

THE NORTH AMERICAN ICHNEUMON-FLIES OF THE  
TRIBES LABENINI, RHYSSINI, XORIDINI, ODONTO-  
MERINI, AND PHYTODIETINI.

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This paper, which is a contribution from the Branch of Forest Insects, Bureau of Entomology, is based on the collections in the United States National Museum but the types which are in other American collections have been examined and notes on them have been used in the discussion of the species. The types of all new species are in the National Museum. In the tribe Labenini notes on all the material in the National collection have been included but in the other groups the notes and keys include only the species found north of Mexico.

The definition and limits of the tribes used in this paper is the same as those proposed by Cushman and Rohwer.<sup>1</sup> All of the drawings were prepared, under the writer's supervision, by Miss Mary Carmody, formerly of the Branch of Forest Insects, Bureau of Entomology.

Tribe LABENINI Ashmead.

*Labenini* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 48, (part).

*Labenini* SCHMIEDEKNECHT, Gen. Insect., fasc. 62, 1907, p. 94, (part).

*Labenini* CUSHMAN and ROHWER, Proc. U. S. Nat. Mus., vol. 57, 1920, p. 394.

Ashmead was the first writer to propose a tribe for these American insects, but the tribe as originally defined by him included also the Ophionine genus *Nonnus* Cresson. Schmiedeknecht followed Ashmead in including *Nonnus* in the Labenini but this is undoubtedly due to the fact that he did not know the genus (under that name) because he had redescribed it, as pointed out by Viereck,<sup>2</sup> under the name *Ophionocryptus*.

The tribe Labenini is very distinct, yet recalls through *Labena* Cresson the Rhyssini and through *Grotea* Cresson there is a suggested affinity to some Ophioninae. The larvae are externally parasitic on larvae which live within woody tissue. *Labena* is parasitic on wood-boring Coleoptera, while *Grotea* is parasitic on bees and wasps and at least in some instances is phytophagous through part of its life.

<sup>1</sup> Proc. U. S. Nat. Mus., vol. 57, 1920, p. 379.

<sup>2</sup> Idem, vol. 46, 1913, p. 377.

In this tribe the author has based his studies on all of the available material and has therefore included notes and descriptions of Mexican and West Indian species.

*Tribal characters*.—Head transverse; occipital carina complete, well-defined; inner margins of eyes emarginate; malar space narrow; clypeus well-defined dorsally; antennae long; mesoscutum long, produced anteriorly, both it and the scutellum without transverse striae or rugosities; propodeum more or less areolated; hind coxae slender, elongate, as long as the hind femora; tarsal claws simple; areolet large, pentagonal; disco-cubitus not strongly curved or angulate; nervulus interstitial or nearly; nervellus perpendicular or reclivous broken at about the middle; abdomen inserted above the hind coxae, petiolate, somewhat compressed and thickened apically; ovipositor well exerted, more or less compressed, without a notch on the dorsal margin, apically with oblique ridges or furrows; hypopygidium not reaching the apex of the abdomen.

TABLE TO THE GENERA.

1. First tergite bent upwards beyond middle and almost twice as long as the hind coxae; prepectal carina terminating below the middle of the mesepisternum which is much longer (cephalocaudad) than high; ovipositor about half as long as the abdomen; cheeks armed; clypeus curved dorsally, short, not depressed apically; head distinctly narrowed behind eyes.....*Grotea* Cresson.  
First tergite straight, subequal in length with the hind coxae; prepectal carina terminating above the middle of the mesepisternum which is higher than long; ovipositor at least nearly as long as abdomen..... 2.
2. Cheeks produced into a broad tooth posteriorly; clypeus short, not depressed apically, its dorsal margin strongly curved; face smooth, feebly punctured; head distinctly narrowed behind the eyes; third antennal joint subequal in length with fourth and fifth combined.....*Labenidea* Rohwer.  
Cheeks unarmed; clypeus long, depressed from above the middle, its dorsal median straight; face roughened; head not receding posteriorly; third antennal joint much shorter than fourth and fifth combined.....*Labena* Cresson.

Genus LABENA Cresson.

*Labena* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 399. *Genotype*.—*Cryptus grillator* Say (Viereck, 1914).

*Dyseidopus* KREICHBAUMER, Ann. k.k. Naturh. Hofm. Wein, vol. 5, 1890, p. 489. *Genotype*.—*Dyseidopus sericeus* Kreichbaumer. (Monobasic.)

Species which belong to the genus *Labena* have been referred to *Cryptus* (by Say) and *Mesochorus* (by Brullé) but since the description of the genus in 1864 it has been correctly recognized by most authors. The genus *Dyseidopus* Kreichbaumer is synonymized after a study of the original description and is supported by the observations of Krieger published in 1903.

The genus *Labena* although very distinct has a habitus and many characters which suggest the Rhyssine genus *Apechneura* Kriechbaumer and more especially the subgenus *Paraneura* Morley. As far as known all of the species are parasitic on wood-boring Coleoptera.

*Generic characters.*—Head, as seen from above, rectangular in outline, not narrowed posteriorly; eyes large, their inner margins emarginate above the antennae; posterior orbits somewhat less than half the cephalo-caudad diameter of the eye, broader below; clypeus long, depressed above the middle and clothed with hairs; clypeal suture straight; face more or less roughened and often with a medium carina or tubercle; third antennal joint much shorter than the fourth and fifth joints combined; prepectal carina extending well above the middle of mesepisternum; mesepisternum higher than cephalo-caudad length; the scutum long and without notauli; scutellum not margined; propodeum areolated, sharply separated from the metanotum by a furrow, but not separated laterally from the metapleura; propodeal spiracle slit-like and well removed from the base; the first tergite straight and subequal with the hind coxae; ovipositor at least nearly as long as abdomen, compressed, straight below, tapering dorsally at apex, without a notch, and apically with oblique ridges; four anterior tibiae somewhat twisted; hind coxae slender, elongate almost as long as the femora or first tergite; apical joint of hind tarsi curved subequal in length with the three preceding joints; claws strongly curved; onychia prominent; nervellus perpendicular, angularly broken slightly above the middle.

Color used in a broad way, the general sculpture and the relative length of the chitinized base part of the first sternite offer the best specific characters. The areolation of the propodeum is subject to such variation that it can not be used as a specific character and it is doubtful if it can be relied upon even when used as loosely as it is in the following key. Most of the Nearctic species are very closely allied and subject to much variation as to details of color markings. The characters presented in the following key have been found to be satisfactory for the material examined.

KEY TO THE SPECIES IN THE UNITED STATES NATIONAL MUSEUM.

1. Body entirely smooth and polished; face with prominent lateral and median carinae..... 2.  
At least with distinct, though scattered punctures on the thorax; no dorsad-ventrad carinae on the face along the eye margins..... 3.
2. Propodeum with a black band basally; sides of the thorax marked with black; male..... *trilineata* Ashmead.  
Propodeum and sides of thorax yellowish; female..... *gloriosa* Cresson.
3. Body entirely black..... *nigra* Rohwer.  
Body largely or entirely ferruginous or rufoferruginous..... 4.
4. Body entirely rufo-ferruginous without markings; wings yellowish-hyaline with the apical margin dusky..... *tinclipennis* Rohwer.  
Body ferruginous with black and yellowish markings; wings either entirely or in the greater part brownish or in the males hyaline with a dusky margin.. 5.
5. Rather slender; chitinized basal part of the first sternite extending to or beyond a line drawn tangent to the caudal margin of the spiracle; basal area longer than wide or with the length and width subequal..... 6.

- More robust; chitinized basal part of the first sternite not extending beyond a line drawn tangent to anterior margin of the spiracle; basal area usually much wider than long ..... 7.
6. Wings uniformly brownish, or nearly so; stigma dark brownish-ferruginous; larger. *gallator* (Say).  
Wings largely hyaline with the apical margin dusky; stigma ferruginous; smaller; females placed here have brownish wings with spot in discal area. *apicalis* Cresson.
7. Large, fully 16 mm., with brownish-ferruginous color.....*confusa* Rohwer.  
Smaller, not more than 12 mm., color of female clear ferruginous. *confusa* var. *minor* Rohwer.

**LABENA TRILINEATA** Ashmead.

*Labena trilineata* ASHMEAD, Proc. Zool. Soc. London, 1895, p. 781.

*Type*.—Cat. No. 6592, U.S.N.M.

Eyes distinctly closer together at clypeus than at vertex; face transversely rugose with a distinct median dorsad-ventrad carina and with distinct carina along the eye margins; body entirely smooth and polished; basal area slightly longer than wide; chitinized basal part of the first sternite extending a little beyond a line drawn tangent to the caudal margin of the spiracle.

This species, which is represented only by the unique type male, is closely allied to *gloriosa* Cresson.

St. George's (leeward side), Grenada, West Indies (H. H. Smith).

**LABENA GLORIOSA** Cresson.

*Labena gloriosa* CRESSON, Proc. Acad. Nat. Soc. Phila., 1873, p. 412.

*Type*.—Cat. No. 647, Acad. Nat. Sci. Philadelphia.

Eyes distinctly nearer together at the clypeus than at the vertex; face transversely rugose, with a distinct median dorsad-ventrad carina and with distinct carinae along inner eye margins; body yellowish, smooth and polished; basal area wider than long; wings hyaline with apical margin dusky; venation including stigma, dark brown; chitinized basal part of first sternite ending distinctly before a line drawn tangent to the anterior margin of spiracle; ovipositor distinctly shorter than abdomen.

This species was originally described from one female from Mirador, Mexico, but has since been recorded from Peru. A single female from "Mexico" is in the National Collection. Notes from type and specimen in Museum collection.

**LABENA NIGRA**, new species.

This species is remarkably distinct from the other species of the genus in color.

*Female*.—Length, 10 mm.; length of ovipositor, 6.5 mm. Eyes somewhat closer together at the clypeus than at the vertex; face transversely wrinkled and also with some distinct punctures, with a nearly complete, distinct, median, dorsad-ventrad carina but with-



out carinae along inner eye margins; vertex and posterior orbits smooth and polished; ocellar triangle not quite equilateral; postocellar line subequal with the ocellocular line; sides of pronotum and the scutum with close distinct punctures; punctures on scutellum, propodeum and mesepisternum more widely separated, the dorsal part of mesepisternum being almost without punctures; basal area not sharply defined posteriorly, its width a very little greater than its length; arcola with its length and greatest width (which is somewhat anterior to middle) subequal; abdomen smooth and polished; the chitinized basal part of the first sternite terminating distinctly before a line drawn tangent to the anterior margin of the spiracle; ovipositor as long as abdomen. Black; palpi, clypeus and scape beneath yellowish; base of mandibles and a spot on posterior orbits beneath rufo-piceous; antennae brownish with a broad yellowish annulus between middle and apex; legs yellowish, coxae, posterior trochanters and femora black; wings hyaline with the apical margin dusky; venation dark brown, stigma yellowish; ovipositor sheaths brownish, yellowish at base.

*Male*.—Length, 13 mm. Chitinized basal part of first sternite terminating beyond a line drawn tangent to the posterior margin of spiracle; otherwise structure much as in female; differs from female in color thus: clypeus, face except a dorsal median spot, elongate spot on posterior orbits, spot on lower margin of pronotum and four anterior coxae beneath yellow; antennae brownish, paler basally and without annulus; stigma brownish.

Paratype males show the face may be entirely yellow.

*Type locality*.—Bermuda Islands, West Indies. Described from one female (type) and four males (one allotype) collected May 1 and 10, 1909, by F. M. Jones.

*Type*.—Cat. No. 22134, U.S.N.M.

**LABENA TINCTIPENNIS, new species.**

The bright rufo-ferruginous color and the color of the wings make this species easily distinguished from the other Nearctic species. The original description of *rufus* (Brullé) suggests that this species is allied to *tinctipennis*.

*Female*.—Length, 18 mm.; length of the ovipositor, 13 mm. Distance between the eyes at the clypeus very little less than at the vertex; face transversely wrinkled on an opaque surface, without a distinct median carina or tubercle, no lateral carinae but with two oblique low, rounded ridges from clypeus to near eye margin; vertex and posterior orbits polished, smooth; ocelli in a low triangle; postocellar line longer than ocellocular line; interocellar area raised and parted by a median furrow; thorax shining, with distinct, widely separated punctures; mesepisternum dorsally practically impunctate;

propodeal carinae strong; basal area more than two times as wide as long; areola distinctly wider than long, costulae received behind middle; abdomen smooth and shining; first tergite subpetiolate; chitinized basal part of first sternite terminating before a line drawn tangent to the anterior margin of the spiracle; ovipositor as long as abdomen. Entirely rufo-ferruginous; apices of antennae brownish; wings yellowish hyaline with the apical margin dusky; venation, including stigma, practically the color of the wing; ovipositor and sheath yellowish with brownish apex.

*Type locality*.—Webber Creek, California. Described from one female collected on *Alnus rhombifolia*, February 6, 1915, by F. B. Herbert.

*Type*.—Cat. No. 22135, U.S.N.M.

LABENA GRALLATOR (Say).

*Cryptus grallator* SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 236.

*Mesochorus fuscipennis* BRULLÉ, Hist. Nat. Ins. Hym., vol. 4, 1846, p. 250.

*Labena grallator* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 400.—WALSH, Trans. St. Louis Acad. Sci., vol. 3, 1873, p. 62.

The type of *grallator* Say is lost but the species was first recognized by Cresson and the specimen in Academy Natural Science, Philadelphia, bearing the name label in Cresson's hand is considered as the neotype of this species. The type of *fuscipennis* (Brullé) has not been examined, it is probably in the Paris Museum.

It is impossible to say that *fuscipennis* (Brullé) is a synonym of *grallator* as here defined, but since other authors have considered it the same it seems best to treat it as such until the type has been studied.

The wings of *grallator* are uniformly dark brown in both sexes and the stigma is brownish-ferruginous; the antennae are without a distinct annulus although in some females they are paler in the middle; ovipositor subequal in length with the abdomen. The areolation of the propodeum is subject to considerable variation but in the specimens examined the basal area is longer than wide or the length and width are subequal.

*Distribution*.—Discussion of species based on neotype and on specimens from New Orleans, Louisiana, (Shufeldt); Texas (Bel-frage); St. Louis, Missouri (Riley); Lawrence, Kansas (Hugo Kahl); Centerville, Jacksonville (Ashmead), Biscayne, Florida; Washington, District of Columbia; Highspire, Pennsylvania (W. S. Fisher); and West Cliff, Colorado (T. D. A. Cockerell).

*Hosts*.—Walsh records rearing this species from hickory at the same time as he reared *Cesrasphorus cinctus* Fabricius and this has, therefore, been considered as a host for the species. The record is not entirely satisfactory. Chittenden records *grallator* as a parasite

of *Chrysobothris femorata* Fabricius and this seems to be a correct association.

LABENA APICALIS Cresson.

*Labena apicalis* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 402.

*Type*.—Cat. No. 1532, Acad. Nat. Sci. Philadelphia, a single male without a head.

This species is very closely allied to *grallator* Say and it is not unlikely that when more material is available it will be found impossible to retain this name. The characters given in the above key will, however, distinguish the specimens examined. The species is smaller and has paler wings than *grallator*, but has much the same range and is subject to about the same variation in the carination of the propodeum.

*Distribution*.—The *type locality* is Delaware, but besides the type, specimens have been examined from the following localities: Texas (Belfrage); Dallas (F. C. Bishopp), Paris (C. T. Brues) and Victoria (J. D. Mitchell), Texas; Lawrence, Kansas (Hugo Kahl); and Peggall, South Carolina (Fiske).

*Host*.—Riley and Howard have recorded this species as a parasite of *Chrysobothris femorata* Fabricius, but the specimen which formed the basis of this record is here referred to as *confusa* var. *minor* Rohwer. A male and female were reared from the galleries of *Lixus scrobicollis* Boheman in *Ambrosia trifida* by J. D. Mitchell (Hunter No. 219). One male reared by J. D. Mitchell from stems of *Verbena virginica* infested by *Lixus scrobicollis* Boheman (Hunter No. 1397).

LABENA CONFUSA, new species.

This species is very similar to *grallator* (Say) but can be separated from that species by the characters used in the above key.

*Female*.—Length 16 mm., length of ovipositor 12 mm. Distance between the eyes and the clypeus practically the same as at the vertex; face transversely roughened, without distinct carinae, tubercles or folds; vertex and posterior orbits smooth, polished; ocelli in a low triangle; postocellar line much longer than the ocellocular line; postocellar furrow distinct; interocellar area convex and deeply parted by a median furrow; thorax with close, distinct punctures which are more widely separated on the propodeum and dorsal part of mesepisternum; propodeal carinae strong; basal area about twice as wide as long; areola longer than wide, receiving costulae before the middle; anterior margin of propodeal spiracle strongly curved; abdomen subpetiolate, shining, without sculpture; chitinized basal part of first sternite terminating a short distance before a line drawn tangent to the anterior margin of the spiracle; ovipositor subequal in length with abdomen. Ferruginous with yellowish and blackish marks; orbits, spot on tegulae, line below, hind

margin of mesepisternum and apical margins of second to fifth tergites yellowish; a band across vertex, thoracic sutures and base of first four tergites blackish; antennae ferruginous, dusky at base above; legs ferruginous with the hind femora somewhat piceous and the tibiae somewhat yellowish; wings subhyaline, more or less brownish basally, along the veins and the apical margin brownish; venation dark brown, stigma somewhat more ferruginous.

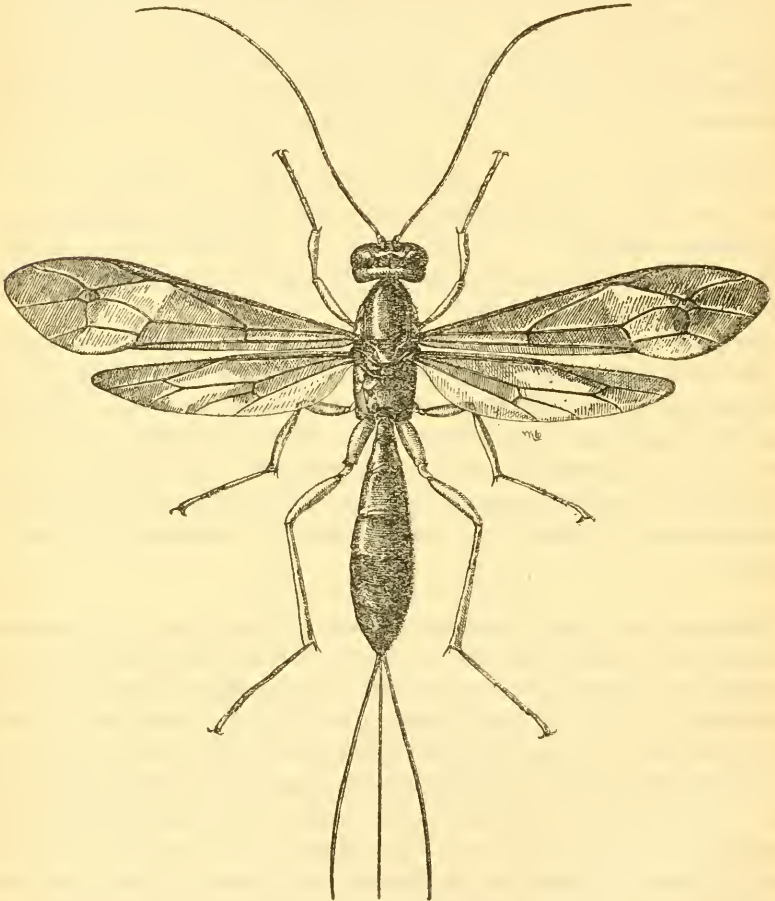


FIG. 1.—FEMALE OF *LABENA CONFUSA* ROHWER.

Paratypes have the ferruginous color brighter and the black and yellow markings more sharply contrasting and the wings almost completely brownish.

*Type locality*.—Texas. Described from fourteen females, three (one type) reared by F. M. Webster as parasites of *Thrincopyge alacris* LeConte. Other Texas specimens come from the Belfrage collection, from Paris (F. C. Bishopp) and Dallas (Schwarz); Meta-



comba Keys, Florida (G. N. Collins); Bluemont, Virginia (S. A. Rohwer); Linglestown (H. B. Kirk), Camphill (W. S. Fisher), Pennsylvania.

*Type*.—Cat. No. 22136, U.S.N.M.

This species has also been reared as a parasite of *Chion cinctus* specimens collected at Mount Vernon, Virginia, by F. C. Craighead.

LABENA CONFUSA var. MINOR, new variety.

This form is much like *confusa*, but is decidedly smaller and the ferruginous color is brighter.

*Female*.—Length, 12 mm.; length of ovipositor, 8 mm. Distance between the eyes at the clypeus less than at the vertex; wings brownish with a subhyaline oblique band below the stigma; venation dark brown, stigma ferruginous; otherwise much as in *confusa*.

*Type locality*.—Washington, District of Columbia. Described from four females (one type), three from Washington, one labeled as from *Chrysobothris femorata* Fabricius, and the other from Texas (Belfrage).

*Type*.—Cat. No. 22137, U.S.N.M.

LABENIDEA, new genus.

*Genotype*.—*Grotea superba* Schmiedeknecht.

This new genus, while perhaps more closely allied to *Labena* Cresson, has many of the characters of *Grotea* Cresson. The habitus, thorax, and abdomen are more like *Labena*, while the head, especially the dentate cheeks, the clypeus and antennae, is more like *Grotea*.

*Generic characters*.—Head transverse, distinctly narrowed behind the eyes; cheeks produced into a tooth posteriorly; inner margins of eyes distinctly emarginate opposite antennae; labrum exserted; clypeus transverse, the apical part not depressed, truncate, the dorsal suture strongly curved medianly; the third antennal joint subequal with the fourth and fifth combined; face finely punctured; scutum long and without notauli; scutellum not margined; propodeum partly areolated, sharply separated from the metanotum by a deep furrow, not separated from the metapleura, spiracle curved, slitlike; prepectal carina terminating well above the middle of the anterior margin of mesepisternum; mesepisternum higher than the cephalocaudal length; first tergite straight and subequal in length with hind coxae; ovipositor longer than the abdomen, compressed, tapering apically on both dorsal and ventral margins, apex with oblique furrows; hind coxae slender, elongate, almost as long as hind femora or first tergite; legs long, tibiae not twisted; apical joint of the hind tarsi not especially lengthened and shorter than the two preceding; claws long, bent at almost a right angle apically; onychia very prominent; nervellus reclivous, broken at about the middle.

## LABENIDEA SUPERBA (Schmiedeknecht).

*Grotea superba* SCHMIEDEKNECHT, Gen. Insect., fasc. 62, 1907, p. 95, pl. 1, fig. 8.

This is very probable the same as *Pimpla gayi* Spinola.

Discussion based on one female and one male collected in Chile by E. C. Reed.

It seems probable that *Atractodes lineata* Brullé also belongs to this genus.

## Genus GROTEA Cresson.

*Grotea* Cresson, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 397. *Genotype*.—*Grotea anguina* Cresson. (Monobasic.)

Cameron<sup>1</sup> when he placed both *Nonnus* and *Grotea* in the Ophioniinae without giving any reasons, is the only author who considered that this genus was not allied to *Labena* Cresson. Krieger<sup>2</sup> transfers *Atractodes lineatus* Brullé to *Grotea*, but since it is evident that Brullé did not correctly understand the genus *Atractodes* we can not justly consider that he would place *Grotea* in the group to which this genus belongs.

Although the genus *Grotea* is very distinct, and when once known easily recognized, there can be but little doubt that it is allied to *Labena*. This relationship is made more certain by the genus *Labenidea*, which is more or less intermediate between the two.

*Generic characters*.—Head subtransverse, distinctly narrowed behind the eyes; cheeks produced into a broad tooth posteriorly; inner margins of the eyes subparallel but distinctly emarginate opposite the antennae; face smooth, sparsely punctured; labrum distinctly exerted; clypeus transverse, the apical margin truncate, not depressed, the dorsal margin strongly curved medially; the third antennae joint longer than the fourth and fifth combined; mesocutum very long, without notauli, the anterior wings attached opposite the posterior margin; scutellum convex, more or less pillow-like; prepectal carina well defined but terminating well below the middle of the anterior margin of the mesepisternum; mesepisternum without depressions, much longer (cephalo-caudad) than high; propodeum partly areolated, rather long, depressed below the level of the metanotum; propodeal spiracle elongate, the inner margin curved; the first tergite almost twice as long as the hind coxae, bent upwards beyond the middle; ovipositor about half or less as long as the abdomen, somewhat compressed, tapering apically on both dorsal and ventral margins, and with oblique furrows apically; hind coxae slender, elongate, subequal in length with the hind femora but much shorter than the first tergite; legs of normal length, the tibiae simple; apical joint of the hind tarsi not especially lengthened, shorter than the two preceding joints; claws rather stout, long, sharply bent

<sup>1</sup> Biol. Central Amer. Ins. Hym., vol. 1, 1886, p. 309.

<sup>2</sup> Zeit. Hym. Dipt., vol. 3, 1903, p. 290.

apically; onychia prominent; nervellus reclivous, broken at about the middle.

The species of *Grotea* are all very closely allied and the only means of distinguishing them are slight differences in color. There are, however, some differences in the shape and size of the basal area and it may be that when more specimens are available it will be possible to state definitely if these differences can be considered as specific. It would not, however, be surprising if more material would prove that all the species should be combined. The following key is based entirely on the females, as males of only one of the forms are in the collection.

## TABLE TO THE SPECIES.

1. Abdomen brownish dorsally, especially apically, wings without a dusky spot.  
*anguina* Cresson. 2.
- Abdomen uniformly ferruginous, not darkened apically..... 2.
2. A dusky spot along apex of radial vein..... *fulva* Cameron. 3.
- No dusky spot along apex of radial vein..... 3.
3. Length 12 mm.; uniformly pale honey-yellow; wings clear hyaline with contrasting black venation..... *mexicana* Cresson.
- Length 17 mm.; with some yellowish and blackish markings on a ferruginous surface; wings very slightly dusky..... *californica* Cresson.

## GROTEA ANGUINA Cresson.

*Grotea anguina* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 398.—GRAENICHER, Ent. News, vol. 16, 1905, p. 44.

*Type*.—Cat. No. 1533, Acad. Nat. Sci. Philadelphia.

In the type of this species the basal area is about twice as long as the basal width and narrows apically. This is the shape of the basal area of all the specimens in the national collection, but in the paratype female (No. 1533.2) which comes from New York, the basal area is fully twice as wide as long and not convergent posteriorly.

*Distribution*.—*Grotea anguina* is represented in the National collection by females only. These come from the following localities: Falls Church, Virginia (N. Banks); Beltsville, Maryland (J. R. Malloch); Ocean Grove, New Jersey; New York; Hartford, Connecticut; St. Louis, Missouri (Phil Rau); Brownsville, Texas (C. H. T. Townsend). Cresson records the species from New Jersey (type locality) and New York, while Graenicher records it from Wisconsin.

*Host*.—In the original description Cresson records the rearing of this species "from a Raspberry stem, together with a small species of *Crabro*" and in an interesting paper in 1905 Graenicher<sup>1</sup> records it as a parasite of *Ceratina dupla* Say. According to Graenicher this species is both carnivorous and phytophagous as it consumes both bee larvae and the "bee-bread" stored by the mother bee. Graenicher also notes that the *Grotea* larva destroys two or three bee cells.

<sup>1</sup> Ent. News, vol. 16, 1905, p. 44.

## GROTEA FULVA Cameron.

*Grotea fulva* CAMERON, Biol. Central Americana, Ins., vol. 1, 1886, p. 309, pl. 12, fig. 27.

*Type*.—British Museum Natural History.

This species, which was described from specimens collected at Presidio, Mexico, is, because of the dusky spot along the apex of the radius, probably the most distinct species. A single female from San Rafael, Jicoltepec, Mexico, is in the United States National Museum, and has the following characters: Basal area converging posteriorly, one-third longer than basal width; length, 18 mm.

## GROTEA MEXICANA Cresson.

*Grotea mexicana* CRESSON, Proc. Acad. Nat. Sci. Phila., 1873, p. 413.

*Type*.—Cat. No. 648, Acad. Nat. Sci. Philadelphia.

*Paratype*.—Cat. No. 13286, U.S.N.M.

The clear wings and pale color as well as the size seem to separate this form from *californica*. In the type, as well as all other specimens examined, the basal area is nearly parallel-sided and about one-third longer than the basal width.

Known only from Orizaba, Mexico.

## GROTEA CALIFORNICA Cresson.

*Grotea californica* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 370.

*Type*.—Cat. No. 1534, Acad. Nat. Sci. Philadelphia.

In the type the basal area slightly converges posteriorly and is only a little longer down the middle than the basal width, while the apical transverse carina is sharply angulate (towards the head) medianly. In the female referred to below the basal area is similar. Two males of this species have the basal area similar but differ from the female in having the apical tergites dusky.

*Distribution*.—Originally described from one female collected in California by H. Edwards. A male and female from Los Angeles and a male from Alameda County, California, all collected by D. W. Coquillett are in the National collection.

## Tribe RHYSSINI Cushman and Rohwer.

*Rhyssides* MORLEY, Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 2.

*Rhyssini* CUSHMAN and ROHWER, Proc. U. S. Nat. Mus., vol. 57, 1920, p. 394.

Morley was the first author to recognize this tribe and in characterizing it laid special stress on the "Strongly transcarinate mesonotum." While this character is very useful it is believed that the defining characters of the tribe as given by Cushman and Rohwer are more reliable and these authors use the commonly accepted ending for tribes.

The members of the tribe Rhyssini have usually been placed in the tribe Ichneumonini (olim Pimplini) but in minor characters and in



biological habits they seem to be more closely allied to the Xoridini. In the classifications used by Ashmead and others it is impossible to satisfactorily place a Rhyssine in the tribe Ichneumonini because the tergites lack the impressions and strong punctures.

All of the species which have been reared are parasitic on wood-boring larvae and most of the records indicate that they prefer the larvae of horntails. A few observers have recorded the hosts as some wood-boring Coleopterous larvae but all of these are without positive proof and in case of the records from *Monohammus* it seems that they can be discarded. The records of *Serropalpus* can not be so easily discredited because the larvae of members of this genus are usually associated with the larvae of horntails.

*Tribal characters.*—Head large, transverse, well developed behind the eyes; the posterior orbits margined at least below, the occiput immargined; clypeus transverse, well-defined above; malar space present; malar furrow wanting; mandibles bidentate, the upper tooth broad; eyes slightly converging below; pronotum vertical; scutum prominent, transversely rugose; notauli wanting or incompletely defined; scutellum transversely rugulose; propodeum rather short, the spiracle well removed from base; legs rather long and slender; claws simple; areolet variable; nervellus strongly reclivous and broken far above the middle; abdomen long, often parallel sided in the male; first tergite without prominent carinae, shorter than the second and with the spiracle well before the middle; ovipositor long; apical tergite of female prominent, triangular in outline; hypopygidium small, not prominent.

The shape of anterior margin of the clypeus, the character of the frons, the areolation of the propodeum, the size and position of the propodeal spiracle, the position of the first tergal spiracle, the fusion of the first sternite with the tergite, the emargination of the apical tergites and the position of the nervulus offer the best generic characters. The presence or absence of the areolet has often been used as a primary generic character but that this can not be used as such is abundantly proven by the fact that in some specimens it is completely wanting on one wing while on the other wing it is well defined. The following table is based on the Nearctic genera but the genus *Epirhyssa* Cresson is included as it has often been misinterpreted and has never been well characterized.

TABLE TO THE GENERA.

1. Clypeus with a median tooth; first sternite completely separated from the first tergite; second sternite of female with two median tubercules near the middle; nervulus postfurcal; tergites not at all emarginate posteriorly

*Rhyssa* Gravenhorst.

- Clypeus truncate; first sternite fused with the first tergite basally; second sternite of female with the median tubercules close to the base; apical tergites at least in the male more or less emarginate posteriorly..... 2.

2. Spiracles of the first tergite at about the basal third, the distance between them less than the distance from one to the anterior margin of tergite; second tergite without distinct lunulae; nervulus interstitial; areolet wanting; abdomen of male slightly widening posteriorly a little more than twice as long as head and thorax.

*Epirhyssa* Cresson.

Spiracles of the first tergite close to the base, the distance between them greater than the distance from one to the anterior margin of the tergite; second tergite with distinct lunulae; nervulus postfurcal; abdomen of the male practically parallel-sided and three or more times as long as the head and thorax . . . 3.

3. Propodeal spiracle about two and one-half times as long as wide and about three times its length from the base of the propodeum; tergites three to five not or but slightly emarginate posteriorly; small or medium size black species.

*Rhyssella* Rohwer.

Propodeal spiracle three or more times as long as wide and about twice its length from the base of the propodeum; tergites three to six deeply angulately emarginate posteriorly; large or medium size usually yellowish species.

*Megarhyssa* Ashmead.

#### Genus RHYSSA Gravenhorst.

*Rhyssa* GRAVENHORST, Ichn. Eur., vol. 3, 1829, p. 260. *Genotype*.—*Ichneumon persuasorius* Linnaeus.

*Cryptocentrum* KIRBY, W. Kirby, Fauna Bor. Amer., vol. 4, 1837, p. 260. *Genotype*.—*Cryptocentrum lineolatum* Kirby.

*Pararhyssa* WALSH, Trans. St. Louis Acad. Sci., vol. 3, 1873, p. 109. *Genotype*.—*Rhyssa persuasoria* (Linnaeus.)

As originally described the genus *Rhyssa* included all of the Palaearctic Rhyssini but since the time of Holmgren European authors have restricted the genus much as it is in the present paper. American authors have not, however, been as careful and, with the exception of Viereck and Merrill, have included species now placed in *Rhyssella* in the genus *Rhyssa*. While Holmgren was the first to point out the clypeal character which separates the genus *Rhyssa* from its allies Merrill was the first to point out the decided difference in the first sternite.

Although there is a superficial resemblance between *Rhyssa* and *Rhyssella*, the genus *Rhyssa* is remarkably distinct from the other genera of this tribe. As far as has definitely been proven the species are parasitic on horntail larvae belonging to the subfamily Siricinae, all of which live in coniferous trees. There are some records of *Rhyssa* being parasitic on the larvae of the Cerambycid genus *Monohammus* but considering the habits of the *Monohammus* larva it seems that these records are open to question. There are other records of *Rhyssa* being parasitic on the Coleopterous genus *Serropalpus* but none of these have been definitely proven and should be verified before accepted.

*Generic characters*.—Clypeus with a medium projection; nervulus postfurcal; areolet normally present; propodeum with two raised median, longitudinal ridges; the propodeal spiracle fully three times as long as wide and about twice its length from the base of the pro-

podeum; spiracles of the first tergite close to the base, the distance between them greater than the distance from one of them to the anterior margin of the segment; first sternite completely separated from the tergite; second sternite with the median tubercles at about the middle; tergites not at all emarginate posteriorly; abdomen of the male slightly widening posteriorly, about three times as long as the head and thorax; second tergite with distinct lunulae.

Merrill<sup>1</sup> considers that the markings of the black species are subject to such variation that they cannot be used to separate species and he would consider all of the American forms (except *hoferi*) as one species. It does not seem to the writer that this is correct. The form with the black posterior orbits (*alaskensis*) is constant for the specimens examined and it has a more restricted distribution. The form with the annulated antenna (*lineolata*) while it has much the same distribution as *persuasoria*, is confined to the Nearctic region and without more evidence it seems unwise to consider that a species would have a black antenna in one region and that in another it would have a black or a white-annulated antenna. The writer prefers to recognize, in the black forms, three species and would separate the species by the following color characters:

## TABLE TO THE SPECIES.

- |  |                                |
|--|--------------------------------|
| 1. General color ferruginous; stigma yellow; wings pale brownish with a darker cloud along radius..... | <i>hoferi</i> Rohwer.          |
| General color black; stigma black; wings uniformly hyaline or subhyaline..                             | 2.                             |
| 2. Posterior orbits black, immaculate, antennae black.....   | <i>alaskensis</i> Ashmead.     |
| Posterior orbits marked with yellow.....   | 3.                             |
| 3. Antennae black.....   | <i>persuasoria</i> (Linnaeus). |
| Antennae with a pale annulus.....  | <i>lineolata</i> (Kirby).      |

## RHYSSA ALASKENSIS Ashmead.

*Rhyssa alaskensis* ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 199.

*Rhyssa skinneri* VIERECK, Trans. Amer. Ent. Soc., vol. 29, 1903, p. 87.

Type of *alaskensis* Cat. No. 5620, U.S.N.M.; type of *skinneri* Acad. Nat. Sci. Philadelphia. Discussion based on types and specimens listed below.

The type of *alaskensis* Ashmead differs from the type of *skinneri* Viereck in having the middle area of the face smooth and practically without sculpture (in the type of *skinneri* the middle area of the face has irregular dorsad-ventrad raised lines); in having a yellow spot on the propodeum; and in having an entirely black mesepisternum. Specimens from Hoquiam, Washington, collected at the same time on a spruce log infested with horntail larvae show that the sculpture of the face is variable and that the spots on the propodeum and mesepisternum vary. The specimens examined show the following variation: Length, 18-30 mm. Coxae usually black but in a

<sup>1</sup>Trans. Amer. Ent. Soc., vol. 41, 1915, p. 142.



few specimens rufo-piceous; mesepisternum black or with a large yellow spot posteriorly; propodeum black or with a large yellow spot or two smaller ones.

*Distribution*.—Fox Point, Alaska (type locality); Hoquiam, Washington from Sitka spruce (H. E. Burke); Moscow, Idaho (C. V. Piper); Meyers, California (F. B. Herbert) a form with rufo-piceous hind coxae; Beulah, New Mexico (type-locality of *skinneri*).

**RHYSSA PERSUASORIA (Linnaeus).**

*Ichneumon persuasorius* LINNAEUS, Syst. nat., ed. 10<sup>a</sup> I, 1858, p. 562.

Location of type unknown. Discussion based on the specimens listed below which have been compared with many European specimens received from specialists.

The size of the yellow markings especially those of the mesepisternum, propodeum and abdomen varies somewhat. In a male and female from Falls Church, Virginia, the pale marks on the tergites and narrow and almost form bands. The color of the legs is fairly constant but in some specimens the hind pair (especially the coxae) are piceous or blackish.

*Distribution*.—Canada; Oswego County, New York; Washington, District of Columbia; Falls Church, Virginia (Middleton); Pisgah Ridge, North Carolina (Fiske); Texas (Belfrage); Whitefish Point, Michigan (A. W. Andrews); El Paso County, Colorado (A. B. Champlain); Waldo Canon, Colorado (W. D. Edmonston); Williams Canon, Colorado (Hofer); Fort Garland, Colorado (A. D. Hopkins); Scofield, Utah (C. L. D. Bliss); Fieldbrook, California (H. S. Barber).

*Hosts*.—Parasitic on *Xeris* sp. in *Abies concolor* (Champlain), *Sirex* sp. in *Pinus virginiana* (Middleton), and reared from fir in connection with *Serropalpus* (Fiske). Records from the files of the Branch of Forest Insects, Bureau of Entomology.

**RHYSSA LINEOLATA (Kirby).**

*Cryptocentrum lineolatum* KIRBY, W. Kirby, Fauna Bor. Amer., vol. 4, 1837, p. 260.

*Rhyssa albomaculata* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 318.

*Epirhyssa crevieri* PROVANCHER, Fauna Can. Hym., 1881, p. 449.

*Megarhyssa nitida* MERRILL not Cresson, Trans. Amer. Ent. Soc., vol. 41, 1905, p. 137. (Merrill does not tell how many specimens he saw or where they came from, but one male which he returned to the United States National Museum labeled as *Megarhyssa nitida* is certainly *lineolata*.)

The type of *lineolata* is in the British Museum, and it has not been studied by the writer. Type of *albomaculata*, Cat. No. 1438, Acad. Nat. Sci. Philadelphia. Type of *crevieri*, yellow label 388, second Provancher collection, Public Museum, Quebec. Discussion based on the types of *albomaculata* and *crevieri* and the specimens listed below.

The width of the annulus of the antennae varies somewhat, but it never gradually fades out; it is broader in the females than in the



males. The size of the yellow spots varies somewhat. The legs are usually rufoferruginous, but occasionally the hind legs, especially the coxae, are blackish. In one female from Colorado the hind legs are black with a pale spot on the coxae and tibiae and tarsi brownish beneath.

*Distribution*.—Canada; Cap Rouge, Canada (type-locality of *crevieri*); New Jersey (type-locality of *albomaculata*); Erie County, New York (Blackman); Detroit, Michigan; Great Falls, Virginia (Banks); Morgantown, West Virginia (Hopkins); Colorado National Forest; Hoquiam, Washington (Burke); Vancouver, British Columbia.

*Host*.—Parasitic on *Xeris* sp. in spruce, from observations made by H. E. Burke and on file in the Branch of Forest Insects, Bureau of Entomology.

**RHYSSA HOFERI, new species.**

The color of this species is unusual for members of this genus, and because of this *hoferi* has a superficial resemblance to small species of the genus *Megarhyssa* and to *Labena*. In structure this species is certainly *Rhyssa*. The color, as well as the sculpture of the pronotum and tergites, readily distinguishes it from other Nearctic species.

*Female*.—Length to end of abdomen, about 16 mm.; length of ovipositor beyond abdomen, 20 mm. Head, with the exception of the obscurely transversely wrinkled face, smooth; vertex with very fine aciculation and in postocellar area with scattered punctures; ocelli rather large, the postocellar line slightly shorter than the ocellocular line; antennae slightly thickening apically, the third joint distinctly longer than the fourth; sides of the pronotum dorsally with separate, fairly distinct punctures on a granular surface; anterior coxae truncate anteriorly; prepectal carina present only ventrally; mesepisternum mostly coriaceous; propodeum coriaceous; tergites opaque, finely punctato-coriaceous; tubercles on the second sternite elongate, areolet distinct, triangular, the second recurrent a little more than its width basad of second intercubitus. Ferruginous; inner orbits, spot on clypeus, posterior orbits narrowly, narrow dorsal margin and lower anterior margin laterally of pronotum, spot beneath tegulae and anterior tibiae basally, yellowish; sutures of the thorax and base of second, third, and fourth tergites narrowly brownish or blackish; antennae uniformly ferruginous; wings infumate, with the area along the radius and occupying most of the cubital area dusky; venation brownish, stigma yellowish.

*Type locality*.—Garden of the Gods, Colorado. Described from two females (one type) caught, June 23, 1915, while ovipositing in dying tree of *Pinus edulis* infested with Buprestidae. Material collected by George Hofer, for whom the species is named.

*Type*.—Cat. No. 22133, U.S.N.M.

Genus *EPIRHYSSEA* Cresson.

*Epirhyssa* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 39. *Genotype*.—*Epirhyssa speciosa* Cresson.<sup>1</sup>

According to various authors (Ashmead, Morley) the genus *Rhyssonota* Kriechbaumer is a synonym of *Epirhyssa* Cresson, but as this group is not well represented in the collections of the United States National Museum and as it is outside the area covered by this paper, no discussion, other than to present a few notes on Cresson's types, will be given at this time. The genus *Epirhyssa* has not been understood by American authors and the following notes are presented in order that Cresson's species may be placed in the present classification. None of the Nearctic species assigned to *Epirhyssa* belong there.

*Generic characters*.—Clypeus truncate; frons unarmed; nervulus interstitial; areolet wanting; propodeum not areolated; first sternite fused with the first tergite basally; spiracles of the first tergite at about the basal third, the distance between them less than the distance from one of them to the anterior margin of the segment; second sternite of the female with two median tubercles near base; second tergite without lunulae; abdomen of the male a little more than twice as long as the head and thorax, slightly widening posteriorly; tergites three to five rather shallowly emarginate in male, hardly emarginate in female.

## TABLE TO CRESSON'S SPECIES.

- |  |                           |
|--|---------------------------|
| 1. Stigma black; wings yellowish with the apical margin brown; scutum yellow except for the brownish notauli.....  | <i>mexicana</i> Cresson.  |
| Stigma yellow; wings subhyaline with the apical margin somewhat dusky; scutum mostly brown.....  | 2.                        |
| 2. Tergites beyond the third uniformly castaneous; hind legs castaneous; recurrent postfurcal by the length of the intercubitus.....                       | <i>speciosa</i> Cresson.  |
| Tergites beyond the third yellowish with the basal margins brownish; hind legs mostly yellow; recurrent postfurcal by half the length of the intercubitus. | <i>alternata</i> Cresson. |

*RHYSSSELLA*, new genus.

*Genotype*.—*Rhyssa nitida* Cresson.

The species which are grouped together under the new generic name *Rhyssella* have been placed both in *Rhyssa* and *Megarhyssa*. They are in general habitus more like *Rhyssa* but in structural characters are closer to *Megarhyssa*. The more recent classifications have placed them in *Megarhyssa* but it seems to the writer that their habitus, habits and structural characters are of sufficient value to be considered generic.

*Generic characters*.—Clypeus truncate; nervulus postfurcal; areolet variable, normally present, but often petiolate or completely wanting;

<sup>1</sup> Morley, Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 4.

propodeum with two raised, median, longitudinal ridges; the propodeal spiracle about two and one-half times as long as wide and about three times its length from the base of the propodeum; spiracles of the first tergite close to the base, the distance between them greater than the distance from one end of them to the anterior margin of the segment; first sternite fused with the tergite basally; second sternite of the female with the median tubercles near the base; second tergite with lunulae; tergites three to six not, or but slightly, emarginate posteriorly; abdomen of the male nearly parallel-sided and about three times as long as the head and thorax; ovipositor usually somewhat longer than body.

All the species which have been reared are parasitic on horntail larvae of the genus *Xiphydria*.

There are only two species which occur in the Nearctic fauna and these are easily distinguished by color characters. One of our species is very close to a common European species and the European species is included in the following key for that reason. The notes on the European species are based on specimens in the United States National Museum which were determined by Konow.

TABLE TO THE SPECIES.

1. Posterior orbits broadly yellow; mesepisternum and sternum and sides of the propodeum reddish-yellow, tergites with lateral yellow spots. *humida* (Say).  
Posterior orbits black; mesothorax and propodeum black; tergites black. . . . . 2.
2. Apices of hind femora and tibiae black; North America. . . . . *nitida* (Cresson).  
Hind femora and tibiae concolorous; Europe. . . . . *curvipes* (Gravenhorst).

RHYSSSELLA HUMIDA (Say).

*Pimpla humida* SAY, Bost. Journ. Nat. Hist., vol. 1, 1836, p. 224.

The type of *humida* is lost and none of the specimens studied by Walsh seem to be in existence. The following discussion is based on specimens listed below. The female from Fort Lee, New Jersey, is chosen as a neotype.

*Distribution*.—Indiana (Say, and a specimen determined by Merrill); Illinois (Walsh); Connecticut (Patton); Fort Lee, New Jersey (Zabriskie); Harrisburg, Pennsylvania (Champlain); Lyme, Connecticut (Champlain).

*Host*.—Patton records this as being parasitic on the larva of *Xiphydria attenuata* Norton and Champlain has collected it as parasitic on *Xiphydria abdominalis* Say and on *Xiphydria erythrogastra* Ashmead.

RHYSSSELLA NITIDA (Cresson).

*Rhyssa nitida* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 319. Male.

*Rhyssa canadensis* CRESSON, Can. Ent., vol. 1, 1868, p. 35. Female.

*Epirhyssa clavata* PROVANCHER, Addit. fauna. Can. Hym., 1886, p. 115.

The types of *nitida* Cresson and *canadensis* Cresson are both in the Academy of Natural Sciences, Philadelphia. The type of *clavata* is in

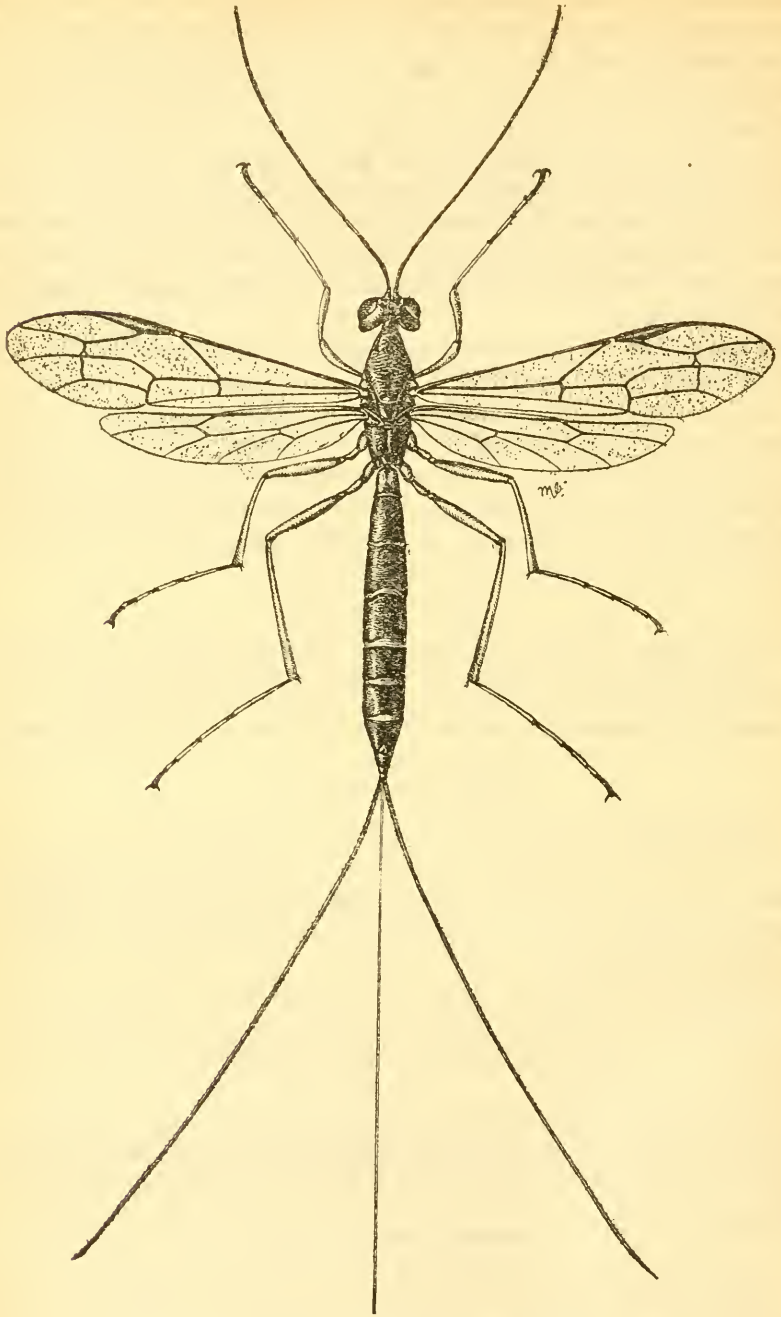


FIG. 2.—FEMALE OF RHYSELLEA NITIDA (CRESSON).



the second Provancher collection in the Public Museum of Quebec and bears yellow label 1260. Discussion based on the types, homotypes and specimens from the localities listed below.

Specimens of males and females reared from the same piece of maple limb included males which could not be distinguished from the type of *nitida* and females which could not be distinguished from the type of *canadensis*; so there can be no doubt that the above synonymy is correct. This species is very close to the European *curvipes* (Gravenhorst) and other than the unsatisfactory color characters given in the above key no differences could be found. It seems to the writer, that it is better to retain Cresson's name for the American form until there is more evidence that it is the same as the European species. Merrill's<sup>1</sup> conception of this species is entirely wrong, as is abundantly proven by the types and the descriptions. The abdomen is black.

*Distribution.*—"Virginia, Dr. T. B. Wilson" (type-locality for *nitida*) "Quebec, Couper" (type locality for *canadensis*); "Cap Rouge" (type-locality for *clavata*); Pennsylvania; Clementon, New Jersey; Washington, District of Columbia (van Horn); Plummer's Island, Maryland (Barber, Middleton, Rohwer); Columbia, South Carolina (G. F. Atkins); Akron, Ohio; Detroit, Michigan.

*Host.*—According to rearings by van Horn, Middleton and Rohwer of the branch of Forest Insects of the Bureau of Entomology this is a common parasite of the larva of *Xiphydria maculata* Say.

#### Genus MEGARHYSSA Ashmead.

*Thalessa* HOLMGREN, Öfvers. Svensk. Vet. Akad. Förh., vol. 16, 1859, p. 122 (pre-occupied by Adams in 1853). *Genotype.*—(*Ichneumon*) *Megarhyssa superbus* (Schrank). Through synonymy.

*Megarhyssa* ASHMEAD, Can. Ent., vol. 32, 1900, p. 368.

This generic group was first recognized by Holmgren, but unfortunately in naming it he chose a name which had already been used, so it was necessary to rename it and this was done by Ashmead in 1900. Neither Schmiedeknecht nor Morley have thought it necessary to use Ashmead's name, although they may have been misled by the way Dalla Torre gives the references.

☞ The Nearctic species of this genus are easily recognized by the size, long ovipositor, and color. The Oriental species are apparently not as easily recognized by superficial characters, as there seems to be some confusion about the genus *Lytarmes* Cameron, which has never been satisfactorily characterized.

All of the species which have been reared are parasitic on the larvae of horntails and all but one of them seem to confine their attacks to species of the genus *Tremex*.

<sup>1</sup> Trans. Amer. Ent. Soc., vol. 41, 1915, p. 137.

*Generic characters.*—Clypeus truncate; nervulus postfurcal; areolet present; propodeum with two raised, median longitudinal ridges; propodeal spiracle three or more times as long as wide and about twice its length from the base of propodeum; spiracles of the first tergite close to the base, the distance between them greater than the distance from one of them to the base of the segment; first sternite fused with the tergite at the base; second sternite with the median tubercles of the female near the base; second tergite with lunulae; tergites 3 to 6 deeply angulately emarginate posteriorly; abdomen of the male parallel-sided and more than three times as long as the head and thorax; ovipositor as long as or much longer than the body.

The four recognized Nearctic species are easily distinguished by the following key which is based mostly on color.

## TABLE TO THE SPECIES.

1. Middle of the posterior margin of the heavily chitinized basal part of the first sternite extending in female distinctly beyond a line drawn tangent to the posterior margin of the first tergal spiracle, in male extending beyond such a line by a distance as great as that from the anterior margin of the first tergal spiracle to the base of tergite; ovipositor not more than one and one-half times as long as body; wings of male hyaline, of female hyaline with a cloud below stigma.

*greenei* Viereck.

Middle of the posterior margin of the heavily chitinized basal part of the first sternite in female distinctly before and in male beyond this point about the length of the line drawn tangent to the posterior margin of the first tergal spiracle; spiracle of ovipositor nearly twice, often thrice, as long as the body. . . . 2.

2. Wings subhyaline with a large cloud below stigma; lateral marks on the tergites V-shaped; ovipositor about twice as long as body; anterior femora one-third longer than their tibiae. . . . . *lunator* (Fabricius).

Wings unicolorous. . . . . 3.

3. Stigma yellowish; wings subhyaline; mesonotum and mesepisternum in the male black; yellow of front of the head in the male restricted to orbital lines; female with yellowish spots on the sides of the tergites; ovipositor about twice as long as the body. . . . . *nortoni* (Cresson).

Stigma black; wings of male subhyaline, of female blackish; mesonotum and mesepisternum of male marked with pale; face of male mostly yellow; thorax and abdomen of female black; ovipositor distinctly more than twice as long as the body.

*atrata* (Fabricius).

## MEGARHYSSA GREENEI Viereck.

*Megarhyssa greenei* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 191, female, not male.

*Type.*—Cat. No. 13499, U.S.N.M. Discussion based on types and specimens from localities listed below.

The male which Viereck assigned to this species is in the writer's opinion a small male of *lunator* (Fabricius). Rearings and the structural characters of the first sternite show that the wings of the male of *greenei* are without a cloud below the stigma.

*Distribution.*—Harrisburg, Pennsylvania (type-locality, and material collected by Fisher); Linglestown, Pennsylvania (Fisher), Cory,

Pennsylvania (Walton); Indiana; Sherbrook, Canada; Tryon, North Carolina (Fiske).

*Host.*—*Tremex columba* (Linnaeus) in hickory from rearings made by W. S. Fisher, of Branch of Forest Insects, Bureau of Entomology.

MEGARHYSSA LUNATOR (Fabricius).

*Ichneumon lunator* FABRICIUS, Spec. Insect., vol. 1, 1781, p. 430.

*Megarhyssa greenei* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 191, male, not female.

The type of this well-known species seems to be lost, but inasmuch as it is impossible to say definitely it is inadvisable to fix a neotype. Discussion based on specimens from the localities mentioned below.

*Distribution.*—This species is common in the Eastern States and it probably occurs as far west as the Rocky Mountains. Specimens from the following localities are in the collection: New York; New Jersey; Philadelphia, Cory, Harrisburg, Linglestown, Pennsylvania; Washington, District of Columbia; Falls Church, Virginia; Pendleton, South Carolina; Jacksonville, New Philadelphia, Illinois; Wyandotte, Michigan; Boulder, Colorado (A. J. Evans).

*Host.*—Parasitic on the larvae of *Tremex columba* (Linnaeus) according to Riley and many rearings by the Branch of Forest Insects, Bureau of Entomology.

MEGARHYSSA NORTONI (Cresson).

*Rhyssa nortoni* CRESSON, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 317.

*Thalessa quebecensis* PROVANCHER, Nat. Can., vol. 5, 1873, p. 447.

*Thalessa superba* (Schrank) MORLEY, Rev. Ichn. Brit. Mus., pt. 2, 1913, p. 16. (North American specimens.)

The type of *nortoni* is in the Academy of Natural Sciences, Philadelphia. The type of *quebecensis* is probably lost. Discussion based on type of *nortoni* and specimens from localities listed below.

Morley considers this species to be a synonym of the European *superba* (Schrank) but if the European specimens of *superba* which are in the United States National Museum are correctly determined (and they agree with the descriptions) then the two can easily be separated by the first sternite, as follows:

Middle of posterior margin of the heavily chitinized basal part of the first sternite in female much before and in male even with a line drawn tangent to the posterior margin of the first tergal spiracle; mesonotum of male black. . . . . *nortoni* (Cresson).

Middle of posterior margin of the heavily chitinized basal part of the first sternite in female and male much beyond a line drawn tangent to the posterior margin of the spiracle; mesonotum of male largely pale. . . . . *superba* (Schrank).

*Distribution.*—Provancher records this from Canada. Specimens in the United States Museum are from the following localities: El Paso County, Colorado (A. B. Champlain); Kansas; Panguitch (H. E. Burke), Scofield (C. S. D. Bliss), Utah; Easton (Koebele), Olympia (C. V. Piper), Mount Rainier (C. V. Piper), Hoquiam (H. E. Burke),

Washington; Meyers Vade (F. B. Herbert), Yosemite (J. J. Sullivan), California; Tanana, Alaska (K. W. Strangman); Pisgah Mountain, North Carolina, altitude 5,600 feet (A. D. Hopkins).

*Host*.—A. B. Champlain of the Branch of Forest Insects has reared this species from the larva of a species of *Xeris* living in *Abies concolor*.

MEGARHYSSA ATRATA (Fabricius).

*Ichneumon atratus* FABRICIUS, Spec. Insect, vol. 1, 1781, p. 436.

*Ichneumon tenebrator* THUNBERG, Bull. acad. sci. St. Peters., vol. 8, 1822, p. 266.

*Rhyssa laevigata* BRULLÉ, Hist. Nat. Ins. Hym., vol. 4, 1846, p. 78, pl. 40, fig. 2.

Types of none of these species have been seen. Discussion based on specimens from the localities listed below.

*Distribution*.—BillERICA, Massachusetts (T. F. Lyon); Long Island, New York; Cory (W. R. Walton), Harrisburg (W. S. Fisher), Guys Mills (Heinrich), Pennsylvania; Washington, District of Columbia; Great Falls, Virginia (R. P. Currie); Cabin John, Plummer's Island (H. S. Barber) Maryland; Chattanooga, Tennessee; East Florida (Ashmead); Bellevue, Indiana; Georgia (J. H. Bryan); Clinton, Arkansas.

Although this species is common there seems to be no positive record of its having been associated with its host.

UNRECOGNIZED SPECIES.

THALESSA? HISTRIO Kreichbaumer.

*Thalessa? histrio* KREICHBAUMER, Ann. naturhist. Hofmus. Wien., vol. 5, 1890, p. 487.

It is certain that this species does not belong to the genus *Megarhyssa* and although Moscardy places it in the genus *Epirhyssa* the writer is of the opinion that when the type is examined it will be found to belong to some other tribe.

Tribe XORIDINI Cushman and Rohwer.

*Xoridini* CUSHMAN and ROHWER, Proc. U.S.Nat.Mus., vol. 57, 1920, p. 395.

As here defined the tribe Xoridini contains only those genera which have the mandibles edentate apically so it is only a part of the tribe Xoridini of other authors.

In certain characters the Xoridini are allied to the Rhyssini, while in others they are allied to the Odontomerini. The apically edentate mandibles will, however, easily distinguish this tribe from all others of the subfamily.

As far as known, all of the species are parasitic on the larvae of insects living in wood.

*Tribal characters*.—Head subquadrate, not swollen below the antennae, posterior orbits broad; mandibles edentate apically and usually without an inner tooth, occasionally (*Poemenia*) with a



short inner tooth; clypeus transverse, apically depressed so there is a more or less distinct mouth opening, or convex and without a mouth opening (*Poemenia*); thorax depressed; mesepisternum longer than high; prescutum long, usually completely defined; wings placed much behind the middle of thorax; propodeum shorter than the scutum; legs usually simple, always simple in male, but in some females (genus *Xorides*) the tibiae are constricted; claws simple; wings usually without an areolet; abdomen longer than head and thorax; ovipositor long, cylindrical.

The three genera belonging to this tribe may be easily recognized by the following table:

TABLE TO THE GENERA.

- |   |                                |
|---|--------------------------------|
| 1. Eyes parallel or nearly; malar space long; propodeum areolated. <i>Xorides</i> Latreille.<br>Eyes strongly converging toward the clypeus; malar space very narrow; propodeum not areolated.....  | 2.                             |
| 2. Mandibles without an inner tooth; apical part of clypeus depressed so there is a distinct mouth opening; posterior orbits with a raised ridge which is covered with transverse rugosities; areolet wanting; apical tergite of female long, somewhat trowel-shaped..... | <i>Deuterozorides</i> Viereck. |
| Mandibles with an inner tooth; clypeus not depressed apically; posterior orbits without a raised ridge; areolet often present; apical tergite of female short.  | <i>Poemenia</i> Holmgren.      |

## Genus XORIDES Latreille.

*Xorides* LATREILLE, Gen. Crust. Ins., vol. 4, 1809. p. 4. *Genotype*.—(*Ichneumon*) *Xorides indicatorius* (Latreille).

*Xylonomus* GRAVENHORST, Ich. Eur., vol. 3, 1829, p. 819. *Genotype*.—*Ichneumon irrigator* Fabricius.

*Gonophonus* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1868, p. 169. *Genotype*.—*Gonophonus mokrzechii* Koknjev.

*Moerophora* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1868, p. 169. *Genotype*.—*Xylonomus rufipes* Gravenhorst.

*Rhadina* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1868, p. 170 (not Waterhouse)=*Rhadinopimpla* Schulz.

*Rhadinopimpla* SCHULZ, Zool. Ann., vol. 4, 1909 (1911), p. 23, new name for *Rhadina* Foerster, not Waterhouse. *Genotype*.—*Xylonomus ater* Gravenhorst.

*Sichelia* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1868, p. 169. *Genotype*.—*Xylonomus filiformis* Gravenhorst.

*Sterotrichus* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1868, p. 169. *Genotype*.—*Xylonomus pilicornis* Gravenhorst.

The genotype of the genus *Xorides* Latreille is a species which up to the present time has not been recognized by European writers and it was impossible for the writer to determine to which group, of the long recognized genus *Xylonomus*, it belonged. Inasmuch as it was very desirable to know something about the species the assistance of that careful European authority of Ichneumonoidea, Dr. A. Roman, was sought and under date of February 14, 1916, he replied as follows:

"I have the pleasure to inform you that the *Xorides indicatorius* Latr. was fortunately easy to find out. It is, without any doubt, the same species as *Xylonomus ferrugatus* Grav. Ichn. Fur. 3, p. 840,

belonging to *Xylonomus* in its strictest sense." From this is to be seen that the long recognized name *Xylonomus* will have to be placed as a synonym of *Xorides* and the group which Gravenhorst considered as *Xorides* will have to be known as *Deuteroxorides* Viereck.

Cresson<sup>1</sup> was the first American author to recognize this group as occurring in the Western Hemisphere. Later<sup>2</sup> he listed and tabulated the American species. Since then the group has been recognized correctly by all American writers under the name *Xylonomus* and the species were again tabulated by Harrington<sup>3</sup> when he described *canadensis*. Later Davis described two species (*catomus* and *maudae*) and in 1913<sup>4</sup> Rohwer described seven species and endeavored to use as subgenera certain of the genera erected by Foerster.

The shape, length and carination of the first tergite of the female offers very valuable specific characters yet there is such a gradation from a short medianly constricted and dorsally carinate to a long gradually widening noncarinate segment that no tangible grouping can be made on this character alone. Again there is such antigeny in the length and sculpture of the tergites that this character cannot be used in grouping the species. Foerster would restrict *Xylonomus* to those forms in which the first tergite is constricted medianly, but this restriction can not be used with any reliance without first removing difficult species. Rohwer<sup>5</sup> proposed to separate *Moerophora* from *Xylonomus* s. s. by the relative length of the second tergite as compared with its apical width—a character used by Foerster to separate *Sichelia* from *Rhadina*—but this character, although useful, can not be strictly applied and is available only in the female. The secondary sexual character used by Foerster to separate *Sterotrichus* can not be considered of generic value; nor is the position of the nervulus, as compared with the basal, as employed by Foerster to separate off *Gonophonus*, a sufficiently stable character to be used generically. If this last-mentioned character were used it would be necessary to erect new "genera" and it would widely separate species which are otherwise rather closely allied. Or, to express it briefly, the writer does not believe that any of Foerster's segregates of *Xylonomus* when defined only on the characters he uses can be considered as natural groups sufficiently distinct to be treated as genera. They seem to be a hasty expression of characters which may distinguish the various species groups found in Europe. Our American species fall into a number of natural groups, some of which are probably the same as the European groups, while others are different from the European groups and if we were to name all of them we would need a number of new names. The genotypes

<sup>1</sup> Proc. Ent. Soc. Phila., vol. 4, 1865, p. 288.

<sup>2</sup> Trans. Amer. Ent. Soc., 1870, p. 167 and p. 172.

<sup>3</sup> " Ent., vol. 23, 1891, p. 134.

<sup>4</sup> Proc. U. S. Nat. Mus., vol. 45, pp. 353-358.

<sup>5</sup> Idem, vol. 45, 1913, p. 353.

of all of the genera proposed by Foerster are not in the United States National Museum collection but notes on those examined are given to show the way these generic names would apply to the American species:

**Gonophonus.**—Genotype not available but it is evident that this group is not represented in America by any described species.

**Moerophora.**—Genotype not available but group probably represented in America by *humeralis* or *stigmapteris*.

**Sichelia.**—Apparently not represented in America but no European specimens are available.

**Strotrichus.**—A single male of the genotype, determined by Schmiedeknecht, shows that this belongs close to group *frigidus* but has the striate orbits of group *maudae* and would run there in the key. It is probably the same group as *Xorides* (= *Xylonomus*) in the strict sense.

**Rhadinopimpla.**—Genotype not available but a male determined by Roman as *R. brachylabris* Kriechbaumer belongs to group *insularis* and differs from the male of that group in the presence of a median carina on the first tergite.

**Xorides** (= *Xylonomus*).—Genotype of *Xylonomus*, as determined by Roman, would fall more properly in group *frigidus* but has striate orbits of group *maudae*.

In grouping the American species the sculpture of the orbits and vertex has been found to be very useful character and is used a number of times as the primary character because it is the same for both sexes while the useful characters of the abdomen apply only to the female.

As far as known, all the species of this genus are parasitic on the larvae of wood-inhabiting insects and mostly on Coleoptera of the families Cerambycidae and Buprestidae.

*Generic characters.*—Inner margin of eyes parallel or nearly; malar space long; malar furrow present; facial quadrangle variable; antennae long, slender and in the female sometimes banded with white; nervulus antifurcal, interstitial or postfurcal; nervellus perpendicular or reclivous, broken near the middle; legs not swollen or twisted but the tibiae are often constricted at the base; propodeum truncate posteriorly, more or less completely areolated, the spiracle elongate, well removed from base; abdomen longer than head and thorax, subpetiolate to subsessile, depressed, the base of second tergite with more or less distinct, depressed areas laterally; ovipositor cylindrical, usually as long as or longer than the body.

TABLE TO THE SPECIES.

1. Posterior orbits with strong anteroposterior striae; prescutum with a median depression.....	2.
Posterior orbits with oblique striae or smooth; prescutum without a median depression.....	6.



2. Basal area triangular, separated from areola by a longitudinal carina; no carina from spiracle of first tergite to apex of segment; first three tergites with large punctures; lateral dorsal angles of pronotum strongly tuberculate; vertex anteriorly shining, practically without sculpture; third tergite of male without basal lateral triangular area.....(group *humeralis*).... 3.
- Basal area and areola confluent; a distinct carina from spiracle of first tergite to apex of segment; first three tergites smooth or aciculate; lateral dorsal angles of pronotum not especially prominent; vertex sculptured; third tergite with a triangular-shaped lateral area at base .....(group *maudae*).... 5.
3. Wings uniformly brownish; body rufopiceous.....*piceatus* (Rohwer).  
Wings hyaline or with brownish marks; body black..... 4.
4. Wings with a brownish band below stigma.....*auscralis* (Cresson).  
Wings uniformly subhyaline.....*humeralis* (Say).
5. Female antennae with small annulus; first tergite black; male with abdomen entirely red.....*neoclyti* (Rohwer).  
Female antennae black; first tergite rufous; abdomen in male black or with first two tergites reddish.....*maudae* (Davis).
6. First tergite short distinctly constricted medianly; orbits impunctate; black species.....(group *frigidus*).... 7.  
First tergite not constricted medianly..... 8.
7. First tergite of female with two dorsal carinae from constriction to apex of tergite; male not known.....*frigidus* (Cresson).  
First tergite of female without median dorsal carinae from constriction to apex; see description of male.....*yukonensis* (Rohwer).
8. First tergite with prominent median carinae which may extend to apex of segment; posterior orbits always with a white spot ..... 9.  
First tergite without median carinae or if present in males the color does not agree; posterior orbits without a white spot..... 11.
9. Facial quadrangle longer than broad; face almost impunctate; scutum polished, sparsely punctured; base of third tergite in male with a depressed area laterally; abdomen black with white marks.....(group *albopictus*).... 10.  
Facial quadrangle broader than long; face with distinct punctures; scutum opaque with close poorly defined punctures; third tergite in male without a depressed area; abdomen unicolorous.....(group *calidus*)....*calidus* (Provancher).
10. Basal area triangular and separated from areola by a carina..*albopictus* (Cresson).  
Basal area and areola confluent.....*duplicatus* (Rohwer).
11. Posterior orbits smooth or with a few punctures below....(group *rileyi*).... 12.  
Posterior orbits obliquely striate..... 13.
12. Tibiae black; hind coxae rufous.....*ruficoxis* (Rohwer).  
Tibiae with a white annulus at base; hind coxae usually black but occasionally rufous.....*rileyi* (Ashmead).
13. Vertex smooth, with only a few scattered punctures; antennae of female black.  
(group *insularis*).... 14.  
Vertex closely punctured or punctato-striate; antennae of female with an annulus.  
(group *stigmaferus*).... 15.
14. Posterior dorsal margin of pronotum yellow; second and third tergites transversely aciculate; scutum shining, sparsely punctured.....*insularis* (Cresson).  
Pronotum black; second and third tergites granular; mesonotum punctate to striato-punctate .....*eastoni* (Rohwer).
15. Females..... 16.  
Males (only four species are known in this sex)..... 21.
16. Heavily chitinized part of first sternite medially terminating distinctly before a line drawn tangent to the posterior margin of the spiracle of first tergite; carinae dividing meta-pleura and -sternum terminating much before hind coxal fossae; abdomen broader..... 17.



- Heavily chitinized part of first sternite terminating beyond or at a line drawn tangent to the posterior margin of spiracle of the first tergite; carinae dividing meta-pleura and -sternum complete to the fossae of hind coxae; abdomen narrower..... 18.
17. Black; second and third tergites coarsely coriaceous; apical joint of hind tarsi black.....*harringtoni* Rohwer.  
At least the head with ferruginous marks; second and third tergites finely transversely aciculate; apical joint of hind tarsi concolorous with preceding.  
*catomus* (Davis).
18. Four posterior tibiae unicolorous; lateral dorsal angles of propodeum tuberculate, but the tubercle is not as long as basal width..... 19.  
Four posterior tibiae with white annulus at base; lateral dorsal angles of propodeum with a long tubercle or spine which is at least twice as long as basal width..... 20.
19. Ferruginous; apical joint of hind tarsus concolorous with the preceding; wings strongly brownish.....*californicus* (Cresson).  
Black; apical joint of hind tarsus black, the preceding white; wings nearly hyaline.  
*cincticornis* (Cresson).
20. Ferruginous; apical joint of hind tarsus concolorous with the preceding.  
*floridanus* (Ashmead).  
Black; apical joint of hind tarsus black, the preceding joint white.  
*stigmapterus* (Say).
21. Tibia unicolorous..... 22.  
Tibiae with pale annulus at base..... 23.
22. Apical joint of hind tarsus black, the preceding whitish; body and legs black.  
*cincticornis* (Cresson).  
Apical joint of hind tarsus concolorous with the preceding; ferruginous, especially the head, legs and abdomen.....*californicus* (Cresson).
23. Lateral dorsal angles of propodeum with a short tubercle....*harringtoni* Rohwer.  
Lateral dorsal angles of propodeum with a prominent tooth....*stigmapterus* (Say).

Group HUMERALIS.

*Group characters.*—Elongate species. Facial quadrangle longer than wide; posterior orbits with antro-posterior striae; frons with large close punctures; vertex almost without sculpture (except at occiput); antennae of male clothed with long hair; lateral dorsal angles of pronotum strongly tuberculate; prescutum with a distinct median longitudinal depression; propodeum with coarse punctures, basal area triangular and separated from the areola by a longitudinal carina; first tergite not constricted medianly, about three times as long as apical width, without carinae; the chitinized part of the sternite ending well before a line drawn tangent to the posterior margin of the spiracle in the female and somewhat beyond in the male; second tergite distinctly longer than its apical width; base of third tergite of male without a triangular-shaped area laterally; the first three tergites with large close punctures. Black or dark piceous, without white markings; four anterior legs usually paler than the posterior ones; posterior tibia with a whitish annulus at base; antenna of male black, of female with a white annulus.

The three species of this group are very closely allied and it may be that with more material so much variation will be found that the color characters used in distinguishing them will prove unreliable.

**XORIDES AUSTRALIS (Cresson).**

*Xylonomus australis* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 167.

*Type*.—No. 1520.1, Acad. Nat. Sci. Phila. Notes from type, paratype and specimen listed below.

Louisiana, Texas (Cresson); Hondo, Texas, "on *Cassia*" June 3, 1909, (J. D. Mitchell).

**XORIDES PICEATUS (Rohwer).**

*Xylonomus stigmapterus* SAY, Howard, Insect Book, 1904, pl 9, fig. 2.

*Xylonomus (Macrophora) piceatus* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 357.

*Type*.—Cat. No. 15370, U.S.N.M. Type is only specimen known. Dade County, Florida (Schwarz).

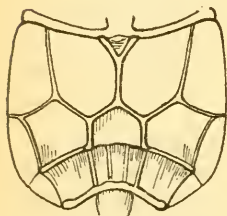


FIG. 3.—PROPODEUM OF *XORIDES PICEATUS* (ROHWER).

**XORIDES HUMERALIS (Say).**

*Anomalon humerale* SAY, Contr. Maclur. Lyc. Phila., vol. 2, 1828, p. 74.

*Xorides humeralis* (Say) SAY, Boston Journ. Nat. Hist., vol. 1, pt. 3, 1836, p. 223.

*Xylonomus lavalensis* PROVANCHER, Nat. Canad., vol. 6, 1874, p. 59.

*Xylonomus humeralis* (Say) PROVANCHER, Nat. Canad., vol. 12, 1880, p. 100.

*Type*.—Say's type is lost and Provancher's type is a female labeled as *humeralis* with yellow label 517 in the 1877 Provancher collection in the Public Museum, Quebec. Neotype of *humeralis* is in the Academy of Natural Sciences, Philadelphia, determined by Cresson. Notes from neotype of *humeralis*, type of *lavalensis*, and specimens listed below.

Indiana (Say); Quebec (Provancher); Ontario (Harrington); Ithaca, New York (Banks); Falls Church, Virginia (Banks); Mount Graybeard, North Carolina (Banks); Texas (Belfrage); Plummer's Island, Maryland (Hopkins); Wayland, Massachusetts (Craighead).

*Host*.—*Phymatodes varius* and a Cerambycid in box elder. From rearings by Branch of Forest Insects, Bureau of Entomology.

**Group MAUDAÆ.**

*Group characters*.—Rather stout species. Facial quadrangle somewhat longer than wide; frons transversely wrinkled; vertex with separate punctures; posterior orbits transversely striate; antennae of the male without long hair; angles of the pronotum not especially prominent; prescutum depressed in the middle; scutum and prescutum wrinkled medianly, punctured laterally; propodeum rather short, its surface punctured or coriaceous, not prominently angulate; the basal

area and areola confluent; first tergite in female short, its length not twice its apical width, not constricted medianly; with strong carina from spiracle to apex of segment in both sexes; the first three tergites finely wrinkled or granular; base of third tergite in male with a triangular area laterally. Black or dark piceous with some white markings on head and thorax; legs black or black and red; abdomen black, red and black, or entirely red; antenna of male black, of female black or with a faint white annulus.

XORIDES MAUDAE (Davis).

*Xylonomus maudae* DAVIS, Trans. Amer. Ent. Soc., vol. 22, 1895, p. 32.

*Type*.—In the Academy of Natural Sciences, Philadelphia. Notes from type and specimens listed below.

Washington (Davis); both sexes from Corvallis, Oregon; female from Menlo Park, California, June, 1905 (F. Hornung).

XORIDES NEOCLYTI (Rohwer).

*Moerophora neoclyti* ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 223.

*Type*.—Cat. No. 18421, U.S.N.M. Notes from unique male type and female described below.

*Female*.—Length of body 14.5 mm.; length of ovipositor 7.5 mm. Postocellar line nearly twice as long as ocellocular line; third antennal joint slightly shorter than fourth, fourth and fifth subequal; side of pronotum wrinkled anteriorly, punctured posteriorly; mesepisternum shining with irregular punctures medianly, irregularly wrinkled anteriorly and posteriorly; first three tergites finely wrinkled. Black; abdomen dark piceous; inner orbits to a line drawn tangent to anterior ocellus, thirteenth and fourteenth antennal joints and a small spot at base of all tibiae whitish; tarsi piceous. Wings hyaline, a spot around nervulus, one along first abscissa of radius connecting with one around intercubitus dusky; venation black.

Described from one female from Arizona.

The male is from Santa Catalina Mountains, Arizona.

*Host*.—*Neoclytus capraea* Say.

Group FRIGIDUS.

*Group characters*.—Facial quadrangle much wider than long; face finely wrinkled; frons shining, punctured or finely wrinkled; vertex and posterior orbits shining, with at most a few scattered punctures; postocellar line longer than the ocellocular line; antennae of male hairy; pronotum angulate but not dentate; prescutum shining not depressed in middle; scutum laterally shining, medially it and prescutum are somewhat wrinkled; propodeum coriaceous, without prominent teeth; costulae present; basal area and areola confluent; nervellus perpendicular or slightly reclivous, broken a little above the middle; first segment rather short, constricted medially, and some-



times with dorsal carinae, without a complete carina from spiracle to apex of segment although it is present apically; second tergite of female with apical width greater than length, in male about one and one-half times as long as apical width; tergites granular or somewhat reticulate, opaque; ovipositor longer than abdomen. Black; legs more or less rufous; antennae black in both sexes; wings hyaline.

**XORIDES FRIGIDUS (Cresson).**

*Xylonomus frigidus* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 168.

*Xylonomus (Xylonomus) plesius* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 354.

*Type of frigidus.*—Cat. No. 1522, Acad. Nat. Sci. Phil. *Type of plesius:* Cat. No. 15365, U.S.N.M. Notes from types.

In describing *plesius* it was compared with a specimen determined as *frigidus* by Ashmead and Viereck, but an examination of the type of *frigidus* showed that this determination was wrong and that *plesius* is really a synonym of *frigidus*.

The male of this species is unknown and when it is found it will probably prove to be very closely allied to *yukonensis*.

Hudson Bay Territory; United States.

**XORIDES YUKOENSIS (Rohwer).**

*Xylonomus (Moerophora) yukonensis* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 355.

*Type.*—Cat. No. 15367, U.S.N.M. Notes from type and from specimens listed below.

This species is closely allied to *frigidus* (Cresson) and the character made use of in the table is about the only one.

*Male.*—Length 11 mm. Antennae as long as body; very like the female but the sculpture is stronger; propodeal carinae strong, the median ones nearly confluent so the basal area at first sight seems separated from the areola; first tergite with strong complete median carinae. Black; tegulae, four anterior legs and posterior coxae and trochanters rufous.

A specimen from Sherbrook is slightly larger and has the frons punctato-striate while in the type the frons is punctured.

Fort Yukon, Alaska; Sherbrook, Canada; Boulder, Colorado (Cockerell).

**Group ALBOPICTUS.**

*Group characters.*—Facial quadrangle longer than wide, shining almost impunctate; posterior orbits smooth above, obliquely striate below; postocellar line distinctly longer than ocellular line; antennae of male with short hair; angles of pronotum prominent but hardly toothed; scutum and prescutum shining, sparsely punctured; propodeum sparsely punctured, carinae strong, lateral angles not prominently toothed; basal area and areola confluent, or separated



by a longitudinal carina due to the coalescing of the median carinae; first tergite in female a little more than twice as long as apical width, with complete median carinae in both sexes; second tergite in female distinctly wider than long; base of third tergite of male with a triangular depressed area laterally; tergites coriaceous or (in female) with the third and fourth transversely aciculate; nervulus slightly postfurcal; nervellus slightly reclivous, broken at the middle; ovipositor as long as or shorter than the abdomen. Black, with

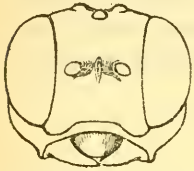


FIG. 4.—FRONT VIEW OF HEAD OF *XORIDES ALBOPICTUS* (CRESSON.)



FIG. 5.—PROPODEUM AND BASAL ABDOMINAL SEGMENTS OF *XORIDES ALBOPICTUS* (CRESSON.)

yellow markings; posterior orbit with yellow spot; antenna of female with an annulus; wings hyaline.

*XORIDES ALBOPICTUS* (Cresson).

*Xylonomus albopictus* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 168.

*Xorides canadensis* PROVANCHER, Nat. Can., vol. 7, 1875, p. 248.

*Type of albopictus.*—Cat. No. 1518, Acad. Nat. Sci. Phila. The type of *canadensis* is lost unless it is one of the specimens under name *Xylonomus albopictus*, it is probable that Provancher recognized that *canadensis* was synonymous with *albopictus* as he omits it from the "Fauna." Synonymy made by study of description and because of Harrington's statement.<sup>1</sup>

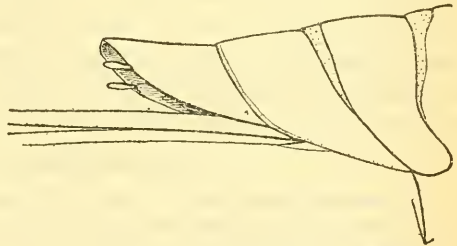


FIG. 6.—APICAL ABDOMINAL SEGMENTS OF *XORIDES ALBOPICTUS* (CRESSON.)

This is the commonest American species and is easily recognized by its markings and the characters used in the table. The yellow line on the dorsal lateral part of the pronotum is another character by which to separate it from its ally, *calidus*.

Canada; New York (Cresson); Harrisburg (and vicinity) (Fisher, Kirk, Champlain), Philadelphia (G. M. Greene); Pennsylvania; West Virginia (Hopkins);<sup>2</sup> Tryon, North Carolina (Fiske); Deweyville, Texas (Fiske); Indiana; Chicago, Illinois (Kahl); Michigan.

<sup>1</sup> Can. Ent., 1893, p. 133.

*Host*.—According to many rearings by Branch of Forest Insects Bureau of Entomology, this is a common parasite of *Superda discoidea* in hickory and probably occurs throughout the range of its host.

XORIDES DUPLICATUS (Rohwer).

*Xylonomus (Moerophora) duplicatus* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 356.

*Type*.—Cat. No. 15369, U.S.N.M.

This is known only from a unique male and is probably nothing more than a specimen of *albopictus* with abnormal aerolation of the propodeum, but inasmuch as none of the many specimens of *albopictus* show any such variation it is probably best to retain the name for the time being.

Clark Station (near St. Louis), Missouri.

Group CALIDUS.

*Group characters*.—Facial quadrangle broader than long, with distinct close punctures; posterior orbits shining above, obliquely striate below; postocellar line distinctly longer than the ocellocular line; antennae of male with short hair; angles of pronotum not prominent; scutum and prescutum opaque, with close poorly defined punctures; propodeum rather closely punctured, carinae strong, angles not prominently dentate; basal area and areola confluent; first tergite of female about twice as long as apical width, with distinct median carinae which are complete in the male but end before apex of segment in female; second tergite of female wider than long; base of third tergite of male without depressed areas laterally; tergites coriaceous or granular; nervulus slightly postfurcal; nervellus perpendicular broken at middle; ovipositor shorter than abdomen. Black; head and thorax with yellow markings; posterior orbits with a yellow spot; abdomen reddish in female black in male without markings antenna of female with an annulus, of male black; wings hyaline.

XORIDES CALIDUS (Provancher).

*Xylonomus calidus* PROVANCHER, Addit. faun. Can. Hym., 1886, p. 119. — HARRINGTON, Can. Ent., vol. 23, 1891, p. 134.

*Xylonomus pulcher* ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, 1889, p. 450. — HARRINGTON, Can. Ent., vol. 23, 1891, p. 134.

*Aplomerus nasonii* DAVIS, Trans. Amer. Ent. Soc., vol. 22, 1895, p. 32.

*Type of calidus*.—One female with blue label with large figures 596 and name label, in second Provancher collection Public Museum, Quebec.

*Type of pulcher*.—Cat. No. 2120, U.S.N.M.

*Type of nasonii*.—Academy of Natural Science, Philadelphia. Notes from types and specimens listed below.

Harrington<sup>1</sup> suggests that *pulcher* Ashmead is only a variety of *calidus* Provancher and an examination of the types failed to show any differences except in the color of the mesepisternum and this character varies from black to rufous, so it is impossible to separate the two. In females the scutellum may have a yellow spot or be black, and in one specimen from Texas the abdomen is almost entirely piceous. Davis' type differs in no way from the male of *calidus*.

*Male*.—Length 8 mm. Face below with a few wrinkles, Black; line on clypeus, inner orbits (interrupted medially), scape beneath, spot on posterior orbits yellow; legs rufopiceous, apices of hind femora, hind tibiae and tarsi, except white bases of tibiae and basitarsi, piceous black.

Canada; Pennsylvania; Fredericktown, College Park, Jackson's, Maryland; Texas (Belfrage); Cadet, Missouri; Tryon, North Carolina (Fiske).

*Hosts*.—According to unpublished records in Branch of Forest Insects, Bureau of Entomology, this species is a parasite of *Chrysobothris femoratus* and *Leptostylus maculus* in chestnut and probably a parasite of *Curius dentatus* in juniper.

#### Group RILEYI.

*Group characters*.—Facial quadrangle longer than wide; face rugose; frons sparsely punctured; vertex and posterior orbits smooth, with only a few punctures; postocellar line distinctly longer than the ocellocular; antennae of male hairy; angles of pronotum prominent; mesonotum punctured, more or less rugulose medially; propodeum rather coarsely punctured, carinae not especially strong, angles toothed; median carinae more or less completely coalesced, so basal area is triangular and separated from areola by a raised line; first tergite in female about two and one-half times as long as apical width and without carinae, in male about four times as long as apical width and with complete median carinae; second tergite in female with length and apical width subequal or with the apical width slightly greater; tergites punctured to striato-punctate; base of third tergite in male without a lateral depressed area; nervulus interstitial to slightly postfurcal; nervellus perpendicular, broken at the middle. Black; legs with some white marks and sometimes the hind legs are partly rufous; wings hyaline; antenna of female with a pale annulus.

The two species recognized in this group are in habitus and structure very similar and it may be with more material it will be necessary to combine the two, or it may be desirable to divide the forms of *rileyi*.

<sup>1</sup> Can. Ent., vol. 23, 1891, p. 135.

**XORIDES RUFICOXIS (Rohwer).**

*Xylonomus (Xylonomus) ruficoxis* ROHWER, Proc. U. S. Nat. Mus., vol. 45  
1913, p. 354.

*Type*.—Cat. No. 15366, U.S.N.M.

The black tibiae readily separate this species from *rileyi*. It is known only from the type material.

Apalachicola, Florida.

*Host*.—*Physoenemum andrea* in *Taxodium distichum*.

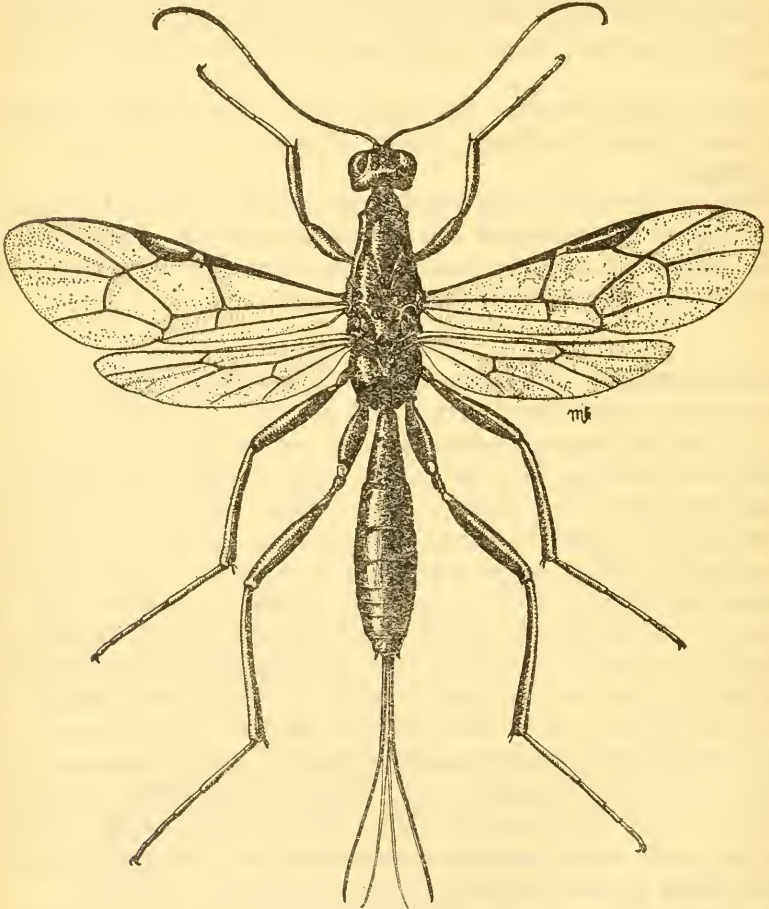


FIG. 7.—FEMALE OF *XORIDES RILEYI* (ASHMEAD).

**XORIDES RILEYI (Ashmead).**

*Xylonomus rileyi* ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, 1889, p. 450.—CHITTENDEN, Bull. 7, Div. Ent., U. S. Dept. Agric., 1897, p. 72.

*Xylonomus (Xylonomus) lepturae* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 534.

*Type of rileyi*.—Cat. No. 2119, U.S.N.M. *Type of lepturae*.—Cat. No. 15489, U.S.N.M. Discussion based on types and specimens listed below.



There is no tangible difference between the types of *rileyi* and the types of *lepturae*, but the female specimens grouped under the name *rileyi* may be divided into three groups as follows:

1. Hind coxae rufous.....Form A.  
Hind coxae black..... 2.
2. Anterior part of prescutum with widely separated punctures.....Form B.  
Prescutum striato-punctate or with rather close punctures anteriorly.....Form C.

These three forms have different hosts and future investigation may prove that they are distinct, but inasmuch as they all agree in habitus and the above characters are all that could be found it does not seem advisable to name them. The types of both *rileyi* and *lepturae* come under form B.

Missouri (Ashmead); Cherrydale (Van Horn), Veitch (Craighead, Snyder), Virginia; Washington, District of Columbia (Howard, Champlain); Linglestown, Pennsylvania (Champlain); Tryon, North Carolina (Fiske).

*Host*.—Chittenden records this species as a parasite of *Xylotrechus colonus*. The unpublished records of the Branch of Forest Insects, Bureau of Entomology, give the hosts as follows: *Form A* from *Xylotrechus colonus*; *form B* from *Leptura nitens* and *Callidium aereum*; and *form C* from *Romaleum atomarium*.

#### Group INSULARIS.

*Group characters*.—Facal quadrangle wider than long; face punctured or punctato-striate; frons sparsely punctured; vertex shining sparsely punctured; posterior orbits obliquely striate below; post-ocellar line subequal with the ocellocular; antennae of male with short hair, angles of pronotum not prominent; scutum sparsely punctured or punctato-striate; propodeum punctured, carinae or a carina strong but not prominent, angles not toothed; basal area triangular, separated from the areola by the short coalescing of the median carinae or the two areas confluent; first tergite in female about two and one-half times as long as basal width, without median carinae or a carina from spiracle to apex; second tergite in female slightly longer than apical width; tergites coriaceous, granular or finely transversely aciculate; base of third tergite in male without depressed areas laterally; nervulus interstitial or slightly postfural; nervellus perpendicular or reclivous, broken at about middle; ovipositor longer than abdomen. Black; head and sometimes thorax with some yellow markings; legs reddish, the posterior ones paler; wings hyaline; antennae black in both sexes.

#### XORIDES INSULARIS (Cresson).

*Poemenia insularis* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 380.

*Xylonomus insularis* (Cresson) CRESSON, Trans. Amer. Ent. Soc., 1887, p. 220.—

HARRINGTON, Can. Ent., vol. 23, 1891, p. 134.

*Type*.—Cat. No. 1521, Acad. Nat. Sci. Philadelphia. Notes from type, homotype and specimens listed below.

This is one of the commoner western species and varies from the typically colored form to a form with reddish propodeum and reddish spots on the mesoscutum.

Vancouver Island (Cresson); Easton (Koebele), Hoquiam (Burke), Washington; Waldo, Oregon (Sargent); Big Tree Grove, Mariposa County, California (Burke).

*Host.*—According to the unpublished notes of the Branch of Forest Insects, Bureau of Entomology this species is parasitic on *Hylotrupes amethystinus*, *Hylotrupes ligneus*, *Tetropium cinnamopterum*, *Tetropium velutinum*, *Melanophila drummondi*, and *Atimia dorsalis*.

**XORIDES EASTONI (Rohwer).**

*Xylonomus (Moerophora) eastoni* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 356.

*Type.*—Cat. No. 15368, U.S.N.M.

This species is known from the unique type and has a small yellow spot on the inner orbits, a character overlooked in the original description.

Fall River, Massachusetts.

**Group STIGMAPTERUS.**

*Group characters.*—Facial quadrangle wider than long, in some species markedly so while in others the width is but little greater than the length; face coarsely punctured or coriaceous; frons closely punctured; vertex closely punctured (in some species the punctures are separated by a distance somewhat greater than the diameter of an ocellus) or punctato-striate; posterior orbits with oblique striae; antennae of male nearly bare; angles of pronotum prominent but not dentate; abdomen dull or shining, closely or sparsely punctured, anteriorly and posteriorly more or less striate; propodeum coriaceous, carinae strong, angles variable; basal area and areola confluent; first tergite in female two to four times as long as apical width, without median dorsal carinae, with a more or less complete carina from spiracle to apex; second tergite in female longer than apical width, in some species (*stigmapterus*, etc.) distinctly so while in others (*catomus*) the difference between length and width is not great; base of third tergite in male without or with only incomplete depressed areas laterally; basal tergites coriaceous, granular or transversely aciculate; nervulus slightly postfural; nervellus perpendicular or reclivous, broken at about middle; ovipositor longer than body. Black or ferruginous; legs with white markings; wings hyaline to brownish, antenna of female with a pale annulus.

The species of this group are closely allied and in the ferruginous species this color is often partly replaced by black. As far as the material is available the species can easily be distinguished by the above table, but males of all of the species are not at hand, and it will prob-

ably be found difficult to associate males or to determine them without female representatives of all the species.

**XORIDES HARRINGTONI, new name.**

*Xylonomus canadensis* HARRINGTON, Can. Ent., vol. 23, 1891, p. 134. [Not *Xorides canadensis* Provancher=*albopictus*.]

*Type, allotype, paratypes* in Harrington collection; *Paratype* male, *metatype* (also *homotype*) in United States National Museum. *Paratype* Cat. No. 20933, U.S.N.M. Notes on types.

In the general black color this species is like *cincticornis* and *stigma-pteris*, but besides the characters used in the table *harringtoni* may be distinguished from *cincticornis* by the pale annulus at the base of the tibia, and from *stigma-pteris* by the habitus being more robust. Ottawa, Canada.

**XORIDES CATOMUS (Davis).**

*Xylonomus catomus* DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 372.

*Type*.—Cat. No. 176, Acad. Nat. Sci. Philadelphia. Notes from types and specimens listed below.

This species varies from piceous with ferruginous marks on the head to entirely ferruginous. In the ferruginous specimens the legs are ferruginous while in the piceous specimens the hind femora and tibiae are piceous. Wings subhyaline.

Craigs Mountain, Moscow, Idaho (Davis); Missoula (Brunner), Darby (Bishopp), Montana; Albee, Oregon (Edmonston); Fallen Leaf, California (Herbert); Boulder, Colorado (Marshall).

*Hosts*.—Edmonston has obtained this as a parasite of *Chalcophora angulicollis* in *Pinus ponderosa* and Brunner as a parasite of *Alaus oculatus* and from material containing *Memphrus perlucida*.

**XORIDES CALIFORNICUS (Cresson).**

*Xylonomus californicus* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 380.

*Type*.—Cat. No. 1523, Acad. Nat. Sci. Philadelphia. Notes from type and specimens listed below.

This species is in structure very close to *cincticornis*, but the ferruginous color will separate it from that species. The color varies from ferruginous to almost piceous, but in the piceous specimens the head is mostly ferruginous and it is also easy to distinguish the piceous color from the deep black of *cincticornis*. The male differs from *cincticornis* in the same manner as does the female.

California (Cresson); Mendocino County (Coquilett), Summerdale (Burke), Fallen Leaf, and Placerville (Herbert), California.

*Host*.—Herbert has collected this at Placerville, California, as a parasite of *Buprestis laeviventris* in *Pinus ponderosa*.



## XORIDES CINCTICORNIS (Cresson).

*Xylonomus cincticornis* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 288.

*Xylonomus (Moerophora) modestus* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 358.

*Type of cincticornis*.—Cat. No. 1519, Acad. Nat. Sci. Phila.; *type of modestus*—Cat. No. 15371, U.S.N.M. Notes on types and specimens listed below.

Very like *californicus*, but it is to be distinguished by color characters. From the other black species of this group the unicolorous tibiae will make it easy to recognize this species.

Colorado (Cresson); El Paso County, Colorado (Champlain); Corvallis, Oregon; Skokomish River, Washington.

*Host*.—Champlain has obtained this as a parasite of a species (probably *chrysocoma*) of *Leptura* in *Pinus scopulorum*.

## XORIDES FLORIDANUS (Ashmead).

*Xylonomus floridanus* ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, 1889, p. 451.

*Type*.—Cat. No. 2121, U.S.N.M.

This species is known only from the type.

Archer, Florida. Collected by E. A. Schwarz.

## XORIDES STIGMAPTERUS (Say).

*Acoenitus stigmapterus* SAY, Keating's Narr. Exp., vol. 2, 1824, App., p. 325; LeConte's Edit. Say, vol. 1, p. 218.

*Xylonomus stigmapterus* (Say) CRESSON, Trans. Amer. Ent. Soc., 1870, p. 167.—WALSH, Trans. St. Louis Acad., vol. 3, 1873, p. 165.—HARRINGTON, Can. Ent., vol. 23, 1891, p. 134.

Say's type is lost and the specimen in the Academy of Natural Science in Philadelphia bearing the name label and determined by Cresson should be considered as a neotype for this species. Notes from neotype and the specimens listed below.

The above table will separate this species from its allies, while the accounts listed in the bibliography will make its identity certain.

United States and Canada (Cresson). Specimens from the following localities are in the collection: New York; Linglestown, Pennsylvania (W. S. Fisher); Sherbrook, Canada; Rock Creek Park, District of Columbia; Rosslyn (Shannon), Falls Church (Middleton), Virginia.

*Host*.—W. S. Fisher has reared this as a parasite of *Leptura proxima* in hickory.

## Genus DEUTEROXORIDES Viereck.

*Deuteroxorides* VIIECK, Bull. 83, U. S. Nat. Mus., 1914, p. 43. *Genotype*.—

*Xorides albitarsus* Gravenhorst.

*Xorides* GRAVENHORST and AUTHORS (not Latreille).

When Gravenhorst in 1829 divided the genus *Xorides* Latreille he made no mention of the species on which Latreille founded his genus,



but restricted *Xorides* to species which he considered to be congeneric with *albitarsus* Gravenhorst. This restriction, which excludes the genotype, has unfortunately been adopted by all writers except Viereck (1914) who calls attention to the nomenclatorial error and proposes the name *Deuteroxorides* to replace *Xorides* Gravenhorst and Authors.

*Deuteroxorides* is one of the most easily recognized genera in the subfamily Ichneumoninae, and although it has many characters in common with *Xorides* can easily be distinguished by the characters mentioned in the generic table. Its species are parasitic on such wood-boring insects as Cerambycids, Buprestids, and Siricids, yet in one instance it has been recorded as reared from a Lepidopterous insect, *Laspeyresia toreuta*, living within the cones of pines.

Eyes strongly converging below; malar space very narrow; malar furrow wanting; posterior orbits with a raised ridge which is armed with tubercles; prescutum well defined anteriorly, not tuberculate; disk of the mesonotum transversely aciculate or striate; propodeum long, gently sloping, not areolate or at most the petiolar area present; legs long, normal; abdomen long, compressed apically in the female, parallel sided in the male; apical tergite of female much produced; nervellus reclivous, broken well above the middle.

No reliable structural characters to separate the species have been discovered and it was necessary to resort to color. The color of the abdomen, head markings and mesoscutum are subject to considerable variation, while the markings of the pronotum and mesepisternum are constant and offer good specific characters. The relative length of the ovipositor is subject to such wide variation (as is proven by reared specimens of *caryae*) that it can not be used as a specific character.

TABLE TO THE SPECIES.

1. Mesepisternum beneath with oblique yellow band.....*caryae* (Harrington).  
Mesepisternum without an oblique yellow band, black or with small yellow spots below the tegula..... 2.
2. Upper posterior margin of the pronotum with a yellow line (in the female the lower margin is black, in the male yellow).....*vittifrons* (Cresson).  
Upper posterior margin of the pronotum black, the lower margin yellow.  
*borealis* (Cresson).

DEUTEROXORIDES CARYAE (Harrington).

*Xorides caryae* HARRINGTON, Can. Ent., vol. 23, 1891, p. 132.

*Type*.—Collection of Harrington, lacks antennae. Notes from specimen compared with type and specimens from localities listed below.

This species is easily recognized by the yellow line on the mesepisternum. In the extent of the yellow markings of the abdomen, thorax above and head it is subject to but little variation, but the reddish markings of the legs vary from bright red to reddish piceous.

There is considerable variation in size of the body (from 9 to 20 mm.), while the length of the ovipositor varies but little (6 to 8 mm. beyond the tip of the abdomen). In the type the body is 9.5 mm. long and the ovipositor extends 8 mm. beyond the end of the abdomen; yet in other specimens the body is 20 mm. long and the ovipositor extends 8 mm. beyond the end of the abdomen.

Ottawa, Canada (Harrington); Detroit, Michigan (Hopkins); Harrisburg (and vicinity) (Fisher and Kirk), Overbrook (Geo. M. Greene)

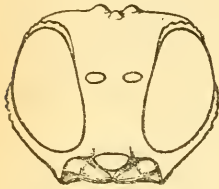


FIG. 8.—FRONT VIEW OF HEAD OF DEUTEROXORIDES CARYAE (HARRINGTON).



FIG. 9.—PROPODEUM AND BASAL ABDOMINAL SEGMENTS OF DEUTEROXORIDES CARYAE (HARRINGTON).

Pennsylvania; Ballston, Virginia (Snyder); Pink Beds, North Carolina (Fiske).

*Host.*—*Saperda discoidea*. Harrington<sup>1</sup> records as a probable host of species *Dorchaschema nigrum*, but numerous rearings from the Branch of Forest Insects, Bureau of Entomology, indicate that *Saperda discoidea* is the only host.

#### DEUTEROXORIDES VITTIFRONS (Cresson).

*Xorides vittifrons* CRESSON, Can. Ent., vol. 1, 1868, p. 37.

*Type.*—Acad. Nat. Sci. Phila. No. 1514. Notes from homotype and specimens from localities listed below.

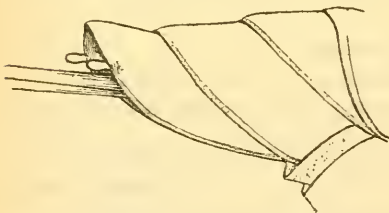


FIG. 10.—APICAL ABDOMINAL SEGMENTS OF DEUTEROXORIDES CARYAE (HARRINGTON).

Harrington<sup>1</sup> would separate this species off by its relatively longer ovipositor but this character is extremely variable and can not be relied upon. The color characters offered in the above table are the only characters which have given satisfaction.

London (Cresson), Ottawa (Harrington), Canada; New York; Overbrook, Pennsylvania (Geo. M. Greene); Tryon, North Carolina (Fiske).

*Hosts:* Harrington records this species "upon old maples infested with *Dicerca divaricata*, *Xiphydryia albifrons*, *Tremex columba*, etc." and Dalla Torre records the insects in the "old maples" as hosts of *vittifrons*. The only authentic host record available is *Graphisurus fasciatus* based on rearings of the Branch of Forest Insects, Bureau of Entomology.

<sup>1</sup> Can. Ent., vol. 23, 1891, p. 133.

## DEUTEROXORIDES BOREALIS (Cresson).

*Xorides borealis* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 167, female.

*Xorides occidentalis* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 380, male.

Type.—Acad. Nat. Sci. Phila. (*borealis*) No 1516; (*occidentalis*) No. 1515. Notes from specimens compared with types, and other material from the localities listed below.

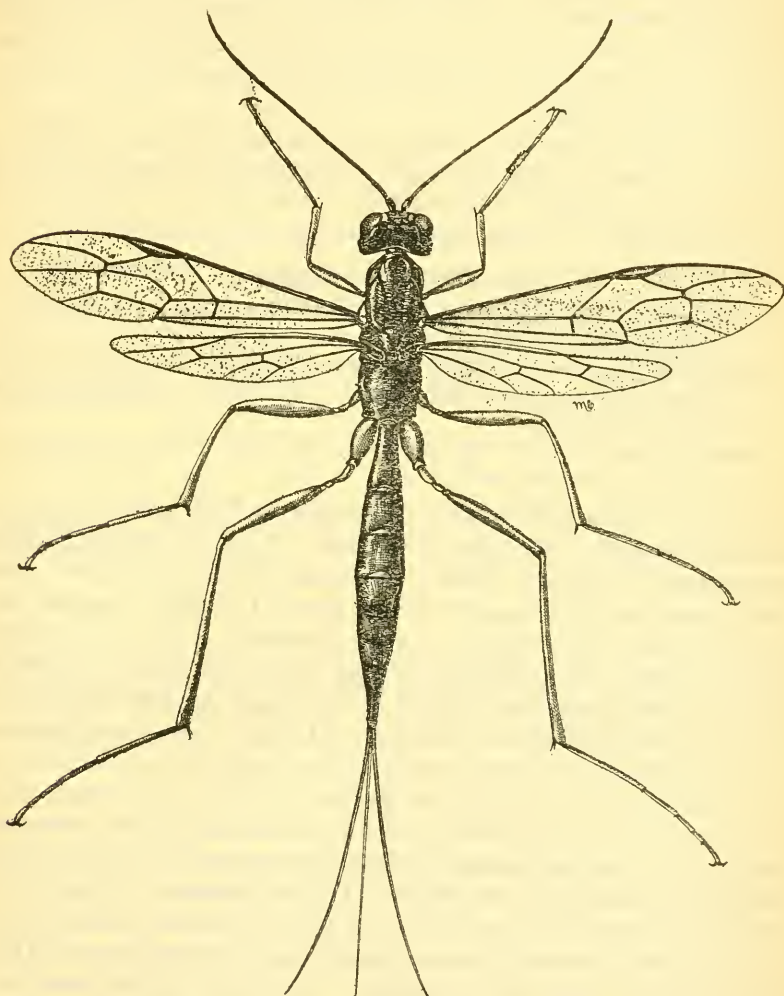


FIG. 11.—FEMALE OF DEUTEROXORIDES CARYAE (HARRINGTON).

Harrington<sup>1</sup> separated *occidentalis* Cresson from *borealis* Cresson (and all other species) by the absence of white markings on the apical margins of the tergites. This character is subject to great variation, and as no other characters have been found to separate these forms it seems necessary to place them under one name. The

<sup>1</sup> Can. Ent., vol. 23, 1891. p. 133

species varies in size from 10 to 20 mm. and from having the posterior femora black (type of *borealis*) to rufous (type of *occidentalis* and most of the other specimens). In some few specimens the sides of the propodeum and the metathorax are rufous but in most of them they are black.

Hudson Bay (Cresson), Vancouver Island (Cresson), Ottawa (Harrington), Canada; Douglas County (Hofer), Waldo Canon (W. D. Edmonston), Colorado; Mariposa County (Burke), Kyrburg (Miller), California; Hoquiam, Washington (Hopkins); Columbia Falls, Montana (Brunner); Palisades, New Jersey (Love); Tyron, North Carolina (Fiske).

*Hosts.*—*Atimia dorsalis*; *Hylotrupes ligneus*; *Tetropium velutinum*, Unknown Cerambycid in chestnut; a Buprestid in Douglas Fir; and an unverified record of *Laspeyresia toreuta* Grote. Records from rearings of Branch of Forest Insects, Bureau of Entomology.

#### Genus *POEMENIA* Holmgren.

*Poemenia* HOLMGREN, Öivers. Vet.-Akad. Förh., vol. 16, 1859, p. 130. *Genotype.*—

*Poemenia notata* Holmgren.

*Calliclisis* FOERSTER, Verh. naturh. Ver. preuss. Rheinland, vol. 25, 1863, p. 169.—

SCHMIEDEKNECHT, Zool. Jahrb., vol. 3, 1888, p. 440. *Genotype.*—*Ephialtes hecticus* Gravenhorst.

*Euxorides* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 167. *Genotype.*—

*Euxorides americanus* Cresson.

The genus *Poemenia* was first recognized by Holmgren for a species which he described under the name *notata*. A few years later Foerster, recognizing Holmgren's genus, separated off certain other species (none mentioned by name) as the genus *Calliclisis* because they lacked the areolet. Two years after Foerster's work was published Cresson placed one American species in a new genus, *Euxorides*, which he considered closely allied to *Deuteroxorides* but distinguished from it by the presence of an areolet. Although the type of *Poemenia* is not available there seems, to the author, no reason to consider that it is different from the other two genera. The only difference which has been offered is the absence of the areolet and this is not even a specific character as in some specimens it is present in one wing and completely wanting in the other. The suppression of *Calliclisis* is further supported by the fact that Dr. A. Roman has given the United States National Museum specimens of the genotype of *Calliclisis* labeled as *Poemenia* (*Calliclisis*). The presence of an inner tooth on the mandibles, the nondepressed clypeus and the short last tergite in the female makes *Poemenia* a somewhat discordant element in the tribe Xoridini, but in general appearance, and in most of the characters of the head, thorax and abdomen, it so closely resembles *Deuteroxorides* that it is certain that it belongs near it. The characters used in the above key, however, show how easily they may be distinguished.



The species whose biology is known are parasitic on insects living within wood or woody substance.

Head subquadrate; eyes large, reaching to near the base of mandibles, strongly converging below; mandibles rather broad, with an inner tooth which is shorter than the outer; malar furrow wanting; clypeus not depressed; posterior orbits broad and without a ridge; antennae not annulated, long and slender; notauli well defined anteriorly but poorly defined posteriorly; prepectus almost wanting; propodeum long, sloping, the spiracle nearly round and placed at about the middle; legs normal, long and slender; areolet present or wanting, when present petiolate and with the outer vein usually incomplete; nervellus reclivous, broken above the middle; abdomen long and slender; hypopygidium and last tergite short; ovipositor of variable length.

The species of *Poemenia* resemble each other very closely and are separated largely by unisexual characters and color. There are but few specimens in any collection and when more material has been studied it may be that an entirely different arrangement will be desirable. The following key is almost a copy of a synopsis made from the Philadelphia types by R. A. Cushman and is based on the females.

TABLE TO THE SPECIES.

- 1. Ovipositor nearly as long as the body; meso- and meta-pleura marked with red (usually)..... 2.
- Ovipositor much shorter than the body; pleura black..... 3.
- 2. Mesoscutum and scutellum red; spiracles of the first tergite prominent.
  - thoracica* (Cresson).
  - Mesoscutum black; scutellum red; spiracles of the first tergite not prominent.
    - vancouverensis* (Provancher).
- 3. Ovipositor nearly as long as the abdomen; tergites narrow, the first hardly one-third as wide as long, the second nearly twice as long as wide.... *albipes* (Cresson).
- Ovipositor but little more than one-half the length of the abdomen; first tergite but little more than twice as long as wide, second one-third longer than wide.
  - americana* (Cresson).

POEMENIA THORACICA (Cresson).

*Ephialtes thoracicus* CRESSON, Proc. Acad. Sci. St. Louis, 1878, p. 377.

*Type*.—Cat. No. 1539, Acad. Nat. Sci. Philadelphia.

This species which is known only from the type material is very close to *vancouverensis* (Provancher) and the latter may only be a color form. The following notes were made from the type by R. A. Cushman:

*Female*.—"Length 12 mm., ovipositor 10.5 mm. Black, with clypeus, mandibles (except at base and tip), palpi, scape and pedicel beneath, mesonotum, scutellum, meso- and meta-pleura red; tegulae, line in front and antero-ventral margin of pronotum yellowish; front and middle legs yellowish, middle tarsi fuscous; hind legs some-

what darker, their trochanters above infuscated and tibiae and tarsi black.

"Eyes converging toward the clypeus, face clypeus and mandibles clothed with dense yellowish pubescence, longer on clypeus and mandibles; antennae (broken) with flagellar joints 1-4 subequal in length, those beyond decreasing gradually in length; pronotum laterally smooth and shining, minutely aciculate posteriorly and dorsally; rest of thorax clothed with very short, dense, appressed, yellowish pubescence, minutely punctate, stronger on metapleura and propodeum, the latter with a median furrow and slightly angulate laterally; wings hyaline with yellow stain, veins, brown, whitish at base; abdomen minutely granularly punctured, and with dense, minute pubescence; first tergite a little more than three times as long as wide, its spiracles prominent."

Vancouver's Island.

**POEMENIA VANCOUVERENSIS (Provancher).**

*Euzorides vancouverensis* PROVANCHER, Addit. faun. Can. Hym., 1883, p. 369.

*Ephialtes vancouverensis* HARRINGTON, Can. Ent., vol. 26, 1894, p. 249.

Type of Provancher's species is in the second Provancher collection at the Public Museum of Quebec and bears yellow label 1556. The type of Harrington's species in the Harrington collection. Both types examined.

This species has the heavily chitinized part of the first sternite terminating at about the middle, and in some of the specimens examined has the thorax almost entirely black. It is probably only a dark form of *thoracicus* Cresson and has been fairly well characterized by its two describers.

Vancouver's Island (type-locality); West Cliff (T. D. A. Cockerell), El Paso County (A. B. Champlain), Colorado; Departure Bay, British Columbia (E. M. Walker).

*Host.*—*Leptura* species in *Pinus ponderosa* (A. B. Champlain).

**POEMENIA ALBIPES (Cresson).**

*Ephialtes albipes* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 143.

*Type.*—Cat. No. 1538, Acad. Nat. Sci. Philadelphia.

The following is R. A. Cushman's redescription of the female type:

*Female.*—"Length 9 mm., ovipositor 3.5 mm. Black, with tegulae, scape, pedicel and first flagellar joint beneath, anteroventral margin of pronotum, palpi, four anterior legs (except middle tarsi, which are blackish) yellowish white; hind legs testaceous, their trochanters infuscated above, and their tibiae and tarsi black except narrow pale areas basally; mandible and apex of clypeus red; eyes converging toward the clypeus; face, clypeus, and mandibles clothed with dense, golden pubescence; pronotum smooth laterally, minutely aciculate posteriorly and dorsally; rest of thorax finely, granularly punctured

(somewhat coarser on metapleura and propodeum) and clothed with dense, minute pubescence; wings hyaline, iridescent; propodeum with median furrow and slightly angulate laterally; abdomen very slender the first tergite more than three times as long as wide, its spiracles subprominent; abdomen granularly punctured and finely pubescent."

Heavily chitinized part of first sternite fully two-thirds as long as the first tergite.

Canada; New Jersey (Cresson); Great Falls, Virginia; Oswego, New York; and a specimen which is probably the same species from Collins, Idaho (C. V. Piper).

**POEMENIA AMERICANA (Cresson).**

*Euzorides americana* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 167.

*Type*.—Cat. No. 1517, Acad. Nat. Sci. Philadelphia. Notes taken from type and specimens listed below.

The short ovipositor makes this species easily recognized. The heavily chitinized part of the first sternite about half as long as the first tergite.

Texas; Connecticut; Pennsylvania (Cresson); Morgantown, West Virginia (A. D. Hopkins); Colorado (Baker); Del Norte, California (P. D. Sergeant); Ashland, Oregon (J. M. Miller).

*Host*.—*Paratimia conicola* and *Laspeyresia toreuta*. This last record may be an error and *Paratimia* have been the host. From rearing by Branch of Forest Insects, Bureau of Entomology.

**Tribe ODONTOMERINI Cushman and Rohwer.**

*Odontomerini* CUSHMAN and ROHWER, Proc. U. S. Nat. Mus., vol. 57, 1920, p. 396.

The two genera belonging to the tribe Odontomerini have heretofore been assigned to the tribe Xoridini, and although they are undoubtedly allied to this group through *Xorides*, they can easily be distinguished from it by the apically bidentate mandibles. The Odontomerini not only show affinity to the Xoridini, but they have considerable in common with the Acoenitini and are allied to this group through *Arotus*.

The hosts of the Odontomerini, as far as known, are the larvae of wood-boring Coleoptera, most of which belong to the families Cerambycidae and Buprestidae. Although many of the species are well represented in the National Collection, it seems likely that we have only a meager knowledge of the group as it really exists and that further collecting and rearing will bring to light undescribed species, and will materially increase our knowledge of the habits of the species.

*Tribal characters*.—Head cubical, swollen below the antennae eyes small and placed well forward; posterior orbits wider than or subequal with the diameter of the eye; head not narrowed behind;

malar furrow obsolete; malar space long; clypeus transverse; thorax depressed; prescutum completely defined; the propodeum long and truncate apically, in lateral view rectangular in outline, the spiracle elongate, slightly basad of middle; areolet wanting; legs very stout; abdomen more or less compressed apically; hypopygidium not prominent; ovipositor long, well exerted.

Some authors have considered that the areolation of the propodeum was a generic character, but examination of the species of *Aplomerus* and *Odontomerus* shows that the carinae which define the middle area may become obliterated, and the author does not consider that this character should be used for generic purposes. The two genera here recognized are readily separated by the following table.

TABLE TO THE GENERA.

- |  |                                 |
|--|---------------------------------|
| 1. First tergite sub-petiolate, the spiracle far removed from the base; hind femur armed with a tooth beneath..... | <i>Odontomerus</i> Gravenhorst. |
| First tergite sessile, the spiracle very close to the base; hind femur not dentate.                                | <i>Aplomerus</i> Provancher.    |

#### Genus *APLOMERUS* Provancher.

*Platysoma* PROVANCHER, Can. Ent., vol. 17, 1885, p. 115 (not Latreille).

*Aplomerus* PROVANCHER, Addit. faun. Can. Hym., 1886, p. 119.

*Anodontomerus* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 61. *Genotype*.—*Platysoma tibialis* Provancher. (For all names.)

Ashmead, under the assumption that *Aplomera* Macquart preoccupied *Aplomerus* Provancher, proposed the name *Anodontomerus* for Provancher's genus. Inasmuch as the spelling is different and the International Commission on Zoological Nomenclature permits the retention of names when the spelling is as different as the two cited above, the name *Aplomerus* is used instead of Ashmead's substitute.

The genus *Aplomerus* is closely related to *Odontomerus* and agrees with it in habitus, but may be readily separated by the characters given in the above table.

From its affinities and structure the species are no doubt all parasitic on wood-boring Coleoptera.

*Generic characters*.—Antennae almost as long as the body; greatest width of the posterior orbits greater than or subequal with the length of the eye; clypeus narrow, limited above by the weak supraclypeal suture, not depressed apically; thorax depressed; propodeum longer than the scutum, truncate posteriorly, the lateral dorsal angles prominent but not toothed, completely or nearly completely areolated or with the two median carinae obliterated; hind coxae rather short; femora swollen, not toothed; tibiae incrassate, the middle pair twisted; claws simple; venation about as in *Odontomerus*; abdomen sessile; the first tergite without prominent carinae, its spiracles



placed close to the base, that is, about one-fourth the length of the tergite; ovipositor usually as long as the body.

For the only species known the sculpture of the head, thorax, and abdomen offer the specific characters.

TABLE TO THE SPECIES.

This table is based on females only.

1. Median carinae of propodeum obliterated; base of second tergite sparsely punctured.....*buprestivorus* Rohwer.  
Median carinae of propodeum well developed; base of second tergite striate.....2.
2. Vertex and posterior orbits with large, distinct, separate punctures; second tergite with fine striae which cover about one-fifth of the segment, the rest of the tergite polished; third and following tergites without sculpture; ovipositor longer than the body.....*tibialis* (Provancher).  
Vertex and posterior orbits practically impunctate; second tergite nearly completely striate; third and fourth tergites finely transversely aciculate; ovipositor as long as the body.....*foutsii* Rohwer.

APLOMERUS BUPRESTIVORUS, new species.

This species differs from the others assigned to the genus in having the median carinae of the propodeum obliterated and in this character does not agree with the genus as defined by Ashmead. It also differs from the others in the sculpture of the abdomen and nonfoveolate notauli.

*Female*.—Length 10 mm.; length of the ovipositor 8 mm. Anterior margin of the clypeus triangular in outline; middle of the face closely punctured, the sides shining with a few separated punctures; front, vertex, and orbits shining and with a few scattered punctures; a U-shaped fovea in front of the anterior ocellus; the dorsal aspect of pronotum irregularly striato-punctate; scutum and prescutum polished with a few scattered punctures; posterior part of prescutum irregularly striate; notauli not foveolate; suture in front of the scutellum foveolate; scutellum polished, with a few scattered punctures; propodeum irregularly rugoso-punctate; transverse apical carina strong; first tergite striato-punctate basally, the extreme apex without sculpture; basal middle of the second tergite with separate, poorly defined punctures, the remaining part of the second and all of the remaining tergite, polished. Black; legs below coxae (except that the femora are brownish) and abdomen beyond the first tergite rufous, wings brownish; venation dark brown; nervulus slightly antefurcal.

In the paratype the second and third tergites are brownish and the femora nearly black; antennae slightly longer than the abdomen.

*Type locality*.—Ashland, Oregon. Described from two females recorded under Bureau of Entomology number Hopk. U. S. 12020h. Material collected by G. Hofer as cocoons in larval galleries of some Buprestid in Mountain Mahogany (*Cercocarpus parvifolius*) and reared at Falls Church, Virginia, by Wm. Middleton.

*Type*.—Cat. No. 20914, U.S.N.M.

## APLOMERUS FOUTSI, new species.

This species is closely allied to *tibialis* Provancher but may be separated from it by the characters used in the foregoing table.

*Female*.—Length of body 10 mm.; length of ovipositor 10 mm. Face coarsely punctured, in the middle the punctures are sometimes confluent; front, vertex, and posterior orbits highly polished with a few scattered, poorly defined punctures; top and sides of pronotum striato-punctate; scutum, prescutum, scutellum, and mesepisternum polished with only a few scattered punctures; notauli completely foveolate; propodeum irregularly wrinkled, the usual carinae distinct but not prominent, basal area and the areola confluent; first and second tergites finely longitudinally striate, in the middle of the second tergite the striae curve so at the extreme apical middle they are transverse; the third and fourth tergites transversely aciculate. Black; palpi pale yellowish; legs except yellowish spot at the base to the four anterior tibiae rufous; first, second, and base of the third abdominal segments rufous; wings hyaline, faintly dusky, venation dark brown; nervulus antefurcal by one-fifth its length.

*Type locality*.—Cabin John, Maryland. One female collected by R. M. Fouts, for whom the species is named. One female paratype from Onaga, Kansas, Crevecoeur.

*Type*.—Cat. No. 20910, U.S.N.M.

## APLOMERUS TIBIALIS (Provancher).

*Platysoma tibialis* PROVANCHER, Can. Ent., vol. 17, 1885, p. 115.

*Aplomerus tibialis* PROVANCHER, Addit. faun. Can. Hym., 1886, p. 120.—DAVIS, Proc. Acad. Sci. Phila. 1894, p. 190.

*Type*.—Entomological Branch, Department of Agriculture, Ottawa, Canada. A single female in good condition except the left antenna is wanting beyond the fifth joint. The notes on this species were taken from the unique type.

Notauli foveolated, body 10 mm. long; ovipositor 13 mm. long. Vancouver Island.

## (APLOMERUS) XORIDES NASONII Davis.

*Aplomerus nasonii* DAVIS, Trans. Amer. Ent. Soc., vol. 22, 1895, p. 32.

*Type*.—In the collection of Academy of Natural Science, Philadelphia.

This is the male of *Xorides calidus* (Provancher), see page 438.

## Genus ODONTOMERUS Gravenhorst.

*Odontomerus* Gravenhorst, Ichneumon. Eur., vol. 3, 1829, p. 851. *Genotype*.—*Ichneumon dentipes* Gmelin.

The genus *Odontomerus* has been correctly recognized in America for many years. In 1870 Cresson tabulated the North American

species describing a few new species. Since then Provancher has described one new species and Rohwer has described five. As far as known all of the species are parasitic on wood-boring Coleoptera.

The genus is easily recognized by the dentate hind femora; all of the North American species are shining, with but little or no sculpture; the thorax is depressed, the notauli complete; antennae longer than the body; the apical part of the clypeus depressed forming a more or less distinct mouth opening; propodeum usually longer than scutum, always more or less areolated; in only one of the species the median carinae are wanting and the dorsal lateral angles but feebly toothed; propodeal spiracle elongate, well removed from the base; abdomen subpetiolate; ovipositor as long as or longer than the body; nervellus reclivous, broken at or below the middle; claws simple; middle tibiae, of female, twisted.

For the larger groups the best specific characters are to be found in the color; the areolation of the propodeum is subject to considerable variation and can not be considered as a specific character; in some of the species the costulae join the median carinae before their middle, while in others they unite with the median carinae behind the middle there is so much variation that this could not be used as a specific character; the position of the nervulus varies from antefurcal to postfurcal even within a species; the point of fracture of the nervellus is subject to some variation but is fairly constant within a species.

TABLE TO THE SPECIES.

1. Abdomen red.....	2.
Abdomen black.....	6.
2. Legs entirely black.....	<i>atripes</i> Rohwer.
Legs mostly red.....	3.
3. Coxae and trochanters black.....	<i>abdominalis</i> Cresson.
Coxae and trochanters rufous.....	4.
4. Sides of the propodeum coarsely punctured; notauli strongly foveolate; base of second and third tergites transversely aciculate; median area of the propodeum not strongly angled and at least four times as long as basal width; propodeal tooth below the dorsal lateral angle.....	<i>bicolor</i> Cresson.
Sides of the propodeum finely punctured; notauli not or but very sparsely aciculate; median area of the propodeum sharply angulate and about three times as long as basal width; propodeal tooth on dorsal lateral angle.....	5.
5. Basal area almost completely closed posteriorly; posterior lateral face of scutellum and the depression of the metanotum without rugae; second recurrent more than the length of the intercubitus from the intercubitus.....	<i>strangalrae</i> Rohwer.
Basal area indicated but not closed posteriorly; posterior lateral face of scutellum and depression of metanotum with rugae; the second recurrent the length of the intercubitus from the intercubitus.....	<i>dichrous</i> Rohwer.
6. Legs entirely black.....	7.
At least four anterior legs pale.....	8.
7. Male with the second and third tergites rather densely punctured; female stout; ovipositor longer than the body.....	<i>aethiops</i> Cresson.
Second and following tergites nearly impunctate.....	<i>atripes</i> Rohwer male.

8. Median carinae of the propodeum obliterated; angles of the propodeum prominent but hardly toothed; legs red..... *alaskensis* Rohwer.  
 Median carinae of propodeum well developed; angles of propodeum toothed. 9.
9. Females..... 10.  
 Males..... 11.
10. Facial quadrangle (area between the eyes) with its width greater than or subequal with its length; ovipositor subequal with the length of the body; first tergite short and broader, seen from the side evenly arched and without a carina from the spiracle to the apex; postocellar line much shorter than ocellular line.  
*mellipes* (Say).  
 Facial quadrangle with its length greater than its width; ovipositor distinctly longer than the body; first tergite lengthened, the chitinized part of the sternite extending well beyond the spiracle, and as seen from the side somewhat flattened with a complete or interrupted carina from the spiracle to apex.  
*canadensis* Provancher.
11. Hind legs black..... *vicinus* Cresson.  
 At least the hind femora rufous..... 12.
12. Facial quadrangle with its width and length subequal or with the width greater; hind tibiae rufous..... *mellipes* (Say).  
 Facial quadrangle longer than wide; hind tibiae usually black.  
*canadensis* Provancher.

**ODONTOMERUS ATRIPES** Rohwer.

*Odontomerus atripes* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 358.

*Type*.—Cat. No. 15372, U.S.N.M.

This species is known only from the type material.

Franconia, New Hampshire; Princeton, Maine.

**ODONTOMERUS ABDOMINALIS** Cresson.

*Odontomerus abdominalis* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 289.

*Type*.—Cat. No. 1527, Acad. Nat. Sci. Philadelphia.

This species is known only from the type material and the following notes are taken from the type.

Basal area and areola confluent; if the basal area were defined where it becomes confluent with the areola it would be twice as wide anteriorly as posteriorly; areola hexagonal, the posterior end straight; angles of the propodeum not sharply toothed; first tergite with sparse punctures; the following segments nearly impunctate; notauli not foveolate; nervellus broken below the middle.

Colorado.

**ODONTOMERUS BICOLOR** Cresson.

*Odontomerus bicolor* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 169.

*Type*.—Cat. No. 1526, Acad. Nat. Sci. Philadelphia.

The characters given in the above table sufficiently distinguish this species from its allies. Besides the type material, two females from Call, Texas, reared from the bark of pine by W. F. Fiske, have been examined.

Canada; Pennsylvania (Cresson); Texas.



## ODONTOMERUS STRANGALIAE Rohwer.

*Odontomerus strangaliae* ROHWER, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 158.

*Type*.—Cat. No. 18999, U.S.N.M.

Besides the type material this species is represented in the Museum by material from Montgomery County, Pennsylvania, and from Oswego, New York, from Rosslyn (H. H. Smith) and Falls Church (T. E. Snyder and Wm. Middleton) Virginia. Specimens collected at East Falls Church, Virginia, by Nathan Banks have also been examined.

*Host*.—*Strangalia luteicornis*.

## ODONTOMERUS DICHROUS Rohwer.

*Odontomerus dichrous* ROHWER, Proc. U. N. Nat. Mus., vol. 45, 1913, p. 361.

*Type*.—Cat. No. 15375, U.S.N.M.

Besides the single type two females from Idaho have been examined. One was collected by R. W. Doane, the other, from Moscow, by C. V. Piper.

Washington, Idaho.

## ODONTOMERUS AETHIOPS Cresson.

*Odontomerus aethiops* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 289.

*Type*.—Cat. No. 1524, Acad. Nat. Sci. Philadelphia.

This species is easily recognized by its color; the female is short, stout, and has the propodeum shorter than mesoscutum; first tergite short, shaped much as it is in *mellipes* but there is a carina from the spiracle to the apex. Besides the type material a single female from Myer, California, reared by F. B. Herbert from a Cerambycid in lodge-pole pine (*Pinus murrayana*) has been examined. Professor Cockerell tells me he has collected a female of this species in Peaceful Valley, Boulder County, Colorado, August 26, 1918.

Colorado, California.

## ODONTOMERUS ALASKENSIS Rohwer.

*Odontomerus alaskensis* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 360.

*Type*.—Cat. No. 15373, U.S.N.M.

This species differs from all other American species of the genus by the obliterated median carinae of the propodeum. It is known only from the type material.

Sitka, Alaska.

## ODONTOMERUS VICINUS Cresson.

*Odontomerus vicinus* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 168.

*Type*.—Cat. No. 1525, Acad. Nat. Sci. Philadelphia.

This male may prove to be the opposite sex of one of the females which has a red abdomen, possibly *strangaliae*. Areola with a few transverse carinae; posterior lateral angle of the propodeum not

sharply toothed. Besides the type a specimen from the eastern United States, compared with the type, has been examined.

Massachusetts.

ODONTOMERUS MELLIPES (Say).

*Anomalon mellipes* SAY, Contrib. Maclur. Lyc. Phila., vol. 2, 1828, p. 75.—LECONTE, ed. of Say, vol. 1, p. 378.

*Odontomerus mellipes* Say, CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 168.

*Odontomerus errans* ROHWER, Proc. U. S. Nat. Mus., vol. 45, 1913, p. 360.

Say's type has been lost, but a neotype, designated by Rohwer (from Pennsylvania) which agrees with Say's description in all ways, is in the United States National Museum. The type of *errans* is Cat. No. 15374, U.S.N.M.

This species has an extremely characteristic habitus. It can be readily distinguished from *canadensis*, its nearest ally, by the characters mentioned in the foregoing table. *O. errans* Rohwer was separated in the original description by having the basal area and the areola separated by a transverse carina, but this character is subject to such variation that the species must be considered as a synonym of *mellipes* Say.

Pennsylvania; Flatbush, Long Island, New York; Washington, District of Columbia; South Dakota; French Creek, West Virginia (F. E. Brooks); Toronto, Canada (E. M. Walker); Priest River Lake, Idaho (Hopkins); Indiana (Say).

*Host*.—Reared from larvae of *Parandra brunnea* by F. E. Brooks.

ODONTOMERUS CANADENSIS Provancher.

*Odontomerus canadensis* PROVANCHER, Nat. Can., vol. 11, 1877, p. 102; Faun. Ent. Can., 1883, p. 490.

*Type*.—Female with label in the 1877 Provancher collection; and type, male, with name label and yellow label 426 in the second Provancher collection, Public Museum, Quebec.

As at present defined this species varies considerably; the females vary from 8 to 15 mm., and the length of the ovipositor from one-fourth to one-third longer than the abdomen, depending on the size of the specimen. Hind tibiae in the female vary from piceous black as in the type to rufous with some black at the ends to entirely rufous; in the male the hind tibiae are usually black but often are black with a rufous line beneath, while in occasional specimens they are almost entirely rufous; the areolation of the propodeum is also subject to considerable variation, especially the distance between the median carinae and the place where they are intersected by the costulae. Provancher and Cresson both separated this species from *mellipes* by the color of the tibiae, but inasmuch as this character is not specific they had specimens of *canadensis* labelled as *mellipes*. The species is closely allied to *mellipes* and can only be separated by the characters made use of in the foregoing table.

*Host.*—*Dicerca divaricata* Say; *Dicerca*, species in *Alnus*; *Leptura*, either *rubrica* or *vagans*; *Serropalpus*, species in fir. All these records

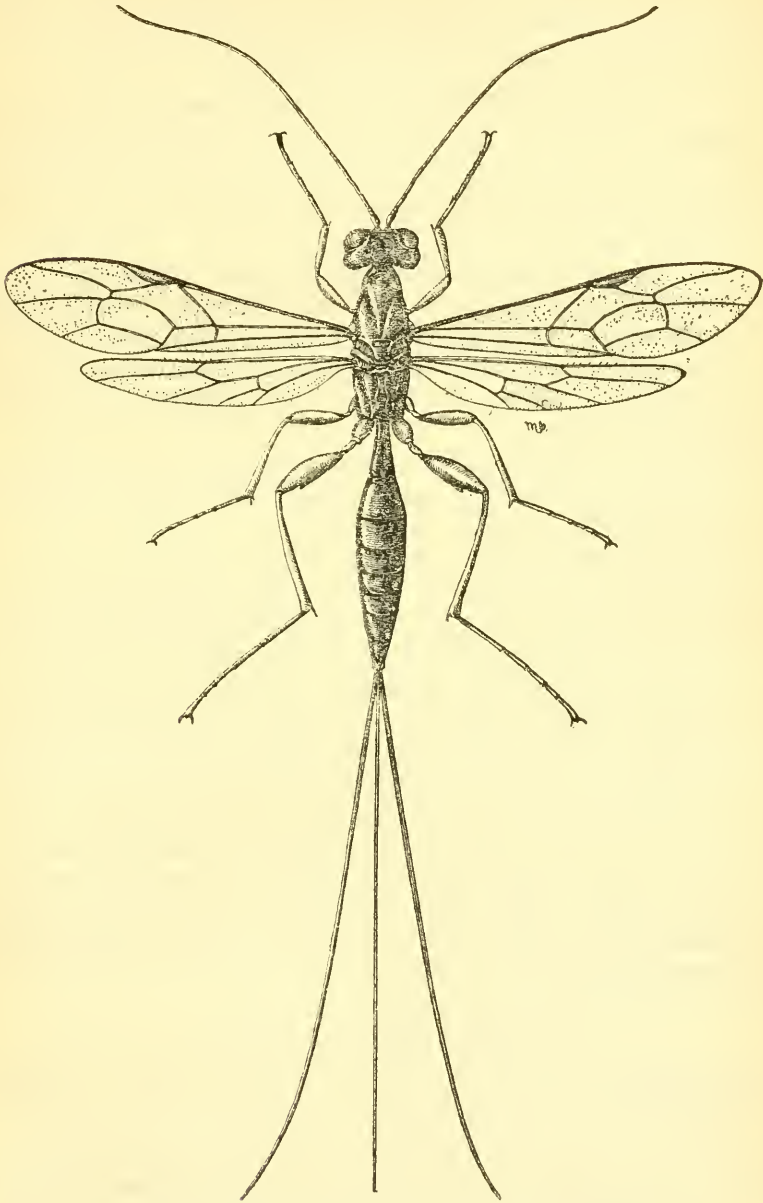


FIG. 12.—FEMALE OF ODONTOMERUS CANADENSIS PROVANCHER.

from the unpublished notes of the Branch of Forest Insects, Bureau of Entomology.

Canada, Vancouver Island; Northeast Pennsylvania (Cushman); Dixie Landing, Great Falls (Kirk), Hunter (Rohwer and Cushman), Rosslyn, Dead Run, (Shannon) Virginia; Pisgah (Fiske), Tryon (Fiske), North Carolina; Cromwell and Collins, Idaho (C. V. Piper); Oregon (Koebele); Austin, Oregon (Craighead).

Tribe **PHYTODIETINI** Cushman and Rohwer.

*Phytodietini* CUSHMAN and ROHWER, Proc. U. S. Nat. Mus., vol. 57, 1920, p. 393.

Although the various species of the only genus of this tribe have been placed in different subfamilies by their describers, the genus has not been considered of tribal importance.

Gravenhorst allied the species of *Phytodietus* to members of the subfamily Cryptinae and there are certain characters which suggest such a relationship. The males, however, resemble closely some of the Tryphoninae, and it is not unlikely that future arrangements will place the Phytodietini close to some of the groups formed out of that heterogeneous complex.

As far as known all of the species belonging to the genus *Phytodietus* are parasitic on Lepidoptera; however but little is known concerning the condition of the host when attacked.

*Tribal characters.*—Comparatively small species with a smooth integument; head transverse, the temples much narrower than cephalo-candad diameter of the eye; clypeus not sharply defined dorsally, convex, the apical portion not depressed; mandibles with two apical teeth; antennae long, slender, thorax short; scutum not quite as long as rest of middle part of body; mesepisternum much higher than long (cephalo-candad), the prepectal carina distinct, terminating about half way up on the mesepisternum and well behind its anterior margin; propodeum without carinae, the spiracles oval and well removed from the base; abdomen sessile, slightly compressed apically; hypopygidium not reaching apex of abdomen; ovipositor prominent, spear-like apically; sheath hairy; legs slender with long calcaria; claws rather short, curved and with about six long teeth; areolet rather small, triangular in outline.

Only one genus occurs in our fauna.

Genus **PHYTODIETUS** Gravenhorst.

*Phytodietus* GRAVENHORST, Ich. Eur., vol. 2, 1829, p. 928. *Genotype.*—*Phytodietus astutus* Gravenhorst (Westwood, 1840).

*Generic characters.*—Those to the tribe. Notauli present anteriorly as the scutum is trilobed cephalad; nervulus interstitial or nearly; nervellus perpendicular or slightly reclivous and broken below middle; third antennal joint longer than following joint; discocubitus strongly bent, but not angulate or with a ramulus.

The American species of *Phytodietus* are closely allied and, other than the structural characters offered in the following key, no charac-



ters other than color were observed. The small amount of material makes it difficult to determine just how variable the color is, and the following key, although it serves to distinguish the material at hand, is not entirely satisfactory. In the only case where a series reared from the same host is available, there is very little variation in color, thus suggesting that there are many incipient species in the genus. On the other hand, however, larger collections and more rearings may prove that too many species are now recognized.

## TABLE TO SPECIES.

- |  |                                |
|--|--------------------------------|
| 1. Hind coxae black.....   | <i>clypearius</i> Ashmead.     |
| Hind coxae rufous or yellow with a line above.....   | 2.                             |
| 2. Males.....  | 3.                             |
| Females.....   | 7.                             |
| 3. Hind coxa yellow with a black spot posteriorly; flagellum testaceous; thorax with abundant yellow marks.....  | <i>pulcherrimus</i> (Cresson). |
| Hind coxa rufous; flagellum black or piceous, throacic markings whitish.....   | 4.                             |
| 4. A distinct yellow spot posterior to origin of hind wing.....  | <i>burgessi</i> (Cresson).     |
| No yellow spot posterior to origin of hind wing.....   | 5.                             |
| 5. Propodeum entirely black; hind femora not black basally.....  | <i>pleuralis</i> Cresson.      |
| Propodeum with yellow marks posteriorly.....   | 6.                             |
| 6. Sides of propodeum black; a black band at base of hind femur; second and third tergites subequal.....   | <i>annulatus</i> (Provancher). |
| Sides of propodeum rufous; hind femur without a black band basally; third tergite shorter than second.....   | <i>vulgaris</i> Cresson.       |
| 7. Inner orbits lined with yellow; if line is interrupted, the hind femur is entirely rufous.....  | 8.                             |
| Inner orbits black or with a small yellow spot dorsally; hind femur with a black preapical band.....   | 9.                             |
| 8. Hind femur with a black preapical band followed by an apical band of yellow; sides and lower part of thorax rufous.....                             | <i>facialis</i> Rohwer.        |
| Hind femur uniformly rufo-ferruginous; sides of thorax mostly black.   | <i>distinctus</i> Cresson.     |
| 9. Anterior basitarsi half or slightly more than half as long as their tibiae; small species.....  | 10.                            |
| Anterior basitarsi fully two-thirds as long as their tibiae.....   | 12.                            |
| 10. Clypeus black; inner margins of eyes not converging below; propodeum with a longitudinal depression dorsally.....                                  | <i>parvus</i> Rohwer.          |
| Clypeus yellow; inner margins of eyes slightly converging below; propodeum without a dorsal longitudinal depression.....                               | 11.                            |
| 11. Second and third tergites subequal in length; band on tergites 1 to 4 reduced to testaceous lines; mesosternum and lower part of episternum black. | <i>californicus</i> Cresson.   |
| Third tergite distinctly shorter than the second; bands on tergites distinct, yellow; mesosternum and lower part of mesepisternum reddish.....         | <i>pleuralis</i> Cresson.      |
| 12. Mesepisternum with a broad yellow line below.....  | <i>plesia</i> Rohwer.          |
| Mesepisternum below, the sternum and sides of propodeum rufous.  | <i>burgessii</i> (Cresson).    |
| Mesepisternum (except a small spot posteriorly) and sternum black.....   | 13.                            |
| 13. Species slender; second and third tergites of subequal length.   | <i>annulatus</i> (Provancher). |
| Species robust; third tergite distinctly shorter than the second.....  | <i>vulgaris</i> Cresson.       |

## PHYTODIETUS CLYPEARIUS Ashmead.

*Phytodietus clypearius* ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 195.

*Phytodietus flavifrons* ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 196.

*Type of clypearius*.—Cat. No. 5612, U.S.N.M., one female in good condition and one female with abdomen wanting, labeled as allotype male. *Type of flavifrons*.—Cat. No. 5613, U.S.N.M., one male in good condition.

There can be but little reason to doubt that *flavifrons* is the male of *clypearius* and that the specimen with the abdomen wanting, considered by Ashmead as the male of *clypearius* is a female. The color and general appearance of this specimen is that of a female and not a male.

The black hind coxae readily distinguish this species from all the other North American forms. Known only from the type material which was collected by T. Kincaid at Yakutat and Orca, Alaska.

## PHYTODIETUS PULCHERRIMUS (Cresson).

*Mesoleptus pulcherrimus* CRESSON, Trans. Amer. Ent. Soc., vol. 2, 1868, p. 101.

*Phytodietus pulcherrimus* PROVANCHER, Natural. Canad., vol. 12, 1880, p. 81.

*Ctenopelma pulchra* ASHMEAD, Trans. Amer. Ent. Soc., vol. 22, 1896, p. 198.

*Phytodietus pulchra* DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 340.

*Type of pulcherrimus*.—Cat. No. 1509, Acad. Nat. Sci., Philadelphia. *Type of pulchra*.—Cat. No. 22161, U.S.N.M.

This distinct species is known only in the male, but it does not seem likely that it can be the male of any of the species treated in this paper. Cresson's type came from Connecticut, Ashmead's from Massachusetts, and there are in the National collection two specimens from Vienna, Virginia, collected June 4, 1913, by R. A. Cushman.

## PHYTODIETUS FACIALIS, new species.

The abundant markings distinguish this species from all other North American forms, but suggest that it is more closely allied to *distinctus* Cresson, from which it may be readily separated by the black band on the hind femur.

*Female*.—Length, 7 mm.; length of ovipositor, 2.5 mm. Inner margins of the eyes parallel; clypeus polished, postocellar line distinctly longer than the ocellular line; ocelli not especially prominent; anterior basitarsi fully two-thirds as long as their tibiae; longer calcarium of hind tibia more than half as long as hind basitarsus; areolet petiolate; first tergite rather short; third tergite distinctly shorter than the second. Black, with luteous and red markings; head black, mandibles (except apices), two spots on clypeus, face, except just above clypeus and a W-shaped mark dorsally, inner orbits to vertex and cheeks luteous; antennae black, the three basal joints beneath luteous, flagellum apically beneath brownish; thorax

black, cuneiform spots on scutum anteriorly, tegulae, a spot before and below, dorsal and ventral margins of pronotum, wedge-shaped spot on scutum posteriorly, sides and apex of scutellum, metascutellum, two spots on metanotum behind origin of hind wings, U-shaped spot on propodeum posteriorly and prepectus luteous; sternum, sides of mesepisternum below, and sides of propodeum reddish; abdomen black, complete apical margins of tergites, and all sternites except the first basally, luteous; legs reddish, apices of intermediate tibiae and their tarsi, a preapical band on hind femur (followed by a luteous apical band), hind tibiae, except luteous basal and median annuli, and hind tarsi, except most of basitarsi, which are luteous, blackish; wings hyaline, iridescent, venation dark brown, stigma pale brown.

*Type locality*.—Louisiana. Described from one female.

*Type*.—Cat. No. 22162, U.S.N.M.

#### PHYTODIETUS DISTINCTUS Cresson.

*Phytodietus distinctus* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 166.

*Phytodietus zonatus* PROVANCHER, Natural. Canad., vol. 6, 1874, p. 79.

*Mesostenus nobilis* PROVANCHER, Natural. Canad., vol. 13, 1882, p. 363.

*Mesoleius telarius* PROVANCHER, Addit. fauna Canad. Hym., 1886, p. 106.

*Phytodietus nobilis* DAVIS, Proc. Acad. Nat. Sci. Phila., 1894, p. 187.

*Phytodietus telarius* DAVIS, Proc. Acad. Nat. Sci. Phila., 1894, p. 189.

*Type of distinctus*.—Cat. No. 1507, Acad. Nat. Sci. Phila. *Type of zonatus*.—Yellow label 514 first Provancher collection, of *nobilis* yellow label 1049 second Provancher collection, of *telarius* yellow label 1241 second Provancher collection, Public Museum, Quebec.

This species is recorded from Cap Rouge and Becancour, Canada, by Provancher and from Massachusetts and Delaware by Cresson. Other than the various types no specimens have been examined.

#### PHYTODIETUS PARVUS, new species.

This species is closely allied to *californicus* Cresson and *pleuralis* Cresson, but can be distinguished by the characters used in the above key.

*Female*.—Length, 4 mm.; length of ovipositor 1.25 mm. Clypeus shining, with sparse punctures; face more distinctly sculptured medially; inner margins of eyes parallel or slightly nearer together opposite bases of antennae; ocelli prominent; postocellar line but little longer than the ocellocular line; anterior basitarsi but little more than half as long as their tibiae; longer calcaria of hind tibiae about two-thirds as long as their basitarsi; areolet shortly petiolate; first tergite short; second and third tergites subequal in length. Black; palpi, mandibles (except apices), a small spot on inner superior orbits, elongate spots on anterior margin of scutum, tegulae, a spot before, apex of scutellum and two small basal spots, metascutellum,

narrow apical margins of tergites (interrupted laterally on basal ones), and most of the sternites luteous; spot on mesepisternum posteriorly and side of propodeum rufous; legs rufous, anterior coxae and trochanters, intermediate and posterior trochanters, base and most of exterior surface of hind tibiae and base of two basal joints of hind tarsi luteous; remaining parts of hind tibiae and tarsi dusky; apices of hind femora above brownish; wings hyaline, slightly dusky; venation, including stigma, dark brown.

*Type locality*.—Siskiyou County, California. Described from one female.

*Type*.—Cat. No. 22163, U.S.N.M.

**PHYTODIETUS CALIFORNICUS** Cresson.

*Phytodietus californicus* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 380.

*Type*.—Cat. No. 1512, Acad. Nat. Sci. Philadelphia.

Inner margins of eyes slightly converging toward the clypeus; anterior basitarsi but little more than half as long as their tibiae; longer calcarium of hind tibia about two-thirds as long as the hind basitarsus, second and third tergites subequal in length.

This species is known only from the type which came from California, and one female collected at Easton, Washington, by A. Koebele.

**PHYTODIETUS PLEURALIS** Cresson.

*Phytodietus pleuralis* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 266.

*Type*.—Cat. No. 1510, Acad. Nat. Sci. Philadelphia.

*Female*.—Length, 4.5 mm.; length of ovipositor, 1.75 mm. Inner margins of eyes slightly converging to clypeus; postocellar line slightly longer than ocellocular line; anterior basitarsi a little more than half as long as their tibiae; longer calcarium of hind tibia but little more than half as long as its basitarsus; first tergite short; third tergite distinctly shorter than the second. Black; palpi, mandibles, clypeus, small spot on inner superior orbits, small spots on anterior margin of scutum, apex of scutellum, tegulae, a spot before, narrow line on metanotum, narrow apical margins of tergites and sternites broadly, luteous; sternum, lower part of mesepisternum and sides of propodeum ferruginous; apex of hind femora above, base and apex of hind tibiae and apex of hind tarsi brownish; trochanters and base of hind tarsi whitish; wings hyaline; venation dark brown.

This species is known only from the type male which came from Colorado and the single female, also from Colorado, described above.

Riley and Howard,<sup>1</sup> record *Eudemis botrana* as the host of this species but the specimen on which this record is based was erroneously determined. The record should refer to *P. burgessii* Cresson, given below.

<sup>1</sup>Ins. Life, vol. 3, 1891, p. 464.



## PHYTODIETUS BURGESSII (Cresson).

*Tryphon burgessii* CRESSON, Trans. Amer. Ent. Soc., vol. 2, 1868, p. 105.

*Phytodietus ? burgessii* DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 347.

*Type*.—Cat. No. 1508, Acad. Nat. Sci. Philadelphia.

*Female*.—Length, about 7 mm.; ovipositor about 3.5 mm. Slender; inner margins of the eyes parallel; ocelli prominent; postocellar line about one-fourth longer than ocellocular line; anterior basitarsi fully two-thirds as long as their tibiae; second and third tergites subequal in length; longer calcarium of hind tibia about half as long as hind basitarsus; ovipositor somewhat shorter than abdomen. Black; palpi, mandibles, elongate spots on inner superior orbits, cuneiform spots on anterior margin of scutum, tegulae, spot before, sides and apex of scutellum, metascutellum, spot on metanotum behind posterior wing, U-shaped spot on posterior face of propodeum, apical margins of tergites and sternites broadly luteous; sternum, lower part of mesepisternum and sides of propodeum rufous; legs rufous; anterior coxae four anterior trochanters, apical joint of posterior trochanters, apex of posterior femora, base and exterior part of posterior tibiae and basal part of two basal joints of hind tarsi whitish; basal joint of hind trochanters, basal and preapical band on hind femur and most of hind tarsus blackish; wings hyaline; venation pale brown.

*Male*.—In the male the rufous color of the thorax and anterior legs is largely replaced by yellowish; the face, inner orbits, cheeks, scape and pedicellum beneath and ventral margin of pronotum are luteous.

This species was originally described from a single male collected in Massachusetts. Specimens in the National Collection came from the following localities: "Canada," "New York," "Pennsylvania," Charter Oak, Pennsylvania (W. S. Fisher); Montclair, New Jersey (W. D. Kearfott); Washington, District of Columbia; Trout Lake, Wisconsin (J. J. Davis); and Texas (Belfrage).

*Hosts*.—*Polychrosis liriiodendrana* Kearfott on *Liriiodendron* (recorded by Riley and Howard under name *P. pleuralis* Cresson with the host given as *Eudemis botrana* Schiffermüller); *Exartema myricanum* (reared by Kearfott); and a lepidopteran on chestnut (reared by Fisher).

## PHYTODIETUS PLESIA, new species.

This form is closely allied to *burgessii* (Cresson) but besides the color differences mentioned in the key it differs in the somewhat longer ovipositor and shorter third tergite.

*Female*.—Length, 8 mm.; length of ovipositor, 4.25 mm. Eyes large, their inner margins slightly closer together slightly below the antennae; face punctured on a granular surface; ocelli prominent; postocellar line one-fourth longer than ocellocular line; anterior

basitarsi fully two-thirds as long as their tibiae; longer calcarium of hind tibia a very little more than half as long as hind basitarsus; first tergite one and two-thirds times as long as basal width; third tergite distinctly shorter than the second; ovipositor somewhat longer than the abdomen. Black; palpi, mandibles except apices, elongate spots on inner superior orbits, cuneiform spots on scutum anteriorly, tegulae, a spot in front and one below, sides and apex of scutellum, metascutellum, spot on metanotum behind posterior wing, U-shaped spot on posterior face of propodeum, prepectus, band on mesepisternum below, apical margins of tergites (complete and broader on basal ones, interrupted laterally on apical ones) and apical margins of the sternites luteous; sides of propodeum rufous; legs rufous, anterior coxae and trochanters, apical joint of posterior trochanters, apices of hind femora, base and exterior face of hind tibiae, basal part of joints of hind tarsi luteous; anterior tibiae and tarsi testaceous; dorsal spot on apex intermediate femora, narrow apex of intermediate tibiae and basitarsi, basal joints of hind trochanters, base and a preapical band of hind femora, hind tibiae and tarsi except where luteous, blackish; wings hyaline; venation brown, stigma yellowish.

*Type locality*.—Riley County, Kansas. Described from one female collected May 22, by Popenoe.

*Type*.—Cat. No. 22169, U.S.N.M.

PHYTODIETUS ANNULATUS (Provancher).

*Mesoleius annulatus* PROVANCHER, Addit. faun. Can. Hym., 1886, p. 108.

*Type*.—Yellow label 1242 second Provancher collection, Public Mus. Quebec.

Davis<sup>1</sup> considered this to be the same as *vulgaris* Cresson but it is a more slender species and may be distinguished by characters given in the above key.

Slender; eyes prominent, their inner margins parallel; ocelli prominent, postocellar line about one-fourth longer than the ocellocular line; anterior basitarsi but little shorter than their tibiae; first tergite slender about one and two-thirds times as long as apical width; second and third tergites subequal in length; ovipositor distinctly shorter than the abdomen; longer calcarium of hind tibia somewhat more than half as long as hind basitarsus.

*Male*.—Length, 5 mm. Structure as above. Black; palpi, mandibles (except piceous tips) scape and pedicellum beneath, clypeus, face, inner orbits, cheeks, cuneiform mark on anterior margin of scutum, sides and apex of scutellum, metascutellum, lateral spots on posterior face of propodeum, tegulae, spots before and below, wing process, lower margin of pronotum, mesosternum and lower part of episternum and apical margins of tergites and sternites whitish; legs ferruginous;

<sup>1</sup> Proc. Acad. Nat. Sci. Phila., 1894, p. 189.

four anterior coxae and trochanters, apical joint of hind trochanters, apex of hind femur, base of hind tibia white; basal joint of hind trochanter, base and preapical band on hind femur, most of hind tibia and all of hind tarsus blackish; wings hyaline, venation dark brown.

*Distribution.*—Discussion based on the type, which came from Ottawa, Canada, and specimens from the following localities: Canada;



FIG. 13.—FEMALE OF PHYTODIETUS ANNULATUS (PROVANCHER).

Oswego, Ithaca, and Watkins, New York; Durham and Franconia, New Hampshire; Pennsylvania; Kirkwood, Missouri; Ohio.

*Hosts.*—Geometrid on *Physalis viscosa* (recorded as a host of *Phytodietus vulgaris* by Riley and Howard).<sup>1</sup> *Eulia pinatubana* from material reared at Ithaca, New York, by A. Hartzell. This material contains specimens said to be larval parasites and also specimens said to be pupal parasites.

<sup>1</sup> *Ins. Life*, vol. 3, 1891, p. 464.

## PHYTODIETUS VULGARIS Cresson.

*Phytodietus vulgaris* CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 166.

*Type*.—Cat. No. 1506, Acad. Nat. Sci. Philadelphia.

Inner margins of eyes parallel; anterior basitarsus fully two-thirds as long as tibia; longer calcarium of hind tibia distinctly more than half as long as hind basitarsus; third tergite distinctly shorter than the second; ovipositor somewhat shorter than the abdomen but varying somewhat in the specimens examined.

The male assigned to this species has not been definitely associated with the female, but it agrees so well with the female and is so closely allied to *annulatus* that it seems fair to assume that the association is correct.

*Distribution*.—Cresson records this species from Canada, Massachusetts, Connecticut, Pennsylvania, Delaware, and Illinois, but not all of his specimens belong to the species as here restricted. The specimen from Delaware was labeled by Cresson as lectotype. Specimens in the National Collection come from the following localities: Agricultural College, Michigan; Westville and Pemberton (Scammell), New Jersey; Washington, District of Columbia; and Chain Bridge, Virginia (Wm. Middleton).

*Hosts*.—Erroneously recorded by Riley and Howard from a geometrid on *Physalis viscosa* (see *Phytodietus annulatus*). Recorded as a parasite of *Eucosma ocellana*,<sup>1</sup> *Cacoccia (Archips) argyrospila* Walker<sup>2</sup> and *Peronea minuta*.<sup>3</sup> One male in the National Collection was reared by Scammell as a parasite of *Peronea minuta*.

## SPECIES ERRONEOUSLY REFERRED TO THE GENUS.

(PHYTODIETUS) PLECTISCUS GRACILIS (Provancher).

(PHYTODIETUS) LISSONOTA? TRUNCATA (Davis).

*Phytodietus? truncatus* DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 371.

I have not been able to locate the type of this species but the description makes it reasonably certain that the species does not belong to *Phytodietus*.

(PHYTODIETUS) LISSONOTA OBSCURELLUS (Cresson).

*Phytodietus obscurellus* CRESSON, Proc. Acad. Nat. Sci. Phila., 1878, p. 379.

## HOST CATALOGUE.

The following is a list of the various insect hosts referred to in this paper:

## COLEOPTERA.

## ALAUUS OCULATUS Linnaeus.

*Xorides catomus* (Davis).

<sup>1</sup> Duporte, 7th Ann. Rept. Quebec Soc. Prot. Plants, 1915, pp. 76-77.

<sup>2</sup> Herrick and Leiby, Cornell Univ. Agr. Exp. Sta. Bull. 357, 1915.

<sup>3</sup> Franklin and Morse, Mass. Agr. Exp. Sta. Bull. 150, 1914.



## ATIMIA DORSALIS LeConte.

*Deuteroxorides borealis* (Cresson).*Xorides insularis* (Cresson).

## BUPRESTID in CERCOCARPUS PARVIFOLIUS.

*Aplomerus buprestivorus* Rohwer.

## BUPRESTID in DOUGLAS FIR.

*Deuteroxorides borealis* (Cresson).

## BUPRESTIS LAEVIVENTRIS LeConte.

*Xorides californicus* (Cresson).

## CALLIDIUM AEREUM Newman.

*Xorides rileyi* (Ashmead) form B.

## CERAMBYCID in BOXELDER.

*Xorides humeralis* (Say).

## CERAMBYCID in CHESTNUT.

*Deuteroxorides borealis* (Cresson).

## CERAMBYCID in PINUS MURRYANA.

*Odontomerus aethiops* Cresson.

## CERASPHORUS CINCTUS Fabricius.

*Labena grillator* (Say). Record somewhat doubtful.

## CHALCOPHORA ANGULICOLLIS LeConte.

*Xorides catomus* (Davis).

## CHRYSOBOTHRIS FEMORATA Fabricius.

*Labena confusa* var. *minor* Rohwer.*Labena grillator* (Say).*Xorides calidus* (Provancher).

## CURIUS DENTATUS Newman.

*Xorides calidus* (Provancher).

## DICERCA SPECIES in ALNUS.

*Odontomerus canadensis* Provancher.

## DICERCA DIVARICATA Say

*Odontomerus canadensis* Provancher.

## DORCHASHEMA NIGRUM Say.

*Deuteroxorides caryae* (Harrington). This record is probably wrong.

## GRAPHISURUS FASCIATUS De Geer.

*Deuteroxorides vittifrons* (Cresson).

## HYLOTRUPES LIGNEUS Fabricius.

*Deuteroxorides borealis* (Cresson).*Xorides insularis* (Cresson).

## HYLOTRUPES AMETHYSTINUS LeConte.

*Xorides insularis* (Cresson).

LEPTOSTYLUS MACULUS Say.

*Xorides calidus* (Provancher).

LEPTURA species (probably CHRYSOCOMA).

*Xorides cincticornis* (Cresson).

LEPTURA species, either RUBRICA or VAGANS.

*Odontomerus canadensis* Provancher.

LEPTURA species in PINUS PONDEROSA.

*Poemenia vancouverensis* (Provancher).

LEPTURA NITENS Forster.

*Xorides rileyi* (Ashmead), form B.

LEPTURA PROXIMA Say.

*Xorides stigmapterus* (Say).

LIXUS STROBICOLLIS Boheman.

*Labena apicalis* Cresson.

MELANOPHILA DRUMMONDI Kirby.

*Xorides insularis* (Cresson).

NEOCLYTUS CAPRAEA Say.

*Xorides neolycyi* Rohwer.

PARANDRA BRUNNEA Fabricius.

*Odontomerus mellipes* (Say).

PARATIMIA CONICOLA Fisher.

*Poemenia americana* (Cresson).

PHYMATODES VARIUS Fabricius.

*Xorides humeralis* (Say).

PHYSOENEMUM ANDREA Haldemann.

*Xorides ruficoxis* (Rohwer).

ROMALEUM ATOMARIUM Drury.

*Xorides rileyi* (Ashmead), form C.

SAPERDA DISCOIDEA Fabricius.

*Deuteroxorides caryae* (Harrington).*Xorides albopictus* (Cresson).

SERROPALPUS species.

*Rhyssa persuasoria* (Linnaeus). Record open to question as association not definitely proven.

SERROPALPUS species in FIR.

*Odontomerus canadensis* Provancher.

## STRANGALIA LUTEICORNIS Fabricius.

*Odontomerus strangaliae* Rohwer.

## TETROPIUM CINNAMOPTERUM Kirby.

*Xorides insularis* (Cresson).

## TETROPIUM VELUTINUM LeConte.

*Deuteroxorides borealis* (Cresson).*Xorides insularis* (Cresson).

## THRINCOPYGE ALACRIS LeConte.

*Labena confusa* Rohwer.

## XYLOTRECHUS COLONUS Fabricius.

*Xorides rileyi* (Ashmead) form A.

## HYMENOPTERA.

## CERATINA DUPLA Say.

*Grotea anguina* Cresson.

## CRABRO species in RASPBERRY.

*Grotea anguina* Cresson.

## SIREX species in PINUS VIRGINIANA.

*Rhyssa persuasoria* (Linnaeus).

## TREMEX COLUMBA (Linnaeus).

*Megarhyssa greeni* Viereck.*Megarhyssa lunator* (Fabricius).

## XERIS species in SPRUCE.

*Rhyssa lineolata* (Kirby).

## XERIS species in ABIES CONCOLOR.

*Megarhyssa nortoni* (Cresson).*Rhyssa persuasoria* (Linnaeus).

## XIPHYDRIA ABDOMINALIS Say.

*Rhyssella humida* (Say).

## XIPHYDRIA ATTENUATA Norton.

*Rhyssella humida* (Say).

## XIPHYDRIA ERYTHOGASTRA Ashmead.

*Rhyssella humida* (Say).

## XIPHYDRIA MACULATA Say.

*Rhyssella nitida* (Cresson).

## LEPIDOPTERA.

## GEOMETRID on PHYSALIS VISCOSA.

*Phytodietus annulatus* (Provancher).

## LEPIDOPTERAN on CHESTNUT.

*Phytodietus burgressii* (Cresson)

## CACOECIA (ARCHIPS) ARGYROSPILA Walker.

*Phytodietus vulgaris* Cresson.

## EUCOSMA OCELLANA.

*Phytodietus vulgaris* Cresson.

## EULIA PINATUBANA.

*Phytodietus annulatus* (Provancher).

## EXARTEMA MYRICANUM.

*Phytodietus burgessii* (Cresson).

## LASPEYRESIA TOREUTA Grote.

*Deuteroxorides borealis* (Cresson). Record needs verifying.*Poemenia americana* (Cresson). Record open to question, needs verification.

## MEMYTHRUS PERLUCIDA Busck.

*Xorides catomus* (Davis). Host association not positively proven.

## PERONEA MINUTA.

*Phytodietus vulgaris* Cresson.

## POLYCHROSIS LIRIODENDRANA Kearfott.

*Phytodietus burgessii* (Cresson).

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