

DESCRIPTIONS OF SOME NORTH AMERICAN SAWFLY LARVAE.

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INTRODUCTION.

The following paper, which is a contribution from the Branch of Forest Insects, Bureau of Entomology, describes the larvae of certain sawflies which have been obtained in connection with investigations on insects injurious to forest and shade trees and shrubs. The species here treated belong to eight genera, representing four sub-families, of the Tenthredinidae and one genus (*Acordulecera*) of the Pterygophoridae. The genera represented are briefly characterized and keys, separating the larvae described, are included. Some brief remarks, based on notes made in the rearing work on the life and seasonal histories of the species, are added.

In the descriptions of the larvæ the author has used the terminology which he had previously adopted for chalastogastrous larvae.¹ This terminology recognizes four transverse dorsal areas denoted by the letters A, B, C, and D and four pleural areas termed preepipleurite, postepipleurite, prehypopleurite, and posthypopleurite. The spiracle, spiracular area, and alar area are considered as pertaining to the tergum or to the integument between tergum and pleurum and are treated after the discussion of the transverse tergal areas. The ambulatory appendages of the thorax have been designated by "legs" and those of the abdomen by "uropods" excepting on the ultimate segment, where they are called "postpedes." These appendages are herein treated following the discussion of the pleural areas since they occur between the pleurum and the sternum. The transverse dorsal areas A, B, C, and D may become subdivided, and when so are denoted by B¹, B², or C¹, C², and C³. In order that the position of pigment or external morphological characters may be definitely indicated, the body has been divided into a series of imaginary longitudinal regions, placed one below the other on each side of

¹ LeConte's Sawfly, An Enemy of Young Pines, Jour. Agri. Research, vol. 20, No. 10, pp. 741-760, and Some Suggested Homologies between Larvae and Adults in Sawflies, Proc. Ent. Soc. Wash., vol. 23, No. 8, pp. 178-192, 1921.

the larva beginning with a middorsal line and ending with a midventral line. These regions are named and defined as follows:

I^a.—Middorsal, a single, longitudinal midtergal line.

I.—Dorsal, a pair of longitudinal tergal regions, one to each side of the middorsal line.

II.—Subdorsal, a pair of longitudinal tergal regions, one to each side of the dorsal regions.

III.—Laterodorsal, longitudinal regions, below the subdorsal regions.

IV.—Supraalar, regions, one on each side of larva below laterodorsal regions.

V.—Alar, regions, one on each side of larva below the supraalar regions and wherein the spiracle is situated on the larvae described in the present paper.

VI.—Epipleural, regions, below the alar.

VII.—Pleural, regions, below the epipleural.

VIII.—Hypopleural or lateroventral, paired regions, in which the hypopleurites are situated one to either side of the sternum and below the pleural regions.

IX.—Adventral, paired longitudinal regions in which the uropods protrude from the hypopleurites.

X.—Ventral, a pair of longitudinal regions, one to either side of the midventral line.

X^a.—Midventral, a single, midsternal longitudinal line.

The rearing of the insects was done at the eastern field station of the Bureau of Entomology, located at East Falls Church, Virginia, and the paper prepared under the direction of Mr. S. A. Rohwer, who has described the adults of such species as were new to science and identified those adults previously described.

The types of the larvae here described are in the collection of the United States National Museum.

Family TENTHREDINIDAE.

Subfamily EMPRIINAE.

Genus PERICLISTA Konow.

The larvae of the two species described in this genus are readily distinguished from each other in the arrangement of the spines and from the other sawfly larvae on the character of their spines, the larger of which are usually bifurcate and rarely trifurcate.

PERICLISTA BICORIAE Rohwer.

In Dyar's² "Synopsis of the Larvae of the North American Blenocampinae" the larva of this species falls in with (*Isodyctium*)

² Dyar, Journ. N. Y. Ent. Soc., vol. 6, June, 1898, p. 137.

Periclista murtfeldtiae and *infrequens*, but differs from these, which have spines black tipped or black at base and tip, in that the spines are pale. It agrees very well with the supplementary description of *caryicola* (sic: *calricolum*³), which records that species as possessing spines "nearly normally furcate and others perfectly normal," although they are described as more or less degenerate in the last stage (VI). *Periclista hicoloriae* and *caryicola* are further associated by the use of the same host—hickory.

Larva.—STAGE VI? (Specimen in poor condition.)

Size.—Length, 13 mm., maximum breadth at metathorax 2.25 mm.

Structure.—Head: Face view, circular in outline; epistoma with 6 spines in a transverse row; labrum with about 12 spines; epicra-

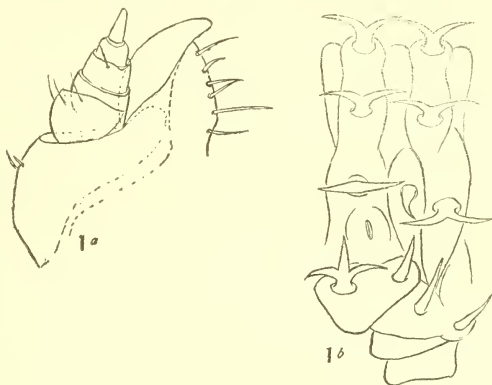


FIG. 1.—PERICLISTA HICORIAE ROHWER. a, MAXILLA; b, THIRD URITE.

nium and frons moderately spined; antennae of the telescopic type with 5 joints; eye disks not elevated, eyes slightly convex; maxilla with palpifer and 4 jointed palpus, lacinia broad and flattened and with a few (6) setae arranged on apical margin (fig. 1^a); labium with palpiger and 2-jointed palpus. Thorax: with large spines; legs with 4 joints and an apical claw, joints moderately haired, joint 3 with small chitinous process at apex of inner side. Abdomen: Uropods on urites 2-8, and postpedes on urite 10, (urites 4 and 10 chosen for describing because condition of the larvae would not permit complete study); tergum; composed of A, B, C (C inclined to subdivision into C¹⁻²) and D; B and C² armed with large bifurcate spines, B in subdorsal, laterodorsal and supraalar regions, C² in subdorsal and laterodorsal regions, on urites 1-9 (Fig. 1^b); urite 10, epiproct with many large spines; spiracular area rather small, with

³ Dyar, Journ. N. Y. Ent. Soc., vol. 6, June, 1898, p. 135.

a rather small spiracle; alar area bilobed—the anterior lobe, below C^1 , smaller and with a smaller, usually unforked spine—posterior lobe, below C^2 , larger and with a large bifurcate spine; pleurum; preepipleurite and postepipleurite with 2 spines each, the anterior frequently bifurcate or trifurcate, the other three becoming smaller and often unforked posteriorly; hypopleurite and uropods present and without spines.

Color.—Head: Paler green than body; eye disks black; mouth-parts brownish; antennae green and prominent. Body: Leaf green, alimentary canal darkened in center; spines white; legs semitransparent, pale green with brown hook.

Prepupa.—

Size.—Length, 9 mm. Head: 1.25 mm. high by 1.25 mm. broad.

Structure.—Spineless, smooth, uropods somewhat reduced; otherwise same as larva.

Color.—Head: White; eye disks black; apices of mandibles blackish brown. Body: White; hooks on legs, the only darkened portions of body, brownish.

Cocoon.—Length, 6.5 mm. by 3 mm. broad. A blackish brown, single-walled case, with particles of sand or earth adhering.

Host.—*Hicoria*, species.

Remarks.—Described from material collected May 24, 1913, at Charter Oak, Pennsylvania, by Thomas E. Snyder and recorded under Hopk. U. S. number 11364. The larvae feed from the under surface of the leaf, eating small holes. All the larvae had finished feeding and had entered the ground to spin their cocoons by June 6. and on May 7 of the following year adults emerged in the rearing cage.

PERICLISTA SIMILARIS Rohwer.

In Dyar's⁴ Synopsis this species runs to *Periclista albicollis*, but appears to be nearer *P. purpuridorsum* in that *albicollis* has a tuberculate prepupa while the prepupa of *similaris* and *purpuridorsum* are spineless and in that the larvae of these two rest on the under side of leaves, while the larvae of *albicollis* rest on the upper side. It is separated from *P. purpuridorsum* of the table, by being pale green, not darkened dorsally.

Larva.—STAGE VI. (Larva in poor condition.)

Structure.—Head: Face view, circular in outline; epistoma and labrum each with four spines; epicranium and frons sparsely spined; antennae of the telescopic type with 5 joints; eye disks not elevated, eyes slightly convex; maxilla with palpifer and 4-jointed palpus, lacinia, broad and flattened with a number (8) setae arranged on the

⁴ Dyar, Journ. N. Y. Ent. Soc., vol. 6, June, 1898, p. 136.

apical and interior⁵ margins (fig. 2^a); labium with palpiger and 2-jointed palpus. Thorax: With large spines; legs with 4 joints and apical claw, joints haired, joint 3 with small process at apex on inner side. Abdomen: (urites 5 and 10 chosen for describing because condition of larva would not permit complete study) tergum; of urites 1-9 composed of areas A, B, C (C inclined to subdivide forming a narrow C¹ and broad C²) and D; B and C² armed with large bifurcate subdorsal and supraalar spines (fig. 2^b); urite 10, tergum consists of epiproct, with large and unforked spines in transverse caudal row and several smaller unforked spines; spiracular area rather small situated in alar region and containing a rather small spiracle; alar area bilobed—the anterior lobe, below C¹, smaller and

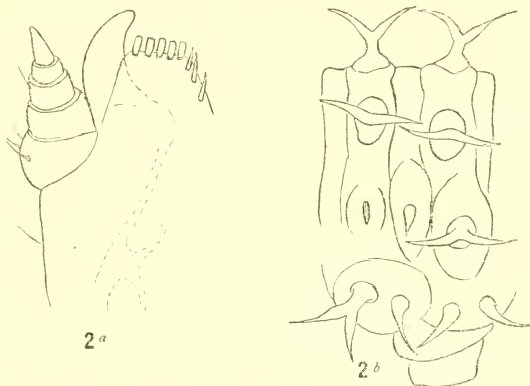


FIG. 2.—PERICLISTA SIMILIS ROHWER. *a*, MAXILLA; *b*, THIRD URITE.

with small, unforked, alar spine—the posterior lobe, below C², larger and with large, bifurcate, alar spine; pleurum; preepipleurite and postepipleurite distinct and separate, preepipleurite with a bifurcate spine anterior of a smaller unforked spine, neither as large as the tergal spines; postepipleurite with two unforked spines; hypopleurite and uropods present and without spines; uropods on urites 2-8, no uropods on urites 1 and 9, postpedes on urite 10.

Color.—Head: Epicranium brownish black above eyes; upper half of frons brownish black; eye disks black; labrum, ventral mouth parts and antennal joints, pale brownish; apices of mandibles brown; remainder pale green. Body: Leaf green, alimentary canal showing darker; spines of tergum and alar area black; preepipleurite and postepipleurite and smaller epiproctal spines pale or occasionally the larger spines pale with brownish tips.

⁵ Exterior with reference to maxillary palpus and galea.

Prepupa.—Pale green and spineless.

Cocoon.—Length, 7.5 mm. by 2.8 mm. A black, single-walled case with particles of sand or earth adhering.

Host.—*Quercus alba* Linnaeus.

Remarks.—Described from material collected May 24, 1913, at Charter Oak, Pennsylvania, by Thomas E. Snyder, and recorded under Hopk. U. S. number 11363. The larvae were feeding on the under surface of the leaves. All the larvae had finished feeding and had entered the ground to spin their cocoons by May 31, and on May 7 of the following year adults emerged in the rearing cage.

Subfamily TENTHREDININAE.

Genus MACROPHYA Dahlbom.

The larvae described below agree in having area B of the mesothorax, metathorax, and abdominal segments 1-9 subdivided and in having a 5-jointed antenna (figs. 3^b and c).

KEY TO SPECIES.

1. Head predominating color pale; thorax and abdomen pale yellowish green.....*epinota* Say.
Head predominating color brownish black; thorax and abdomen mostly blackish above the alar region..... 2.
2. Dorsum of thorax and abdomen with pale middorsal longitudinal stripe and pale spots.....*trisyllaba* Norton.
Dorsum without pale stripe or pale spots.....*nigristigma* Rohwer.

MACROPHYA EPINOTA Say.

Larva.—STAGE IV.

Size.—9.5 mm. long. Head: 1.125 mm. high by 1 mm. broad.

STAGE V.

Size.—10.5 mm. long. Head: 1.67 mm. high by 1.5 mm. broad.

STAGE VI.

Size.—18 mm. long. Head: 2.2 mm. high by 2 mm. broad.

Structure.—Head: Face view, circular in outline; viewed from side rather oval; epistoma with 4 (?5 or 6) spines; labrum with 6 spines; frons and epicranium moderately haired; eye disks not elevated; antennae of the telescopic type with 5 joints (fig. 3^b); maxilla with palpifer and 4-jointed palpus; lacinia broad and flattened with a number of setae (10-12) arranged on the apical margin (fig. 3^a); labium with palpiger and 2-jointed palpus. Thorax: tergum; prothorax composed of areas A, B, C¹⁻² and D; B and C² with few indistinct spines; mesothorax and metathorax, A, B¹⁻², C¹⁻² and D, B² and C¹ with few indistinct spines; alar area absent on prothorax, alar area large, somewhat divided and not very prominent on the mesothorax and metathorax; pleurum; preepipleurite indistinctly separated from B in the prothorax and from the alar area in the mesothorax and meta-

thorax, not large; postepipleurite rather large; prehypopleurite triangular, somewhat chitinized and haired; posthypopleurite of medium size; legs with 4 joints and a claw, sparsely haired, joint 3 with rather long process at apex on inner side. Abdomen: Tergum; of urites 1-8 composed of A, B¹⁻², C¹⁻²⁻³ and D, B² and C² with sparse, indistinct spines (fig. 3^c); urite 9 the same but with a subdivision of C wanting; urite 10 composed tergally of the epiproct which is sparsely haired and has no pseudocerci; urites 1-8 with spiracular area situated in alar region, rather well defined, and with a rather large spiracle; spiracular area and spiracle wanting on

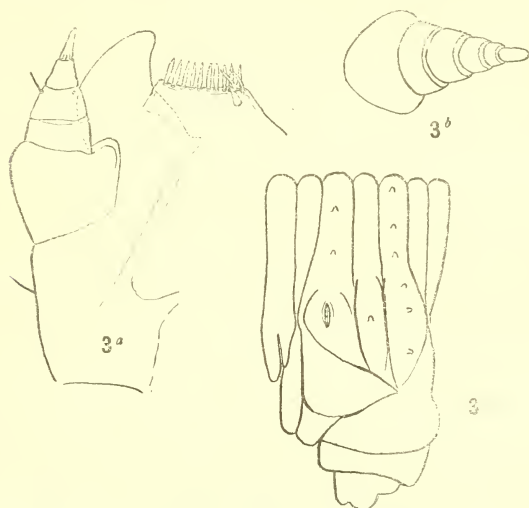


FIG. 3.—*MACROPHYA EPINOTA* SAY. a, MAXILLA; b, ANTENNA; c, THIRD URITE.

urites 9 and 10; alar area distinctly bilobed on urites 1-8, indistinct on urite 9 and wanting on urite 10; pleurum; urites 2-8 with uropods and distinct hypopleurite present; urites 1 and 9 with no uropods or distinct hypopleurite present; urite 10 with postpedes but no distinct hypopleurite and with postcallus of fair size and moderately haired; urites 1-8, epipleurite divided into distinct preepipleurite and postepipleurite; urite 9, epipleurite not distinctly divided, and on urite 10, epipleurite not distinguishable.

Color.—Head: Brownish spot dorsally on epicranium between the posterior laterodorsal grooves; eye disks black; small crescent-shaped brownish spot posterior of eye disks; remainder pale yellowish green. Thorax and abdomen pale yellowish green.

Prepupa.—Size.—14.5 mm. long. Head: 2.33 mm. high by 2.2 mm. broad.

Structure.—Similar to stage VI larva.

Color.—Much as stage VI larva; vertex of head undarkened; spiracles blackish.

Cocoon.—Pupation occurs in a capsule-shaped cell of sand or earth cemented together by the prepupae, similar to those made by certain other Tenthredinidae, 13 mm. long by 7 mm. broad.

Host.—*Sambucus canadensis* Linnaeus.

Remarks.—Described from material collected June 26, 1912, at Falls Church, Virginia, by S. A. Rohwer, and recorded under Hopk. U. S. number 10144. The larvae were of various sizes at time of collection, the fourth to sixth stages being present. The elderberry was in flower or with young fruit at this time. The larvae sit either flat on edge or somewhat curled on the under side of leaf. All the larvae had entered the ground for pupation on July 13, 1912, and June 3, 1914, adults emerged in the rearing cages.

MACROPHYA TRISYLLABA Norton.

Larva.—STAGE VI.

Structure.—Head: Face view, circular in outline; epistoma with 4-6 spines; labrum with 6 spines; frons and epicranium moderately haired; eye disks not elevated, eye lenses slightly convex; antennae of the telescopic type with 5 joints; maxilla with a palpifer and 4-jointed palpus, lacinia broad and flattened, with a number of setae (10-12) arranged on the apical margin (similar to *M. epinota*, see fig. 3^a); labium with a palpiger and 2-jointed palpus. Thorax: Tergum; prothorax composed of A, B, C¹⁻², and D; mesothorax and metathorax composed of A, B¹⁻², C¹⁻², and D; in prothorax A and D are bare while B and C are sparsely spined; in mesothorax and metathorax A is haired, B¹ bare, B² sparsely spined, C¹ sparsely spined, C² and D bare; alar area large, not distinctly separated from preepipleurite and sparsely haired in the mesothorax and metathorax; alar area absent in prothorax; pleurum; preepipleurite not large, sparsely haired; postepipleurite large and sparsely haired in the prothorax, small and bare in the mesothorax and metathorax; prehypopleurite chitinized, triangular and sparsely haired; posthypopleurite rather small and sparsely haired; legs with 4 joints and an apical claw, joints sparsely haired and joint 3 with a long, broad, and well chitinized extension at apex on inner side of leg. Abdomen: The tergum consists of A, B¹⁻², C¹⁻²⁻³, and D on urites 1-8, with urite 9 the same, excepting that B and C are but indistinctly subdivided and a subdivision of C is wanting, and with urite 10 consisting of an epipect without pseudocerci; spiracular area with spiracle present on urites 1-8 and wanting on urites 9 and 10; alar

area bilobed on urites 1-7, single lobed on urites 8 and 9, and wanting on urite 10; pleurum; preepipleurite and postepipleurite, separate and distinct on urites 1-8, not separate, but forming an epipleurite on urite 9, and not recognizable on urite 10; hypopleurite and uropods on urites 2-8; hypopleurite undeveloped or absent and uropods wanting on urites 1 and 9; hypopleurite not distinguishable, postpedes present, and postcallus moderately haired and not especially prominent on urite 10.

Color.—Head: Epicranium mostly brownish black, excepting posterior laterodorsal grooves, which are white and a white area extending across pleurostoma below eye disks and along the frontal epicranial sutures; eye disks black; remainder of head, excepting labrum and mandibles, white; labrum and mandibles yellowish-brown. Thorax and abdomen: dorsum above alar region blackish with pale, narrow, middorsal, longitudinal stripe and large whitish subdorsal spots on B¹⁻², C¹⁻²⁻³ and D; alar area dark; pleurum and venter, pale but for preepipleurite and postepipleurite which have dark markings; ultimate segment, dorsum above pleurum grayish—darker at the cephalad laterad angles and darkest at a moderately large blackish spot on the dorsad caudad margin of the epiproct; pleurum and venter, pale.

Prepupa.—

Structure.—Head: Similar to that of the larva, but bare excepting for four hairs each, on epistoma and labrum. Thorax: Similar but bare. Abdomen: Similar but bare, including epiproct and postcallus.

Color.—Head: Pale with black eye disks. Thorax and abdomen, pale with a few faint grayish markings on pleurum and a number on the dorsum.

Cocoon.—Pupation occurs in a capsule-shaped cell of sand or earth cemented together by the prepupae. Cell 12 mm. long by 8 mm. broad.

Host.—*Sambucus canadensis* Linnaeus.

Remarks.—Material described was collected at East River, Connecticut, on September 3, 1916, by C. R. Ely and recorded under Hopk. U. S., number 13660p¹⁻². Prepupae first appeared September 14 and by October 9 all were in the ground. Adults emerged in the latter part of May and early June of the following year.

MACROPHYA NIGRISTIGMA Rohwer.

Larva.—STAGE VI.

Structure.—Head: Face view, circular in outline, viewed from side wedge-shaped; epistoma with 4 to 6 spines; labrum with 6 spines; frons moderately haired, epicranium densely but finely haired; eye disks not elevated, the lenses slightly convex; antennae of the

telescopic type with 5 joints; maxilla with a palpifer and 4-jointed palpus, lacinia broader than *M. epinota* or *trisyllaba* and flattened with many setae (20) on apical margin; labium with palpiger and 2-jointed palpus. Thorax: With the tergum of the prothorax composed of areas A, B, C¹⁻² and D; B and C² with few indistinct spines; the mesothorax and metathorax A, B¹⁻², C¹⁻², and D; B² and C¹ with few indistinct spines; alar area absent in the prothorax, large, much divided, but not especially prominent in the mesothorax and metathorax; pleurum; preepipleurite not distinctly separated from alar area, not large; postepipleurite small; prehypopleurite angular, somewhat chitinized and haired; posthypopleurite of medium size, no distinct spines; legs sparsely haired, 4 joints and claw, joint 3 with a rather large process at apex on inner side. Abdomen: The tergum of urites 1-8 composed of A, B¹⁻², C¹⁻²⁻³ and D; B² and C² with sparse, indistinct spines; urite 9 the same but with a subdivision of C wanting; urite 10 composed of epiproct, moderately spined and without pseudocerci; spiracular area, situated in alar region, well defined, and with a large spiracle on urites 1-8, wanting on urites 9 and 10; alar area distinctly bilobed on urites 1-7, indistinctly bilobed on urite 8, indistinct on urite 9 and wanting on urite 10; pleurum; epipleurite divided into distinct preepipleurite and postepipleurite on urites 1-8; epipleurite undivided on urite 9 and not distinguishable on urite 10; uropods from distinct hypopleurite on urites 2-8; no uropods or distinct hypopleurite on urites 1 and 9; postpedes but no distinct hypopleurite, and postcallus rather large and moderately haired on urite 10.

Color.—Head: Epicranium brownish black; pleurostoma below eyes, lateral margins of occiput, posterior laterodorsal grooves and margins of frontal epicranial suture, whitish; eye disks black; remainder of head whitish. Thorax and abdomen, prothorax, white, except brownish D; mesothorax and metathorax and abdomen, dorsum above alar region brownish; A and B¹ in middorsal region, alar area under B² in supraalar region and preepipleurite, with blackish spots on mesothorax and metathorax; B¹⁻² in middorsal region, B² in supraalar region, alar area in alar region, preepipleurite in epipleural region, with blackish spots on urite 1; urites 2-8 inclusive, same but with an alar spot below spiracle on the spiracular area and postepipleurite with blackish spot; urite 9, B¹⁻² in middorsal region, B² in supraalar region and epipleurite with spots; urite 10 with small supraalar spot at sides.

Prepupa.—

Structure.—Head: Similar to larva, but epistoma and labrum thickened and fleshy. Thorax and abdomen, similar to larva but with spines wanting.

Color.—Head: Epicranium darkened, grayish tan above eyes; eye disks black; apices of mandibles black; remainder of head yellowish white. Thorax and abdomen, very faintly yellowish gray where the larva is brownish; with faint gray spots where the larva has blackish spots.

Cocoon.—Pupal cells or cocoons not obtained but they are doubtless the same as the other two species of this genus.

Host.—*Hicoria*, species.

Remarks.—Described from material collected August 6, 1914, at Linglestown, Pennsylvania, by W. S. Fisher, and recorded under Hopk. U. S. number 10959^a. The larvae were abundant and fed vigorously during the morning and evening but not in the heat of the day. All these larvae had entered the ground for pupation by August 17, 1914, but no adults emerged.

The lack of emergence from this cage throws the possibility of doubt as to the identity of the larvae; however, they agree so well with the other larvae of the genus *Macrophya* and since an adult of *Macrophya nigristigma* Rohwer was taken from these plants about the same time the larvae were collected the adults and larvae have been associated.

Subfamily ALLANTINAE.

The following larvae differ from the other sawfly larvae herein described in that their antennae have 5 joints and that urites 1-8 inclusive have the tergum composed of areas A, B, C¹⁻²⁻³ and D, with B and C² haired (fig. 4^b).

The present description of one of the species was prepared from a shed skin supplemented by rearing notes and hence is not so complete as might be wished. Because of this the genera to which the larvae belong can not be adequately defined, only color characters being available for differentiation.

Genus PSEUDOSIOBLA Ashmead.

PSEUDOSIOBLA FLORIDANA Provancher.

Larva.—(Poorly preserved specimen.)

STAGE III or IV?

Size.—11 mm. long. Head: 1.5 mm. high by 1.33 mm. broad.

Structure and color.—Similar to stage VI.

STAGE VI.

Size.—13.5 mm. long. Head: 2.33 mm. high by 2 mm. broad.

Structure.—Head: Face view, circular in outline, somewhat wedge-shaped viewed from side; epistoma with 4 spines; labrum with 6 spines; frons and epicranium sparsely haired; eye disks not elevated, lenses slightly convex; antennae of the telescopic type with 5 joints;

maxilla with a palpifer and 4-jointed palpus, lacinia broad and flattened with many (16) setae on apical margin (fig. 4^a); labium with palpiger and 2-jointed palpus. Thorax: The tergum of the prothorax composed of areas A, B, C, and D; B and C sparsely but distinctly spined; mesothorax and metathorax, tergal areas A, B, C spined and D bare; alar area of prothorax wanting but large and somewhat divided in the mesothorax and metathorax; pleurum; preepipleurite large, indistinctly separated from B in the prothorax and the alar area in the mesothorax and metathorax; postepipleurite of moderate size; prehypopleurite triangular, somewhat chitinized and haired; posthypopleurite of medium size; legs with 4 joints and an apical claw, joints sparsely haired, joint 3 with rather long process

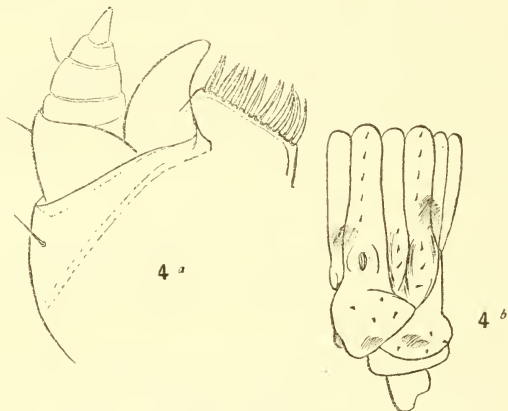


FIG. 4.—*PSEUDOSIOBLA FLORIDANA* ASHMEAD. *a*, MAXILLA; *b*, THIRD URITE.

at apex of inner side. Abdomen: The tergum of urites 1-8 composed of A, B, C¹⁻²⁻³ and D with B and C² sparsely but distinctly spined (fig. 4^b); urite 9 the same but with a subdivision of C wanting; urite 10 consisting of an epiproct sparsely but distinctly spined and with no pseudocerci; spiracular area in the alar region fairly distinct and with a rather large spiracle on urites 1-8, wanting on urites 9 and 10; alar area distinctly bilobed and each lobe spined on urites 1-8, indistinct on urite 9 and wanting on urite 10; pleurum; epipleurite divided into distinct preepipleurite and postepipleurite with both spined on urites 1-8, epipleurite not distinctly divided on urite 9, and not distinguishable on urite 10; uropods and a distinct hypopleurite present on urites 2-8; no uropods and no distinct hypopleurite on urites 1 and 9; postpedes present but no distinct hypopleurite on urite 10.

Color.—Head: Blackish above eyes, pale below; eye disks black; antennal joints brown. Thorax: Legs brownish to blackish. Thorax and abdomen, with supraalar and pleural rows of spots; remainder of larva pale.

Prepupa.—Appears same as other stages.

Cocoon.—Spins no cocoon but prepupa cements particles of sand or earth together into a capsule-shaped case, 11 mm. long by 6 mm. broad, similar to other Tenthredinidae.

Host.—*Cephalanthus occidentalis* Linnaeus.

Remarks.—Described from material collected June 27, 1912, at Newington, Virginia, by S. A. Rohwer, and recorded under Hopk. U. S. number 10145. At this time the flower buds varied from about the size of a pea to the size of a marble. The larvae were of several sizes and were found feeding solitary, on edge of the leaves. They feed stretched along the edge of leaf but are sometimes found curled. The larvae are easily disturbed and fall, curled, to the ground. All the larvae had entered the ground for pupation by July 10, 1912, and on June 7 of the following year adult sawflies were found in cage.

Genus STRONGYLOGASTEROIDEA Ashmead.

STRONGYLOGASTEROIDEA PALLIDICORNIS Norton.

Larva.—STAGE VI.

Size.—Length 15 mm. Head: 2.5 mm. high by 2 mm. broad.

Structure (from shed skin).—Head: Face view, circular in outline; epistoma with 4 hairs; labrum with 6 hairs; epicranium and frons rather sparsely haired; eye disks not elevated, eyes slightly convex; antennae of the telescopic type with 5 joints; maxilla with palpifer and 4-jointed palpus, lacinia broad and flattened with a number of setae (12) on apical margin; labium with palpifer and 2-jointed palpus.

Color (from rearing notes).—Head: Powdery, large dorsal blackish spot between posterior laterodorsal grooves and down vertex to near the junction of the frontal epicranial sutures above frons; eye disks black, with brownish black markings posterior to them. Body: Tergum and pleurum bluish white, with bloom or white powder and spotted with black, a middorsal row 1 per segment, a subdorsal row 3 per segment, and alar or supraalar row 2 per segment; venter including legs and uropods, yellowish.

Cocoon.—Spins no cocoon, pupates in cell of sand or earth cemented together. Cell, capsule-shaped; length, 15 mm.; width, 7.5 mm.

Host.—*Rubus*, species.

Remarks.—Described from material collected July 29, 1913, at Falls Church, Virginia, by William Middleton and recorded under

Hopk. U. S. number 11388. The larvæ were feeding upon the edges of the leaves and were in the sixth stage. On August 4 they had shed, becoming prepupæ and had entered the ground for pupation. Adults emerged on August 25 of the same year.

Subfamily NEMATINAE.

Tribe NEMATINI.

The larvae described below may be distinguished from the other larvæ herein treated by the possession of a cone and disk type antenna with 4 joints or parts (fig. 7^b), and a broad and flattened lacinia armed with setae along the apical margin. The following table will serve to separate the larvae here described:

- | | |
|--|-----------------------------|
| 1. Area A with several hairs..... | 2. |
| Area A bare..... | 3 |
| 2. Pseudocerci present..... | Croesus castaneae. |
| Pseudocerci wanting..... | Pteronidea amelanchieridis. |
| 3. Pseudocerci present..... | 4. |
| Pseudocerci wanting..... | 6. |
| 4. Lower seta or tube on anterior lobe of the alar area in black spot. | |
| | Pteronidea winnanae. |
| Same seta or tube not in black spot..... | 5. |
| 5. Postepipleurite of mesothorax and metathorax blackish. | |
| | Pteronidea mendicana |
| Same areas pale..... | Pteronidea plesia. |
| 6. Second joint from base of the maxillary palpus with fleshy process at apical end of the inner side..... | 7. |
| Same joint without process..... | Pontania amentivora. |
| 7. Area C indistinctly subdivided, forming C ¹⁻² with C ¹ haired..... | 8. |
| Area C indistinctly subdivided, forming C ^{1-2,3} with C ² haired. | |
| | Pristiphora betulavora. |
| 8. Feeding on <i>Corylus</i> | Pteronidea corylus. |
| Feeding on <i>Alnus</i> | Pteronidea alnivora. |

Genus CROESUS Leach.

CROESUS CASTANEAEE Rohwer.

Larva.—STAGE IV.

Size.—15 mm. long. Head: 1.66 mm. high by 1.66 mm. broad.

STAGE V.

Size.—17 mm. long. Head: 2 mm. high by 2 mm. broad.

STAGE VI.

Size.—25 mm. long. Head: 2.5 mm. high by 2.33 mm. broad.

Structure.—Head: Face view, circular in outline; epistoma and labrum with 4 spines each and epicranium and frons sparsely spined; eye disks not elevated, eye slightly convex; antennae of the cone and disk type, basal membrane with disks protruding, disks 4 in number, nearly complete and joint-like; maxilla with palpifer and 4-jointed palpus, the apical 2 joints quite small, lacinia broad, flattened and

armed on the apical margin with 12-13 bristles; labium with palpiger and 2-jointed palpus. Thorax: The tergum consists of areas A, B, C, and D; A, except in the prothorax, B and C are haired sparsely; A prothorax bare and constricted, D bare and narrow; mesothorax and metathorax with enlarged alar area which is sparsely haired and not well separated from preepipleurite; pleurum; preepipleurite large and sparsely haired; postepipleurite of moderate size and bare; prehypopleurite triangular, of heavy chitin and sparsely haired; posthypopleurite large and sparsely haired; legs with 4 joints and an apical claw, joint 3 with soft pad on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of areas A, B, C, and D; A, B, and C are sparsely haired and D is bare and narrow and urite 10 consists of an epiproct, which is sparsely haired and possesses pseudocerci at caudad laterad extremities; urites 1-8, inclusive, with spiracle in the spiracular area but urites 9 and 10 have both the spiracle and the spiracular area wanting; urites 1-8, inclusive, with the alar area distinct, bilobed and sparsely haired, urite 9 with the alar area not distinct and urite 10 with the alar area wanting; pleurum; urites 1-7, inclusive, with preepipleurite distinct and separate from postepipleurite and both sparsely haired, urite 8 with preepipleurite indistinctly separated from postepipleurite and both sparsely haired, urite 9 with preepipleurite indistinguishably united with postepipleurite and sparsely haired, and urite 10 with epipleurite not recognizable; urites 2-7, inclusive, with hypopleurite distinct and not divided into prehypopleurite and posthypopleurite, and urites 1, 8, 9, and 10 with hypopleurite indistinct or wanting; urites 2-7, inclusive, with well-developed uropods, urites 1, 8, and 9 with uropods wanting and urite 10 with postpedes and with a rather prominent postcallus (fold below anus).

Color.—Head: Black; the epistoma, labrum, maxillae, and labium are pale yellow with some brown; the antennal membrane is pale. Thorax: The prothorax is pale yellow, excepting the brownish neck plates and sometimes the spiracular area has faint dark markings; the mesothorax is pale yellow, with a brownish-black transverse band, broken middorsally and extending down B across the anterior portion of the alar area and the preepipleurite and terminating on the lateroventral extremities of the first and second sternal folds; the metathorax is the same. Abdomen: Urite 1 is pale with a brownish black, transverse band which is broken middorsally and extends down B and across the spiracular area to, and terminating on, the anterior portion of preepipleurite; urites 2-8 are similar, but with the band not terminating on the preepipleurite but extending across the venter on the second, or first and second, sternal areas of each

segment: urite 9 is similar to urite 1, but has the transverse band terminating at the alar region, and urite 10 is entirely pale yellow.

Prepupa.—Size: 11 mm. long. Head: 2.25 mm. by 2.25 mm.; much similar to the larva in structure and color.

Cocoon.—12 mm. long by 5 mm. broad; black; single-walled; typical *Croesus* cocoon.

Host.—*Castanea dentata* (Marshall) Borkhausen.

Remarks.—Described from material collected August 7, 1912, at Falls Church, Virginia, by S. A. Rohwer and William Middleton and recorded under Hopk. U. S. number 10154, supplemented by material collected August 30, 1912, at Vienna, Virginia, by R. A. Cushman and recorded under Hopk. U. S. number 10154^a and September 21, 1912, at Blythedale, Maryland, by C. T. Greene, recorded under Hopk. U. S. number 11323.

The larva of this species is a gregarious edge eater and seems to be rare, since only 4 or 5 colonies have been collected. The larvae that were collected August 7, 1912, had finished feeding and had entered the ground for pupation by August 17, 1912. Adults emerged in the rearing cage on September 16, 1912.

Genus PTERONIDEA Rohwer.

PTERONIDEA AMELANCHIERIDIS Rohwer.

Larva.—STAGE VI.—

Structure.—Head: Nematine in type; antennae of the cone and disk type which are but slightly jointlike and 4 in number; maxilla with palpifer and 4-jointed palpus, lacinia broad and flattened with 15 or so bladelike setae along apical margin and this armature with a large gap near galea (fig. 5); labium with palpiger and 2-jointed palpus. Thorax: The tergum with A prothorax and D of prothorax, mesothorax and metathorax bare, A of the mesothorax and metathorax and B and C of the prothorax, mesothorax, and metathorax with a few short hairs; B and D terminating in the alar region with acute angles, due to enlarged, broad, and sparsely haired alar area which is well separated from preepipleurite; the pleurum with preepipleurite, prehypopleurite, posthypopleurite and leg joints sparsely haired; legs with 4 joints and a claw, joint 3 with large pad on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of A, B, C, and D (B and C are not as distinctly separated as A and B or C and D, and C is inclined to subdivide C¹⁻²⁻³); A, B, and C² with few hairs, D bare and narrow; urite 10 composed of epiproct which is sparsely haired and without pseudocerci; urites 1-8, inclusive, contain spiracle in a rather well defined spiracular area and urites 9 and 10, without spiracular area and spiracle; urites 1-9, inclusive, with alar area neither well developed nor distinctly bilobed, wanting on urite 10; pleurum; urites 2-7,

inclusive, possessing well-developed preepipleurite, postepipleurite, hypopleurite, and uropods, the preepipleurite, postepipleurite, and uropods with a few short hairs; urites 1, 8, and 9 preepipleurite and postepipleurite not distinct as two separate areas but united to form an epipleurite; the hypopleurite not distinct as an area and the uropods not developed; urite 10, the pleurum is not developed as in preceding urites, postpedes are present and the postcallus is moderately prominent and haired.

Color.—Head: Tan, eye disks black, mouthparts brownish. Body: Dull, pale whitish green.

Cocoon.—9 mm. long by 4 mm. broad; coarse, single-walled and capsule-shaped; light brown in color and spun in ground.

Host.—*Amelanchier canadensis* (Linnaeus) Medicus.

Remarks.—Described from material collected July 16, 1916, at East River, Connecticut, by C. R. Ely and recorded under Hopk. U. S. number 13649^{e2}. The larvae at the time of collection were quite small and were found feeding on the under surface of leaves. All the larvae had become prepupae, entered the ground and spun cocoons by September 19, 1916, and on May 21 of the following year adults appeared in the cage.

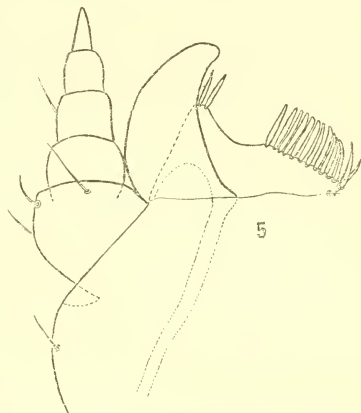


FIG. 5.—PTERONIDEA AMELANCHIERIDIS ROHWER.
MAXILLA.

PTERONIDEA WINNANAE Rohwer.

Larva.—STAGE IV.

Size.—Length, 7.5 mm. Head: 1 mm. high by 1 mm. broad.

Structure.—Similar to stage V.

STAGE V.

Size.—Length, 11 mm. Head: 1.25 mm. high by 1.17 mm. broad.

Structure.—Similar to stage VI.

STAGE VI.

Size.—Length, 14 mm. Head: 1.5 mm. high by 1.5 mm. broad.

Structure.—Head: Face view, circular in outline; epistoma and labrum with 4 hairs each and epicranium and frons, sparsely haired; eye disks not elevated and eyes slightly convex; antennae of the cone and disk type, cone as long as basal diameter, membrane with disks slightly prominent, disks, except outermost, are bands partially sur-

rounding cone, outermost a free plate, disks 4 in number and not joint-like: maxilla with palpifer and 4-jointed palpus; third joint from apex with fleshy process on inner side, lacinia broad and flattened, with 12 setae on apical margin and no break or gap in this armature (fig. 6); labium with palpiger and 2-jointed palpus. Thorax: The tergum, composed of areas A, B, C, and D; A, excepting in prothorax, and B and C sparsely haired, A prothorax bare and constricted, D bare and narrow; mesothorax and metathorax with enlarged alar area (A and B terminating in alar region with acute angles) which is sparsely haired and rather well separated from preepipleurite; prothorax with the alar area absent; pleurum; preepipleurite rather large and sparsely haired; postepipleurite

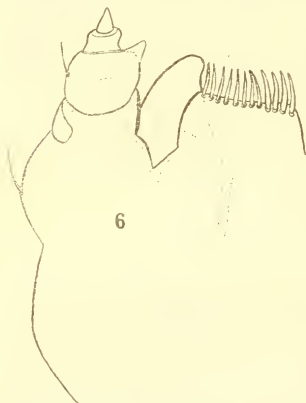


FIG. 6.—PTERONIDEA WINNANAE ROHWER. MAXILLA.

rather large and bare; prehypopleurite large, triangular, heavily chitinized and sparsely haired and posthypopleurite large and sparsely haired; legs with 4 joints and an apical claw, joint 3 with a small, soft pad on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of areas A, B, C, and D (C somewhat inclined to subdivide C^{1-2} , with C^1 haired, on urites 2-7); B and C are sparsely haired, A bare and D bare and narrow; urite 10 consists of an epiproct, which is sparsely haired and has pseudocerci at the caudad lateral extremities; urites 1-8, inclusive, with spiracular area containing spiracle, but urites 9 and 10 have the spiracle wanting and the spiracular area is not demarked; urites 1-7, inclusive, have the alar area large, distinct, bilobed, and sparsely haired, urites 8 and 9 with the alar area smaller, sparsely haired and not distinctly bilobed, and urite 10 with the alar area wanting; pleurum; urites 1-8 preepipleurite distinct and separate from postepipleurite, both sparsely haired, urite 9 with preepipleurite and postepipleurite not separated, but forming an epipleurite which is sparsely haired, and urite 10 with epipleurite not recognizable; urites 2-7 with hypopleurite distinct and not divided into prehypopleurite and posthypopleurite; urites 1, 8, 9, and 10 with hypopleurite indistinct or wanting; urites 2-7, inclusive, with well-developed uropods; urites 1, 8, and 9 uropods wanting and urite 10 with postpedes and with a rather prominent postcallus which is thickly haired.

Color.—Head: Brownish black; the epistoma, labrum, maxillae, and labium yellow to yellowish brown; antennal and mandibular membranes pale. Thorax: Prothorax pale orange yellow, excepting the brownish neck plates. laterodorsal spot on D, prehypopleurite which is yellowish, posthypopleurite which is grayish and the leg joints which are blackish; mesothorax, pale green, with middorsal and laterodorsal brownish spots on A, laterodorsal on B, middorsal and laterodorsal on D, under B and C on the alar area and on preepipleurite, postepipleurite, and posthypopleurite: a transverse band on C; prehypopleurite and leg joints with blackish heavy chitin; metathorax, similar. Abdomen: Urite 1 pale greenish yellow with middorsal and laterodorsal brownish spots on A, B, C, and D, supralar on B, C and the alar area, alar on the alar area, epipleural on preepipleurite and A, pleural on postepipleurite and hypopleural on that portion of the segment corresponding with the hypopleurite of urites 2-7; urites 2-7, inclusive, the same but with the hypopleural brown spot on the hypopleurite: urite 8, much similar to urite 1; urite 9 almost entirely pale greenish yellow, but with the alar area and epipleurite each brownish; and urite 10 epiproct greenish yellow with posterior half between the pseudocerci black.

Prepupa.—Size: Length 10 mm. Head: 1.5 mm. high by 1.5 mm. broad.

Structure.—Similar to the larva.

Color.—Head: Brownish. Body: Similar to the larva, excepting that the middorsal line is wanting and that the epiproct is gray posteriorly between pseudocerci.

Cocoon.—8.5 mm. long by 3.5 mm. broad, capsule-shaped, blackish in color, consisting of single case, thin, but finely woven. Cocoons are generally found in sand or earth, particles of which adhere to them.

Host.—*Salix*, species.

Parasites.—*Diaborus mediatius* Cresson (Determined S. A. Rohwer).

Remarks.—Described from material collected August 21, 1912, at Ballston, Virginia, by William Middleton and recorded under Hopk. U. S., number 11316.^b These larvae cling to and feed on the edge of leaves with their abdomen curled on the under surface. All had become prepupae and entered the ground to spin their cocoons by August 31, 1912. Adults emerged in considerable numbers on September 9, 1912, and parasites on September 16 and 21, 1912.

PTERONIDEA MENDICANA Rohwer.

P. mendicana much similar to *P. winnanae*, differing from the latter species in larger size and having the lower seta or tubercle of the

anterior lobe of the alar area not in blackened spot, while that of *P. winnanae* is in black spot.

Larva.—STAGE VI.

Structure.—Head: Face view, circular in outline; epistoma and labrum with 4 hairs each, epicranium sparsely haired and frons bare or nearly so; eye disks not elevated and eye lenses slightly convex; antennae of the cone and disk type (fig. 7^b), cone as long as diameter at base, membrane with disks rather prominent, disks except outermost are bands partially or wholly surrounding cone, outermost a small free plate, disks 4 in number and somewhat joint-like; maxilla with palpifer and 4-jointed palpus, lacinia similar to that of *P. winnanae*; labium with palpifer and 2-jointed palpus. Thorax:



FIG. 7.—PTERONIDEA MENDICANA ROHWER. *a*, THIRD URITE; *b*, ANTENNA.

The tergum composed of areas A, B, C, and D; A, excepting in the prothorax, B and C are sparsely haired: A of the prothorax bare and constricted, D bare and narrow; mesothoracic and metathoracic alar area enlarged (causing A and B to terminate in alar region with acute angles), sparsely haired and well separated from preepipleurite; alar area absent on prothorax; pleurum; preepipleurite rather small in prothorax, large in the mesothorax and metathorax; postepipleurite rather large and bare; prehypopleurite large, triangular, heavily chitinized and sparsely haired; posthypopleurite rather large and sparsely haired; legs with 4 joints and an apical claw, joint 3 with small, soft pad on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of areas A, B, C, and D (C indistinctly subdivided C¹⁻²⁻³) (fig. 7^a), B and C² are sparsely haired, A is usually bare and D is bare and narrow; urite 10 consists of the epiproct, which is sparsely haired and possesses pseudocerci at laterad caudad extremities; urites 1-8, inclusive, with spiracle in a rather well defined spiracular area; urites 9 and 10 with the spiracle wanting and the spiracular area not demarked; urites 1-7, inclusive, with a large, distinct, bilobed and sparsely haired alar area, urites 8 and 9 with the alar area smaller, sparsely haired, and not distinctly bilobed and urite 10 with the alar area wanting; pleurum; urites 1-7, inclusive, with preepipleurite distinct and separate from postepipleurite and both large and sparsely haired, urite 8

with preepipleurite rather distinct from postepipleurite both large and sparsely haired, urite 9 with preepipleurite and postepipleurite forming epipleurite and not distinctly separated and sparsely haired; urite 10 with epipleurite not recognizable; urites 2-7, inclusive, with hypopleurite distinct, not subdivided into prehypopleurite and posthypopleurite and not haired and urites 1, 8, 9, and 10 with hypopleurite indistinct or wanting; urites 2-7, inclusive, with well-developed uropods, urites 1, 8, and 9 with uropods wanting, and urite 10 with postpedes and with a rather prominent, thickly haired postcallus.

Color.—Head: Brownish black, membranes pale, eye disks deep black. Thorax: Prothorax pale, excepting grayish markings on postepipleurite and posthypopleurite; neck plates, leg joints, and prehypopleurite brownish black; mesothorax pale with brownish middorsal line and brownish black laterodorsal spots on A, B, C, and D; alar area with supraalar and alar blackish spots; preepipleurite, postepipleurite, prehypopleurite, posthypopleurite, and leg joints, blackish; metathorax similar to mesothorax. Abdomen: Urite 1 pale with middorsal and laterodorsal brownish black spots on A, B, C, and D; supraalar spots on B and the alar area; alar spots on A and the alar area; epipleural spot on preepipleurite and a pleural spot on postepipleurite; urites 2-7, inclusive, similar to urite 1, but further possessing a lateroventral spot on hypopleurum; urite 8 similar to those preceding, but with spots fainter and occasionally several wanting; hypopleurite not distinct but lateroventral spot present, however; urite 9 mostly pale, excepting the alar area and epipleurite and urite 10 pale with the epiproct blackish posteriorly.

Cocoon.—9 mm. long by 4 mm. broad; single-walled, close woven, capsule-shaped structure; brownish black in color.

Host.—*Salix*, species.

Parasites.—*Masicera*, species (determined by C. T. Greene).

Remarks.—Described from material collected September 23, 1913, at Harrisburg, Pennsylvania, by A. B. Champlain and recorded under Hopk. U. S. number 11398^r. All had become prepupae, gone into ground and spun cocoons by October 28, 1913. On May 26, the following year, an adult diptera emerged in cage. Adult sawflies began emerging on July 24, 1914, and continued to issue until August 3, 1914.

PTERONIDEA PLESIA Rohwer.

Like *P. mendicana* but with postepipleurite pale on prothorax, mesothorax, and metathorax.

Larva.—STAGE VI.

Structure.—Head: As *P. mendicana*. Thorax: As *P. mendicana*. Abdomen: As *P. mendicana*.

Color.—Head: As *P. mendicana*. Thorax: Prothorax pale, excepting neck plates and leg joints, which are black; mesothorax pale, excepting laterodorsal blackish spots on B and C, grayish spots on preepipleurite and postepipleurite and black prehypopleurite and leg joints; metathorax the same but with small grayish middorsal spot on A and the alar area with a supraalar gray spot. Abdomen: Urite 1 pale, with grayish middorsal spot on A, laterodorsal blackish spots on A, B, and C; supraalar blackish spots on B and one on each lobe of the alar area, alar spot on the posterior lobe of the alar area, preepipleurite and postepipleurite with black spots; urites 2-6, inclusive, similar to urite 1, but possessing a lateroventral spot on hypopleurite; urite 7 similar to 2-6, but without lateroventral spot on hypopleurite; urite 8 pale, excepting laterodorsal spot on B, supraalar spots on B and the alar area and blackish preepipleurite and postepipleurite; urite 9 pale and with spot on epipleurite and urite 10 pale with large black spot dorsad caudad on epiproct.

Host.—*Populus grandidentata* Michaux.

Remarks.—Described from material collected August 7, 1916, at East River, Connecticut, by C. R. Ely and recorded under Hopk. U. S. number 13656²³. Adults emerged August 25, 1916.

PTERONIDEA ALNIVORA Rohwer.

Egg.—The eggs are laid in the mid or side ribs on the under side of the leaf.

Larva.—STAGE VI.

Structure.—Head: Face view, circular in outline; epistoma and labrum with 4 hairs each and epicranium and frons sparsely haired; eye disks not elevated and eye slightly convex; antennae of the cone and disk type, cone longer than basal diameter, membrane with disks rather prominent, disks except outermost are bands partially or wholly surrounding cone, outermost a free plate, disks 4 in number and joint-like; maxilla with palpifer and 4-jointed palpus, lacinia much similar to *P. winnanae*; labium with palpiger and 2-jointed palpus. Thorax: The tergum is composed of areas A, B, C, and D; A, excepting in prothorax, B and C are sparsely haired; A of the prothorax is bare and constricted, D bare and narrow; mesothorax and metathorax with the alar area enlarged, sparsely haired and well separated from preepipleurite (A and B terminating in alar region with acute angles); the alar area absent in the prothorax; pleurum; preepipleurite rather small in the prothorax and large in the mesothorax and metathorax, sparsely haired; postepipleurite rather large and bare; prehypopleurite large, triangular, heavily chitinized, and sparsely haired; posthypopleurite rather large and sparsely haired; legs with 4 joints and an apical claw, joint 3 with small, soft pad

on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of areas A, B, C, and D (C slightly inclined to subdivide C^{1-2}), B and C^1 are sparsely haired, A is usually bare (occasionally with one or two hairs), and D is bare and narrow; urite 10 consists of an epiproct which is sparsely haired and without pseudocerci; urites 1-8, inclusive, with the spiracle in a rather well-defined spiracular area and urites 9 and 10 with the spiracle wanting and the spiracular area not demarked; urites 1-7, inclusive, with the alar area large, distinct, bilobed and sparsely haired, urites 8 and 9 with the alar area smaller, sparsely haired and not bilobed, and urite 10 with the alar area wanting; pleurum; urites 1-7 with prepleurite distinct and separate from postepipleurite, both large and sparsely haired, urites 8 and 9 prepleurite and postepipleurite not distinctly separated and forming epipleurite which is sparsely haired and urite 10 with epipleurite not recognizable; urites 2-7, inclusive, with hypopleurite distinct and not divided into prehypopleurite and posthypopleurite and urites 1, 8, 9, and 10 with hypopleurite indistinct or wanting; urites 2-7, inclusive, with well-developed uropods, urites 1, 8, and 9 with uropods wanting and urite 10 with postpedes and with a rather prominent postcallus which is thickly haired.

Color.—Head: Black to yellow brown; portions of epistoma, labrum, maxilla, labium and membranes of antennae and mandibles, pale; eye disks black. Thorax and abdomen, with a broad, tergal (to supraalar line) bronze brown, longitudinal band; spiracular area pale but alar area bronze brown and confluent with the tergal band; prepleurite dark brown; D posterior of the alar area and area between prepleurite and postepipleurite pale; postepipleurite dark brown; urites 2-7, inclusive, with the anterior of hypopleurite brownish; uropods brown, apex pale and with large ventral spots; urite 1 with small faint, brownish, lateroventral spot; venter pale; urites 8 and 9 with a rather large ventral spot and urite 10 pale.

Cocoon.—8 mm. long by 4 mm. in diameter; capsule-shaped, single-walled, of fine texture and colored blackish brown.

Host.—*Alnus*, species.

Parasites.—*Polyterus olympiae* Ashmead, *Homalomma pteronideae* Rohwer.

Remarks.—Described from material collected October 11, 1912, at Falls Church, Virginia, by William Middleton and recorded under Hopk. U. S. number 11329^{b2} supplemented by notes from material collected same time and place and recorded under Hopk. U. S. number 11329^{b1}. These larvae were found feeding gregariously on the edges of the leaves carrying their abdomens S-shaped. On October 27, 1912, most of the larvae had become prepupae and cocooned—some among the leaves and some in the sand on the bottom of the cage.

Adults began emerging May 9, 1913, and continued to issue until May 24, 1913. Parasites emerged May 24 and June 11, 1913. This species has also been collected at Dismal Swamp, Virginia, and East River and Lyme, Connecticut.

PTERONIDEA CORYLUS (Cresson).

Eggs.—The eggs are laid in August about first to middle of month. They are placed in slits made in the midrib of the hazel leaf on the under side. The egg is about 1 mm. long and 0.25 mm. wide; oval. Hatching: In hatching the eggs seem to become distended just before it is time for the young larvae to emerge. A bubble-like protrusion appears, sometimes in the middle and sometimes at one end of the egg membrane. This bubble seems to disappear as soon as the larva begins its struggle to emerge. The larva usually emerges from the shell, head first, but sometimes backs out. It rests for one or two hours before beginning to feed.

Larva.—STAGE VI.

Structure.—Similar to *P. alnivora*.

Color.—Head: Blackish. Body: Similar to *P. alnivora* but less dark brown.

Cocoon.—9 mm. long by 4 mm. in diameter; single-walled; medium texture; capsule-shaped and brownish black in color; is spun in ground.

Host.—*Corylus*, species.

Remarks.—Described from material collected July 21, 1915, at East River, Connecticut, by C. R. Ely and recorded under Hopk. U. S. number 10752^b. These larvae were found feeding gregariously on the edge of the leaves. The first cocoons appeared August 2, 1915, and cocoon spinning continued until August 17, 1915. Adults emerged August 20 to September 9, 1915.

Genus PRISTIPHORA Latreille.

PRISTIPHORA BETULAVORA Rohwer.

Larva.—STAGE VI.

Structure.—Head: Similar to *Pteronidea*; antennae of the cone and disk type, cone about as long as basal diameter, consisting of 4 joints; maxilla with palpifer and 4-jointed palpus, apical 2 palpi joints small, second basal joint with process at apex on inner side, lacinia broad and flattened with an unbroken row of setae on apical margin (similar to *P. winnanae*); labium with palpiger and 2-jointed palpus. Thorax: The tergum is composed of A, B, C, and D and a rather large alar area in the mesothorax and metathorax; the pleurum is composed of preepipleurite, postepipleurite, prehypopleurite, and posthypopleurite, which are similar to *Pteronidea*; and the legs

have 4 joints and an apical claw; the prothorax with A, D, and postepipleurite bare; B, C, preepipleurite, prehypopleurite, posthypopleurite and leg joints sparsely haired; mesothorax with D and postepipleurite bare; A, B, and C, alar area, preepipleurite, prehypopleurite, posthypopleurite, and leg joints, sparsely haired; the metathorax same as the mesothorax. Abdomen: The tergum of urites 1-9 is composed of areas A, B, C, and D (C inclined to subdivide C¹⁻²⁻³), A and D are bare, B and C are sparsely haired and urite 10 consists tergally of an epiproct which is sparsely haired and without pseudocerci; urites 1-8, inclusive, with spiracle in a rather well-defined spiracular area and the alar area is bilobed and sparsely haired, urite 9 with the spiracle and spiracular area wanting and the alar area wanting or not distinct and urite 10 with spiracle, spiracular area and alar area wanting; in the pleurum; urites 2-7, inclusive, with preepipleurite, postepipleurite, hypopleurite, and uropods, urites 1 and 8 with a rather distinct preepipleurite but with indistinct postepipleurite and hypopleurite and no uropods, urite 9 with the pleurum indistinct and no uropods, and urite 10 pleurum indistinct, postpedes present and with postcallus not very prominent; urites 1-9, preepipleurite, postepipleurite, and uropods sparsely haired, urite 10 postpedes sparsely haired and the postcallus rather thickly haired.

Color.—Head: Leaf green with few dusky marks. Body: Leaf green.

Cocoon.—9 mm. long by 3.5 mm. in diameter; thin, single-walled, medium texture, capsule-shaped or elliptical in outline with one or more flattened surfaces due to contact. Blackish brown in color.

Host.—*Betula alba* Linnaeus.

Remarks.—Described from material collected August 23, 1915, at East River, Connecticut, by C. R. Ely and recorded under Hopk. U. S. number 10757^d. All the larvae had shed becoming prepupae and spun their cocoons by September 10, 1915, and adults emerged in the cage on May 17 of the following year.

Genus PONTANIA Costa.

PONTANIA AMENTIVORA Rohwer.

Oviposition.—Oviposition occurs about the middle of April when the pistillate catkins are about half grown. The adults (observations from reared specimens in captivity) prefer, apparently, the medium and slightly developed catkins. Oviposition, in the large majority of cases, occurs at the tip of the bud. (Those exceptions observed are cases where large, nearly full developed buds are attacked; here oviposition is made at the basal swelling of the bud.) So far as could be observed the adults did not feel over a particular

bud prior to attempting oviposition, but climb about irregularly over the buds, suddenly stopping, grasping one behind them at about the middle with the metathoracic legs, bending down the abdomen and inserting the ovipositor with a plough-like motion. If these actions constitute the entire technic of egg laying, which is uncertain since no eggs were recovered in the examination of the material, the time occupied by the disposition of one egg is extremely short. The author is of the opinion that, as these adults were cage-reared and their emergence probably retarded (infested aments observed April 18, 1913, while adult emergence in cage began April 10, 1914; see remarks), the buds were too advanced to be suitable for oviposition.

Larva.—At time of collection both years, 1912 and 1913, the larvae were more or less advanced, so that only the fourth to the sixth stages of the larvae and the prepupae are available for description.

STAGE IV.

Size.—Head: 0.67 mm. high by 0.67 mm. broad. Body: 6.5 mm. long.

Structure.—Similar to stage V.

Color.—Head: Dark. Body: Pale; markings very faint, more distinct on preepipleurite than on postepipleurite or elsewhere, though scarcely discernible.

STAGE V.

Size.—10 mm. long. Head: 0.87 mm. high by 0.75 mm. wide.

Structure.—Similar to stage VI.

Color.—Similar to stage VI; spot markings faint gray.

STAGE VI.

Size.—12 mm. in length. Head: 1.12 mm. high by 1 mm. wide.

Structure.—Head: Face view, circular in outline; epistoma and labrum with 4 spines each and epicranium and frons sparsely haired; eye disks not elevated, eye slightly convex; antennae of the cone and disk type, cone short and button-like, membrane with disks flat, disks, except the outermost bands, partially surrounding cone, outermost a free plate, disks 4 in number and not joint-like; maxilla with palpifer and 4-jointed palpus, apical 2 palpi joints quite small; second basal joint without process on inner side, lacinia not especially broad and flat, armed on apical surface with a few (8) setae forming a row; labium with palpiger and 2-jointed palpus. Thorax: The tergum is composed of areas A, B, C, and D; A, excepting in the prothorax, B and C are sparsely haired, A prothorax is bare and constricted, D is bare; mesothorax and metathorax with an enlarged alar area sparsely haired and not distinctly separated from preepipleurite; pleurum; preepipleurite large and moderately haired; postepipleurite of moderate or large size and bare; prehy-

popleurite triangular, of heavy chitin and sparsely haired; posthypopleurite large and sparsely haired; legs with 4 joints and an apical claw, joint 3 with small soft pad on inner side at apex. Abdomen: The tergum of urites 1-9, inclusive, is composed of areas A, B, C, and D (C inclined to subdivide into C^{1-2}), B and C^1 are sparsely haired and A and D are bare; urite 10 consists tergally of an epiproct, which is sparsely haired and without pseudocerci; urites 1-8, inclusive, with spiracle in spiracular area and urites 9 and 10 with spiracle wanting and the spiracular area not demarked; urites 1-8, inclusive, with the alar area distinct, bilobed, and sparsely haired, urite 9 the alar area smaller but distinct and haired and urite 10 with the alar area wanting; pleurum; urites 1-7, inclusive, with preepipleurite distinct and separate from postepipleurite, and both sparsely haired, urite 8 with preepipleurite indistinctly separated from postepipleurite and both sparsely haired, urite 9 with preepipleurite indistinguishably united with postepipleurite and forming a sparsely haired epipleurite and urite 10 with epipleurite not recognizable; urites 2-7, inclusive, with hypopleurite distinct and not divided into prehypopleurite and posthypopleurite and urites 1, 8, 9, and 10 with hypopleurite indistinct or wanting; urites 2-7, inclusive, with well-developed uropods, urites 1, 8, and 9 with uropods wanting and urite 10 with postpedes and postcallus of moderate size.

Color.—Head: Almost entirely dark brown; eye disks black. Thorax: White, except for gray spots about base of hairs on B and C of the prothorax, A, B, and C of the mesothorax and metathorax and preepipleurite and posthypopleurite of entire thorax, and the dark brown chitin of prehypopleurite, leg joints, and claw of entire thorax. Abdomen: White, with the spiracles gray and with faint gray spots about base of hairs on folds B and C, the alar area and preepipleurite and postepipleurite where separate and epipleurite where preepipleurite and postepipleurite are not separated, on urites 1-9, inclusive, and with very faint indistinct grayish markings on the epiproct of urite 10.

Prepupa.—(One that had not spun its cocoon and contracted.)

Size.—10 mm. in length. Head: 1 mm. high by 1 mm. wide.

Structure.—Similar to sixth stage of larva.

Color.—Head: Whitish; faintly gray in front; eyes and eye disks black; mandibles black. Thorax: Legs pale, otherwise similar to sixth larval stage with markings somewhat darker. Abdomen: Similar to sixth larval stage but with darker markings.

Cocoon.—5 mm. long by 2 mm. broad, capsule-shaped; brown in color; consists of single case, thin but finely or closely woven. The

cocoon is generally in sand or earth, but occasionally in the cotton of the ament, with particles of sand or ament cotton adhering to it.

Pupa.—5.5 mm. long. Head: 1.25 mm. wide; dorsal epicranium to and including eyes, black; ventrally pale, including antennae and area basad; tips of mandibles brown. Body: The tergum darkened (nearly black) but paling somewhat posteriorly with the ultimate segment yellowish; the venter yellowish; and the legs and wings white.

Host.—*Salix humilis* Marshall.

Remarks.—Described from material collected April 21–23, 1915, at Falls Church, Virginia, by C. P. Heinrich supplemented by rearing notes from several other collections and some field observations. These larvae work in the pistillate aments of willow, causing a premature issuance of "cotton". The work was first observed April 18, 1913, and in the latter part of the month, April 23, 1913, the prepupae began to leave the aments and seek the ground for places to spin cocoons. The prepupae became pupae about the first of April, 1914, and issued as adults from about April 10–20. It is probable that these individuals were retarded considerably in that they were reared in cages under somewhat unnatural conditions and that these events occur about 15 days earlier in nature.

Family PTERYGOPHORIDAE.

Subfamily ACORDULECERINAE.

Genus ACORDULECERA Say.

The larvae described in the following pages differ considerably from those on the preceding pages. They can be readily distinguished by their antenna which consists of four circular disks not concentric but arranged to form a diamond or square (fig. 8^b) and the presence on the postepipleurite in certain abdominal segments (in the following on urites 2–4 and 8 and urites 2–5 and 8) of a prominent crescent-shaped area (fig. 8^e).

The following table separates the species described below:

- | | |
|---|--------------|
| 1. Crescent-shaped area on urites 2 to 5 and 8..... | maura. |
| Crescent-shaped area on urites 2 to 4 and 8..... | 2. |
| 2. Uropods on urites 2 to 7 about same size..... | 3. |
| Uropods on urites 6 and 7 distinctly smaller than those on urites 2 to 5. | hicoriae. |
| 3. Head and apical leg joints brown or yellow brown..... | nigritarsis. |
| Head greenish white with dorsal brown spots; legs white except claw. | foveata. |

ACORDULECERA FOVEATA Rohwer.

Larva.—STAGE VI (?).

Structure.—Head: Face view, circular in outline, oval in outline viewed from side; labrum with 4 spines; epicranium and frons with

a few short, stout hairs; eye disks not elevated, eyes slightly convex; antennae composed of 4 separate disks (not concentric) no cone (fig. 8^b); maxilla with larger palpifer and 4-jointed palpus, basal 2 joints of palpi not distinctly separated, lacinia neither especially broad nor flattened and armed an apical surface with few (6) setae in row (fig. 8^a); labium with palpiger and 2-jointed palpus. Thorax: The tergum composed of areas A, B, C, and D (D infolded); prothorax B and C with hairs; mesothorax and metathorax A, B, and C haired; alar area absent in the prothorax and medium sized, undivided, not especially prominent on mesothorax and metathorax; the pleurum with preepipleurite not very distinctly separated from B on the prothorax and from the alar area on the mesothorax and metathorax; postepipleurite small; prehypopleurite small, lobe-like rather than flat surfaced, with

few hairs; posthypopleurite rather large, with several hairs; legs sparsely haired with 4 joints, a claw and a small pad or fleshy protuberance basad of claw and on posterior interior side of leg. Abdomen:

The tergum, composed of A, B, C, and D (D infolded);

A, B, and C with hairs, on urites 1 to 9 (fig. 8^c), and urite 10 composed of epiproct, which is moderately haired and possesses no pseudocerci; spiracular area small and indistinct, situated in alar region and with spiracle small on urites 1 to 8; spiracular area and spiracle wanting on urites 9 and 10; alar area neither prominent, large nor bilobed on urites 2 to 8; alar area less developed and smaller on urite 1, indistinct on urite 9, and wanting on urite 10; the pleurum with the epipleurite divided into small preepipleurite and small postepipleurite on urite 1, into small preepipleurite and larger postepipleurite with prominent crescent-shaped area on urites 2 to 4 and 8 (fig. 8^c), urites 5-7 similar to preceding but without crescent-shaped area, urite 9 with epipleurite undivided and urite 10 with epipleurite not distinguishable; uropods from an indistinct hypopleurite on urites 2 to 7, no uropods and hypopleurite indistinct on urites 1, 8, and 9, and postpedes present, hypopleurite wanting and the postcallus small, not prominent and but moderately haired on urite 10.

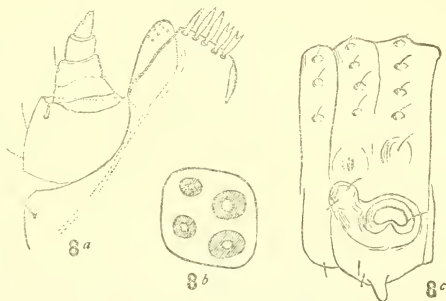


FIG. 8.—ACORDULECERA FOVEATA ROHWER. a, MAXILLA; b, ANTENNA; c, THIRD URITE.

Color.—Head: Greenish white with two dorsal brownish spots, one posterior of other, on vertex; eye disks black; apices of mandibles brownish. Thorax: Pale shiny green, excepting subdorsal spots on C prothorax and A mesothorax, and brownish claw. Abdomen: Whitish entirely.

Cocoon.—5 mm. long by 2.5 mm. in diameter; thin, fine texture, single-walled, capsule-shaped, whitish case.

Host.—*Quercus alba* Linnaeus.

Remarks.—Material described was collected May 26, 1913, at East Falls Church, Virginia, by William Middleton and recorded under Hopk. U. S. number 11362, June 26, 1913. The species is also recorded from Great Falls and Dixie Landing, Virginia.

The larvae feed on the leaves from the under side of leaves and are not especially active. On May 31, 1913, all larvae were in ground. May 21, 1914, four adults emerged.

ACORDULECERA HICORIAE Rohwer.

Larva.—STAGE VI (?).

Structure.—Head: Similar to *A. foveata*. Thorax: Similar to *A. foveata*, but preepipleurite rather distinct from B in the prothorax and the alar area in the mesothorax and metathorax. Abdomen: similar to *A. foveata* but uropods on urites 6 and 7 more distinctly smaller than those on urites 2-5.

Color.—Head: Brownish black (occasionally with some white); eye disks black; mandibles, labrum, and joints and chitin of ventral mouth parts, brownish. Body: Pale yellowish green, nearly white, marked as follows: Legs with joints brown; prothorax with neck plates brown, C with large, subdorsal, brown spot, B with large, alar, brown spot, and preepipleurite, prehypopleurite and posthypopleurite brownish; mesothorax and metathorax A with subdorsal and supraalar brown spots, B with spot extending from subdorsal to supraalar regions, C similar but with the spots tending to divide into a subdorsal, laterodorsal, and supraalar spot. Abdomen: The tergum with A, B, and C similar on urites 1 to 9 (B and C spots confluent forming a large blotch on urites 5 to 9, inclusive); urite 10 with epiproct brownish; alar area brown on urites 1 to 8; the pleurum with preepipleurite brownish on urites 1 to 9; postepipleurite brownish on urites 1 to 8 (crescent-shaped areas on 2 to 4 and 8 white), with small spots on postepipleurite of urite 9; and urite 10 with entire pleurum pale. Larvae vary somewhat, the paler forms with the abdomen mostly devoid of brown. (These are usually younger larvae.)

Cocoon.—Similar to that of *A. foveata*.

Host.—*Hicoria*, species.

Remarks.—Material described was collected May 24, 1913, at Charter Oak, Pennsylvania, by Thomas E. Snyder and recorded under Hopk. U. S. number 11364^a, May 28, 1913.

The larvae feed at the edges of the leaves from the under side. By June 5, 1913, all the larvae had spun cocoons and on May 20, 1914, three adults had emerged.

ACORDULECERA NIGRITARSIS Rohwer.

Larva.—STAGE VI (?)

Structure.—Head: Similar to *A. hickoriae*. Thorax: Similar to *A. hickoriae*. Abdomen: Similar to *A. foveata*.

Color.—Head: Chitinous parts brown or yellowish brown. Body: Pale, legs with apical joints brown, basal joint occasionally yellow brown.

Cocoon.—Similar to *A. foveata*.

Host.—*Quercus marilandica* Muenchausen.

Remarks.—Material described was collected May 19, 1915, at Springfield, Virginia, by William Middleton and recorded under Hopk. U. S. number 13610. Adults emerged in cage May 2, 3, 5, 6, and 10, 1916.

ACORDULECERA MAURA Rohwer.

Larva.—STAGE VI (?)

Structure.—Head: Similar to *A. hickoriae*. Thorax: Similar to *A. hickoriae*. Abdomen: Similar to *A. foveata* but postepipleurite with prominent crescent-shaped areas on urites 2 to 5 and 8.

Color.—Head: Brown, brownish black across the posterior portion of the vertex; eye disks black; antennae brownish black. Body: Greenish white; legs yellowish or pale brown, no spots.

Prepupa.—Similar to larvae, excepting postpedes reduced and pale yellowish white.

Cocoon.—Similar to *A. foveata*.

Host.—*Castanea dentata* (Marshall) Borkhausen.

Remarks.—Material described was collected August 10, 1916, at East River, Connecticut, by Charles R. Ely and recorded under Hopk. U. S. number 13656^a.

All the larvae had spun cocoons on or gone into the ground by August 24, and adults emerged August 28 and 31, 1916.