the state.

**Delphacodes laminalis** (Van Duzee)

*Liburnia laminalis* Metcalf. Jour. Mitchell Soc., p. 173

*Delphacodes laminalis* Muir and Giffard. Bull. 15, Ent. Ser. Exp. Sta. H.S.P.A., p. 38

Specimens in our collections referred to this species agree well with the original Van Duzee description but Muir and Giffard say "We can find no specimens in the collections before us which we can



identify as this species, those standing under this name being *lateralis* or *campestris*, Mr. Hartzell informs us that there are no specimens of this species in the Iowa College of Agriculture. We must leave it to Mr. Van Duzee to suggest how this name should be dealt with." Evidently some future worker has an opportunity to clear up any uncertainty as to the validity of the species. Length of body 2.8 mm.

The specimens referred to this species are from Franklin Co. 9-'03 and 9-15-'03 (H.O.), Buckeye Lake 8-27-'04 (H.O.), Vinton Co. 6-5-12-1900 (J.S.H.), and Wooster 3-30-'97.

### Genus *Phyllodinus* Van Duzee

#### *Phyllodinus flabellatus* Ball

*Brachypterous female*: With transverse bars on vertex and front; pronotum except anterior border, all of scutellum, a broad apical margin of the aborted elytra and the first two joints of the tarsus and margin of the pygofer, white, with terminal joint of the antennae, base of the legs, most of the coxae and a series of marks on the abdomen, dirty white. Length 2.7 mm., width 1.5 mm.

*Brachypterous male*: Color as in the female, but the black of elytra and head more intense and white a purer white. Length 2.3 mm.

*Macropterous male*: Black with the white bars on the vertex and front and tip of scutellum faintly white. Length to tip of elytra 3.2 mm.

*Macropterous female*: Black with margins of vertex in front and tarsal joints white, as in the brachypterous form.

This is one of the most elegant Delphacids which has yet come to light in the Ohio fauna. It was collected by Mr. Albert Koebele in Columbus and it was named in his honor but unfortunately the earlier description by Ball was not discovered until my article was in print. Also recorded for Duncan 8-'22, and Marietta 9-13-'05 (H.O.).

It resembles *nervatus* but differs particularly in the white tarsal joints and in the extent of the frontal bars and in the coloring of the pronotum and scutellum.

Apparently rather rare but distributed throughout the eastern states.

### Genus *Peregrinus*

#### *Peregrinus maidis* (Ashmead)

Light colored with fuscous markings; the face suffused with dusky; vertex, pronotum and scutellum pale fulvous, the carinae

lighter and lateral borders slightly darker; elytra hyaline, nervures at base yellowish; apex of clavus and apical nervures fuscous; beneath dusky; legs whitish; femora and tips of tarsi blackish. Length of tip of elytra 4-4.5 mm.

This is a very common pest of corn in the southern states and has a very wide distribution having been recorded for Hawaii, Ceylon, South Africa, Cuba, and Puerto Rico. Aside from its occurrence on corn it has been recorded for sugar cane and Mexican grass and I have recently seen specimens collected from teosinte at Washington, D. C.

Aside from its direct injuries to a most important crop it has a further menace as a carrier of plant diseases as it has been credited with transmitting the mosaic disease from corn to corn in Hawaii.

While it has not been taken in Ohio there is a considerable probability that it may spread into this state and become established at least for the southern counties. It is already known to occur in Tennessee and east of the Alleghenies and as far north as Washington. It has been known in the southern states since 1890 when it was first discovered in Florida. Apparently it has been spreading northward and we do not know just what its limit of distribution may be. It must of course have abundant food supply in the northern Mississippi Valley but it may possibly be limited in its northward spread by severe winters.

### ***Dicranotropis incerta* Van Duzee**

*Liburnia* (?) *incerta* VanDuzee. Bul. Buf. Soc. Nat. Sci., v:192, 1894

*Liburnia* (?) *incerta* VanDuzee. Bul. Buf. Soc. Nat. Sci., v:258, 1897

*Dicranotropis incerta* Muir and Giffard. Bul. Haw. Exp. Sta. Ent. Ser. 15, p. 17, 1924

"Allied to *L. Bohemani* of Europe." Form and color of *lutulenta* nearly. Short and stout; frontal carina forked opposite the lower angle of the eyes. Length of male 2 mm., female 3 mm.

*Male*: Dark testaceous brown; front obscurely rufo-piceous, tergum darker brown, the middle of the segments at base yellowish; pectoral pieces and legs soiled yellow. Aperture of the pygofers broad below, the styles acuminate, widely divergent and curved at apex, lower edge of the anal tube forming a pair of acute incurved teeth which are approximate and gibbous at base.

*Female*: Larger, tawny or honey yellow, paler beneath; tip of the rostrum and oviduct black." (Van Duzee).

Muir's description "from specimens in the collection of O. H. Swezey taken at Newark and Peebles, Ohio."

Genus **Pentagramma** Van D.

Represented in Ohio by one species.

**Pentagramma vittatifrons** (Uhl.)

This is a rather large species for the group and differs from most of the Delphacinae in having green or yellowish-green color. The antennae are short, the frons with two median carinae, the genital styles of male elongate, enclosing an elongate oval area. The elytra hyaline often shorter than abdomen. Length 5-8.5 mm.

Our specimens are from Sandusky 6-19-'99, and Ottawa Co. 7-11-'35 (R. C. Osburn).

## PRINCIPAL REFERENCES

- Ball, E. D., Canadian Entomologist, Vol. 34, p. 259-266 (1902).  
Canadian Entomologist, Vol. 60, p. 196-201 (1928).
- Breakey, E. P., Univ. Kansas Science Bulletin, Vol. 18, pp. 417-455 (1928).
- Crawford, D. L., A Contribution toward a Monograph of the Homopterous Family Delphacidae of North and South America, Proc. U.S. Natl. Mus. No. 2040, Vol. 46, pp. 557-640 (1914).
- Dozier, H. L., The Fulgoridae of Mississippi, Miss. Agr. Exp. Sta. Technical Bulletin No. 14, pp. 1-152 (1926).
- Fitch, Asa, Homoptera N. Y. State Cabinet (1851) Reprinted Lintner 9th Report State Entomologist of N. Y. (1892).
- Trans. N. Y. State Agr. Soc., Vol. 16, pp. 393-396 (1856).
- Fowler, Biologia Centrali Americana Homoptera, Vol. 1 (1904).
- Melichar, Ann. K. K. Horm Wein, Vol. 17, p. 84 (1902)
- Metcalf, Z. P., Jour. Elisha Mitchell Sci. Soc., pp. 139-230 (1923).
- General Catalogue of Hemiptera, Homoptera. Fasc. 4. Fulgoridae, Part 2, Cixiidae (1937).
- Muir, F., Bull. Div. Entomology Exp. Sta. H.S.P.A., No. 18 (1926).
- Muir F. and Giffard, W. H., Bull. Div. Ent. Exp. Sta. H.S.P.A., Entom. Series, No. 15 (1924).
- Osborn, H., Ohio Naturalist, Vol. 4, p. 42-46, 99-102 (1904).
- Vol. 5, p. 373-376 (1905).
- Technical Publication No. 16, pp. 49-51 and 97-98, N. Y. State College of Forestry, Syracuse (1922).
- Say, Thos., Complete Writings LeConte Ed. (1859).
- Stal, C., Berliner Ent. Zeit., Vol. 6 (1862).  
Berliner Ent. Zeit., Vol. 13 (1869).  
Stettiner Ent. Zeit., Vol. 31 (1870).

- Swezey, O.**, Preliminary Catalogue Fulgoridae of America North of Mexico.  
Div. Insp., Dept. Agr. Ohio, Bull. No. 3 (1904).
- Uhler, P. R.**, Maryland Academy of Science, Vol. 1, pp. 402-407 (1900).
- Van Duzee, E. P.**, A Preliminary Review of the North American Delphacidae.  
Bull. Buffalo Soc. Nat. Hist., Vol. 5, p. 225 (1897).
- Proc. Acad. Nat. Sci., Phil. 1907 (1908).
- - ——— Catalogue of Hemiptera of North America North of Mexico (1917).
- Family Fulgoridae in Hemiptera of Connecticut (1923).
- Walker, F.**, List of Homoptera Brit. Mus. 1852-1858.