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## Hymenoptera Collected Near Boston, Mass., with Descriptions of a Variety of *Bombus affinis*

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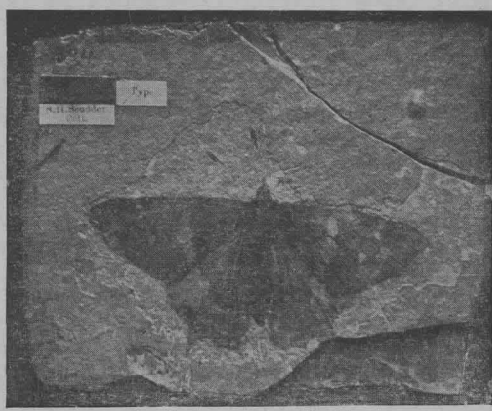
## A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XXVII

FEBRUARY, 1920

NUMBER 1



*Prodryas persephone* Seudder.

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PSYCHE is published bi-monthly, the issues appearing in February, April, June, August, October and December. Subscription price, per year, payable in advance: \$2.00 to subscribers in the United States, Canada or Mexico; foreign postage 15 cents extra. Single copies, 40 cents.

Cheques and remittances should be addressed to Treasurer, Cambridge Entomological Club, Bussey Institution, Forest Hills, Boston, Mass.

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Offprints, if occurring in one signature, per 100, \$2.50; if in two signatures, \$4.50.

Entered as second-class mail matter at the Post Office at Boston, Mass. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on June 29, 1918.

# PSYCHE

VOL. XXVII

FEBRUARY, 1920

No. 1

## NOTES ON FOREST INSECTS.

### III. TWO NEW SPECIES OF PITYOPHTHORUS FROM COLORADO.

BY M. W. BLACKMAN, PH.D.,

Professor of Forest Entomology, New York State College of Forestry, Syracuse, N. Y.

#### *Pityophthorus basseti* sp. nov.

Reddish brown  $2\frac{3}{4}$  times as long as broad.

*Male*—length 2.2 mm. The *front* with distinct elevated transverse carina at level of upper inner angle of eye; above carina coarsely punctured, somewhat rugose and shining; below carina slightly excavated, more finely and densely punctured with moderately short and fine hairs; epistomal margin bordered with longer, coarser hairs; *eyes* rather elongate oval, not coarsely granular, with anterior emargination as broad as deep; *antennal* club short oval with segments sub-equal, first suture straight, second and third procurved ventrally; outer part of funicle one third longer than pedicel.

*Pronotum* very little longer than broad, sides of basal half nearly parallel but widest at the middle and very slightly arcuate; front broadly rounded and rather weakly serrate on the margin; anterior half armed with moderately coarse, acute asperities which are often arranged in fairly regular concentric lines, with their bases often continuous; summit fairly prominent with slight but distinct transverse depressed area immediately posterior to it which is divided by a smooth slightly elevated median area and bordered laterally by fainter elevated lines; depression more deeply and densely punctate; punctures becoming finer and sparser posteriorly and finer laterally; basal marginal line fine but distinct, slightly sinuate. Ventral surface of prothorax grooved and smooth behind but distinctly punctured with fine hairs in front.

*Elytra* equal in width to the thorax; sides nearly parallel but slightly widest near middle, suddenly and strongly rounded behind origin of the declivity with tips sub-acuminate; stria punctures moderately large and deep, not entirely regular near suture; striae not impressed; interstitial punctures very sparse and of moderate size; nearly glabrous above but with a few fine

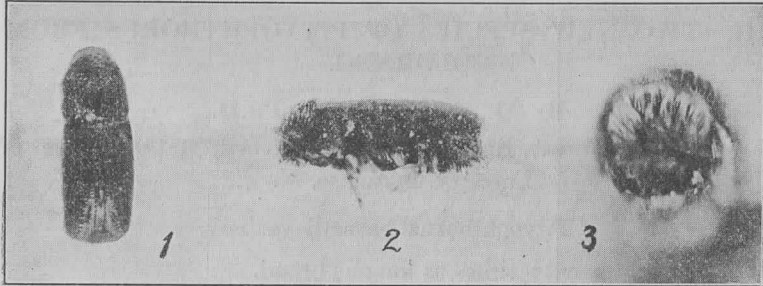


Fig. 1. 1, Dorsal view of male paratype of *Pityophthorus bassetti*, sp. nov., magnified 11 diameters; 2, lateral view of male, magnified 12 diameters; 3, front view of head of female, showing the circular pubes-cent area bordered by longer and coarser hairs, magnified 32 diameters.

short hairs, these becoming more abundant and longer at sides and behind. Declivity steep with deep wide sulcus; suture wide, elevated, with several coarse granules near apex; lateral elevations with fairly sharp serrate edge armed with 10 to 12 moderate sized, black teeth, each with a stiff tactile hair arising from its inner base. Last ventral abdominal segment deeply and very broadly emarginate.

*Female*, slightly longer (2.4 mm.) and of same width. Differs from male in having the frons very slightly concave, with a nearly circular area finely and densely punctured and pubescent and bordered with longer coarser incurved hairs. Elytra much less hairy at sides and rear than in male. Lateral elevations of the declivity with serrations of the male replaced by a sparse row of minute granules, long tactile hairs absent.

From Pitkin, Colorado. Bred from material brought in by Mr. R. O. Bassett, Jr.

Host tree: *Picea engelmanni* Engelm. Will also breed successfully in *Abies balsamea* (Linn.) Miller.

The material from which *Pityophthorus bassetti* was bred consists of several slabs taken from the base of an Engelmann spruce near Pitkin, Colorado by Mr. R. O. Bassett, Jr., a former student. These were received at Syracuse Nov. 23, 1915 and upon examination the bark was found to contain numerous living nearly full grown larvæ of a scolytid. Further examination yielded the dead parent beetles and these proved to be an unknown species of *Pityophthorus*. The slabs were placed in a breeding jar in the laboratory and a considerable number of beetles emerged during the first two weeks of December. Part of these were preserved as specimens while the rest were left in the breeding jar and several pieces of a freshly cut limb of balsam fir about 1 inch in diameter were introduced. The adults readily entered not only the fresh balsam, but also some reentered the slabs of Engelmann spruce from which they had emerged—breeding in both. The new second generation of adults emerged from these two hosts during the summer of 1916 and many of them were still alive in September, at which time also a few small larvæ doubtless of a third generation were found. It would appear that normally there is not more than one generation per year.

The bark on the Engelmann spruce in which the beetles originally bred was about  $\frac{3}{16}$  of an inch thick, while that of the balsam limbs to which the new brood readily transferred was only  $\frac{1}{16}$  of an inch thick. In the former the larvæ worked nearly entirely in the inner and middle bark usually not even grooving the sapwood while in the latter the larval mines were excavated partly from the sapwood. Aside from this the engravings in the two are similar. In their general characteristics the engraving is not unlike those of other species of this genus. It consists of an entrance gallery leading diagonally upward and inward to the junction of bark and sapwood where it is expanded into an irregular nuptial chamber. From this a variable number of egg-galleries branch off from all sides, but these soon take a general longitudinal direction. In number the egg-galleries vary from 4 to 9 and the average in 13 engravings in balsam fir is 6.9. The effect of this large proportionate number of females to each male upon their relative fecundity could not be determined satisfactorily because of the injuries to the engravings by the numerous brood.

The egg-galleries which have a general longitudinal direction are

not excessively long when compared with those of several other species of this genus. In the material at hand they vary from  $3\frac{1}{2}$  cm. to 7 cm. with an average length of 4.2 cm. The egg niches, where these are still recognizable, occur on both sides of the gallery and are not closely arranged—usually being 2 mm. or more apart so that the number of eggs laid by each female is probably not great.

*Pityophthorus occidentalis* sp. nov.

Reddish brown to nearly black in color; 2.8 times as long as broad.

*Male.* Length 2.5 mm. *Front* convex with distinct rough transverse carina below level of upper inner angle of eyes, coarsely and roughly punctured above, slightly excavated and more finely punctured below carina, with distinct median vertical carina from transverse carina to margin of epistoma; fine short hairs over entire front but becoming more conspicuous cephalad; edge of epistoma emarginate and bisinuate, bordered with coarser and longer hairs; eyes oval with rather wide and deep emargination; antennæ light reddish-brown, club oval, with first three segments sub-equal and fourth segment shorter; first and second sutures on ventral face nearly straight, third strongly arcuate; outer part of funicle one-half longer than pedicel.

*Pronotum* slightly longer than broad (14:13), widest behind the summit; sides of basal half slightly arcuate, faintly constricted in front of middle, broadly rounded in front, with distinct nearly regular serrations, slightly more than the cephalic half armed with well developed asperities arranged in concentric nearly regular rows; summit prominent; posterior area shining, with rather numerous moderate sized punctures, except on the impunctate slightly elevated area in the median line; basal marginal line distinct and continued diagonally downward along the sides as a margined ridge easily distinguishable to a point anterior and dorsal to the base of the prothoracic leg. Ventral surface of the prothorax punctured in front, smooth behind except immediately adjacent to the base of the leg.

*Elytra* of same width as prothorax; sides subparallel, widest before the middle, slightly narrowed behind the middle to the level of the origin of the declivity, from which point it is strongly and



BLACKMAN—Forest Insects.



regularly rounded; tips not acuminate; stria punctures moderately fine, in regular rows except near base where they are somewhat confused, first stria impressed, the others not; interstria punctures fine and very sparse, almost lacking on the disc; disc nearly glabrous but with a few small hairs, these becoming longer and more numerous at the sides and behind; *declivity* steep with deep, rather narrow sulcus; suture granulate and widened toward apex; lateral elevations abrupt and granulate; granules of the 3rd and 4th interspaces forming two rows which converge and become confused near apex, those of 4th interspace smaller but distinct, others more or less confused, each of granules with a rather long stiff tactile hair arising from near its base. Ventral abdominal segments rather finely punctured and moderately hairy; last segment deeply and broadly emarginate.

*Female*, of the same general proportions. *Front* flattened, with nearly circular pubescent area bordered by coarser and longer incurved hairs; prothorax as in male; apex of elytra more acutely rounded but not acuminate; *declivity* not so steep, sulcus not so deep, lateral elevations not so pronounced, with a sparse row of minute granules on the 3rd interspace and a few scattered ones lateral to it; long tactile hairs absent.

Host tree: *Picea engelmanni* Englm.

Locality: From Pitkin, Colo., collected by Mr. R. O. Bassett, Jr., October, 1915.

#### EXPLANATION OF PLATE I.

Fig. 4, 5. Slabs from the trunk of Engelmann spruce showing the engravings of *P. bassetti* in the inner bark and the exit holes through the outer bark. About two-thirds natural size.

Fig. 6. Two segments from the limb of a balsam fir, showing the engravings of *P. bassetti* on the surface of the sapwood. About three-fifths natural size.

HYMENOPTERA COLLECTED NEAR BOSTON, MASS.,  
WITH DESCRIPTION OF A VARIETY OF  
*BOMBUS AFFINIS*.

BY J. BEQUAERT,

American Museum of Natural History, New York City.

While collecting Hymenoptera at Forest Hills, Mass., and other localities in the vicinity of Boston, I have taken on two occasions a bumble-bee, which from its aberrant coloration could not be properly named with Franklin's "Bombidæ of the New World." I have been permitted to examine similarly colored *Bombus*, taken some years previous by Professor Wheeler at Forest Hills and by Mr. J. E. Smith at Sherborn, Mass. It was finally recognized that all these specimens belong to a striking color-variant of *Bombus affinis*, which it is the purpose of this note to describe and name. I have used this opportunity to present an account of the Bombidæ of the neighborhood of Boston and to record some other interesting Hymenoptera of that region.

I am greatly indebted to Prof. Wm. M. Wheeler, Messrs. N. Banks, Wm. T. Davis, C. W. Johnson, E. J. Smith, C. Schaeffer, and Dr. F. E. Lutz, who have kindly allowed me to examine material in their possession or care and to use valuable information.

*Bombus affinis* var. *novæ-angliæ* var. nov.

Known in the worker and male phases, which are colored much the same. One or more of the abdominal segments behind the second are covered entirely or to a large extent with ferruginous pile (in the brightest specimens very near Ridgway's vinaceous-rufous). Coloration otherwise as in typical *affinis*; in most of the specimens the usual reddish tinge of the yellow pile on the middle portion of the second tergite is rather faint or faded, which, moreover, is often the case with typical *affinis* too.

The structural characters show no differences with those of typical *affinis*; this is especially true for the shape of the male genitalia, which I have carefully compared with those of the typical form.

The specimens examined do not differ in size from typical *affinis*; total length of the worker: 12 to 14 mm.; of the male: 16 to 17 mm.

Type locality: Forest Hills, Mass.; the holotype, a male taken by Prof. Wm. M. Wheeler, is deposited at the Museum of Comparative Zoölogy, Cambridge. The allotype, a worker from the same locality, is in the American Museum of Natural History. Also known from Sherborn, Mass., and Brooklyn, N. Y.

The extent of ferruginous pile on segments 3 to 6 is variable, the following being the combinations observed:

1. Ferruginous pile covering the major part of the fourth tergite; the extreme sides of this tergite and the whole of segments 3, 5, 6, and 7 being black: one worker from Forest Hills, August 3, 1911 (Wm. M. Wheeler Coll.; allotype); two males from Sherborn, August 30 and September 8, 1913 (E. J. Smith Coll.).

*my specimens* 2. Ferruginous pile covering the whole of tergite 4 and extending over the apical margin of tergite 3: two males from Forest Hills, June, 1911 (holotype of var. *novæ-angliæ*) and August 18, 1911 (Wm. M. Wheeler Coll.). *paratypes*

3. Ferruginous pile covering the entire fourth tergite; also the greater part of tergite 5, though with some admixture of black hair; tergite 6 with a few rufous hairs in the black pile at the base in the center: one male taken at Forest Hills, visiting the flowers of *Lythrum Salicaria*, August 12, 1919.

4. Tergites 4, 5, and 6 covered with ferruginous pile, except at the extreme sides and in the middle along the apical margin, where the pile is black: one male from Brooklyn, N. Y., July, 1915 (F. M. Schott Coll.).

5. Ferruginous pile very bright, covering the entire fourth tergite, tergite 3 except for a median patch of black hair near the base, and the basal part of tergite 5: one worker taken in the Arnold Arboretum at Forest Hills, collecting pollen of a cultivated variety of *Viburnum*, August 3, 1919. This very brightly colored specimen mimics to a certain degree *Bombus ternarius* Say.

It is not without some hesitation that I propose a varietal name for this curious color-variant of *Bombus affinis*. It has been the great merit of Franklin to elucidate the structural characters of the North American Bombidæ; and, while carefully recording the color-variants of each species, this author has wisely refrained from applying names to them. Indeed, it will be a lengthy process for future students to decide which of the many color forms of bumblebees are mere freak specimens, and which others represents racial

differences due either to somatic and environmental influences or to germinal modifying factors. There is, I believe, ample justification for giving such fixed races a nomenclatural standing, as has been the common practice for recent years. Moreover, European students have profusely named the color forms of the palearctic bumble-bees, and, with increasing interest in the study of distributional problems, a similar course will undoubtedly be adopted for the nearctic species.

In the case of *B. affinis* var. *novæ-angliæ* there is every reason to believe that it is not based on freak specimens, but represents a peculiar race, which, having been repeatedly collected, must not be a great rarity in the vicinity of Boston and perhaps in some other localities. Furthermore, *Bombus affinis* varies, as a rule, but little in its coloration, since Franklin, in his Monograph, does not mention a single color-variant and even notes that "this species is very constant in its character, a remarkable fact when the extreme variability of a large proportion of the species of the *Terrestris* group is considered."<sup>1</sup> I have examined over 150 specimens of *B. affinis* from various localities in the states of New York, New Jersey, Pennsylvania, New Hampshire, Massachusetts and North Carolina, and, with the exception of the specimens described above, have only found one aberrant male. This male, collected at Woodbury, N. Y., September 21, 1910, and belonging to the American Museum of Natural History, shows a faint indication of a transverse patch of ferruginous pile in the center and near the base of the fourth tergite; the specimen is otherwise quite normal, but is evidently a transition toward the var. *novæ-angliæ*.

Since this paper was sent to the printer, I have been able to examine several specimens of *B. centralis* Cresson and its var. *juxtus* Cresson, from Colorado, in the collection of the American Museum of Natural History. Such of these specimens as agree best with the description of *juxtus* Cresson, are very similar in coloration to the brightest individuals of *B. affinis* var. *novæ-angliæ*. *B. centralis* and *B. juxtus* are, however, at once separated from *B. affinis* by their much longer oculo-malar space and by their having yellow pile on face and occiput. Titus<sup>2</sup> has recorded *B. juxtus* from Woods Hole, Mass.; but, as Franklin has pointed out,

<sup>1</sup> Trans. Amer. Ent. Soc., 38, 1913, p. 280.

<sup>2</sup> Canadian Entomol., vol. 34, pp. 39 and 43 (1902).

this identification was undoubtedly erroneous. It seems very probable that these Woods Hole specimens belonged to *B. affinis* var. *novæ-angliæ*.

In drawing up the following list of the *Bombidæ* known to occur within a radius of twenty miles from Boston, I have perused, besides my own data, collected during the summer of 1919, information kindly given to me by Prof. Wm. M. Wheeler and Messrs. N. Banks, C. W. Johnson and E. J. Smith.

*Bombus terricola* Kirby. This is perhaps the most common species of bumble-bee at Forest Hills; also at Auburndale (C. W. Johnson Coll.) and Sherborn (E. J. Smith Coll.).

*Bombus affinis* Cresson. The typical form is common at Forest Hills where it visits, among others, the flowers of *Ceanothus americanus*; also at Auburndale and Dedham (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Bombus bimaculatus* Cresson. Common at Forest Hills; also at Cohasset (C. W. Johnson Coll.) and Sherborn (E. J. Smith Coll.).

*Bombus impatiens* Cresson. Forest Hills; also Auburndale, Dedham, Brookline, and Cohasset (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Bombus ternarius* Say. Mr. E. J. Smith, who has taken a few workers of this species at Sherborn, believes that it is very rare near Boston. Professor Wheeler informs me that in many years collecting he has never seen it at Forest Hills, though he has commonly taken it at Colebrook, Conn.

*Bombus perplexus* Cresson. Wollaston (Mus. Comp. Zoöl.); Auburndale and Arlington (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Bombus vagans* Smith. Forest Hills; also from Auburndale, Dedham, and Boston (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Bombus fervidus* Fabricius. This is a common species at Forest Hills; also at Auburndale and Cohasset (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Bombus americanorum* (Fabricius) = *Bombus pennsylvanicus* Franklin. Rather scarce near Boston; I have taken it at Lexington and Mr. E. J. Smith has it from Sherborn.

*Bombus separatus* Cresson. Sherborn (E. J. Smith Coll.).

Mr. E. J. Smith informs me that he has also seen a female of *B.*

*auricomus* (Robertson), which, according to its label, was taken near Boston many years ago. Neither he nor Professor Wheeler has ever taken that species there, and no Boston specimens are contained in the collections of the Boston Natural History Society and of the Museum of Comparative Zoölogy.

*Psithyrus laboriosus* (Fabricius). Five males were taken at Forest Hills, about the middle of August, and one female in the Stony Brook Reservation at flowers of *Cephalanthus occidentalis*, July 21; also at Auburndale and Brookline (C. W. Johnson Coll.); Sherborn (E. J. Smith Coll.).

*Psithyrus ashtoni* (Cresson). Auburndale and Brookline (C. W. Johnson Coll.); Cambridge (S. Henshaw Coll.); Sherborn (E. J. Smith Coll.).

It is interesting to compare this list with other local faunas farther north and south. At Waldoboro, on the coast of southern Maine, Lovell<sup>1</sup> did not find *Bombus impatiens*, *B. americanorum* and *B. affinis*, three species which are rather abundant in the Transition Zone. On the other hand, two forms which are rather Canadian or Boreal, *B. borealis* Kirby and *B. ternarius* Say, are still to be found in southern Maine, while *borealis* has never been seen near Boston and *ternarius* is very rare there. Otherwise the faunas of these two localities are very similar.

From my own collecting experience and from what I have seen in other collections, the bumble-bee fauna of the immediate vicinity of New York City differs mainly from that of Boston in the scarcity of *B. terricola* and the absence of *B. ternarius*, though both these species are commonly found in the Catskills. *B. ternarius* has never been taken near New York City; the nearest locality for that species is Lake Marcia, Sussex County, N. J., where it was collected by Dr. F. E. Lutz.<sup>2</sup> As to *B. terricola*, there are no New York specimens in my own collection, nor in that of Mr. Wm. T. Davis; I find, however, in the Brooklyn Institute of Arts and Sciences two males from Essex Fells, Essex County, N. J. (A. S. Nicolay Coll.) and, in the American Museum of Natural History, two further specimens labeled "Astoria, Long Island." Two species of the Austral Zone, *B. fraternus* (Smith) and *B. auricomus*

<sup>1</sup> J. H. Lovell. The Bumble-bees of Southern Maine. Ent. News, 18, 1907, pp. 195-200.

<sup>2</sup> Bull. Amer. Mus. Nat. Hist., 35, 1916, p. 514. The specimen recorded as *B. ternarius* from Staten Island in Smith's New Jersey List, is a worker of *B. fervidus*, though it bears a label in the late Dr. Ashmead's handwriting "*B. ternarius* Say."

(Robertson), though often seen in southern New Jersey, apparently do not reach New York City.

The vicinity of Boston thus seems to be in some way the meeting ground of certain Boreal and Austral elements, while forms of the Transition Zone constitute the bulk of the local fauna. This may be one of the reasons why the insect fauna of that region contains such a variety of species. Though I was able to devote to collecting only a few odd hours during two of the last summer months, I have to my great surprise taken there many unusual Hymenoptera, among them certain species which I had not seen before in the northeastern states. It will, I believe, be interesting to put on record some of my captures.

**Pachymenes symmorphus** (Saussure). Two females were taken in the Arnold Arboretum at Forest Hills, July 5. This wasp has been placed by H. de Saussure in the genus *Nortonia*. I have shown elsewhere<sup>1</sup> that *Nortonia* may best be restricted to the species with a transverse raised suture on the first abdominal tergite; whereas such species as the nearctic *N. symmorpha* Saussure and *N. tolteca* Saussure, in which there is no raised suture on tergite one, cannot in my opinion be generically separated from *Pachymenes*. I have also *P. symmorphus* from Greenwood Lake, N. Y., ♀, August 20, 1916; White Plains, N. Y., ♂, at flowers of *Ceanothus americanus*, June 29, 1918; Stowe, Lamoille County, Vt. (E. L. Bell Coll.). Mr. Wm. T. Davis has taken a ♀ at Ramsey, N. J., July 19, 1908, and a ♂ at Cabin John Run, Md., June 17, 1910.

**Ancistrocerus unifasciatus** (Saussure). One female at Lexington, July 27, 1919, and another at Forest Hills in June.

**Anacrabro ocellatus** Packard. This was very common at Forest Hills in the latter half of July, visiting *Ceanothus americanus*; I have also taken it at Lexington on *Spiraea salicifolia*, July 27.

**Euspongus bipunctatus** (Say) = *Paramellinus bipunctatus* Rohwer. Forest Hills, August 3, 1919; one female running about on leaves of pickerel weed in the Arnold Arboretum.

**Anthophora walshii** Cresson. One female sucking honey at flowers of *Ballota nigra*, Forest Hills, July 27, 1919. I saw a male, which I was unable to capture, at the flowers of *Pontederia cordata*, Forest Hills. Mr. C. W. Johnson informs me that the collection

<sup>1</sup> Bull. Amer. Mus. Nat. Hist., 39, 1918, p. 93.

of the Boston Society of Natural History contains further specimens of this species as follows: Woods Hole, Mass., ♀, July 25, 1903 (C. W. Johnson Coll.); Manomet, Mass., ♂, July 17, 1904, and Falmouth, Mass., ♂, July 8, 1912 (Dr. J. A. Cushman Coll.). In these two males, the terminal joint of the middle tarsi bears the lateral patches of black pubescence characteristic of this species; furthermore, there are at the base of the clypeus two black spots narrowly connected in the middle. These points, together with the white tegumentary bands of the abdomen, make the species easy to recognize. So far as I have been able to discover, this beautiful insect, originally described from Illinois, has also been recorded from Wisconsin, Nebraska and central Texas. At Carlinville, Ill., Robertson found it sucking nectar on several flowers, among them *Lespedeza reticulata*, while the females gathered pollen exclusively from *Cassia Chamæcrista*.<sup>1</sup> In Nebraska, it was taken at the flowers of a *Salvia*, and Graenicher records it from *Rudbeckia hirta* in Wisconsin.

*Xenoglossa pruinosa* (Say). This handsome species is a common visitor of the flowers of cultivated squash at Forest Hills, between 6 and 8 a. m.; the flowers close by 9 a. m., but the males can often be found during the day, sleeping inside the corolla.

*Dianthidium notatum* (Latreille). This is fairly common in the first half of August at Forest Hills, on flowers of *Lespedeza hirta* and *L. frutescens*, which are visited by both sexes. I have also taken it at the Blue Hills Reservation, on *Baptisia tinctoria*.

*Halictoides novæ-angliæ* Robertson. Many males were seen at the flowers of *Pontederia cordata* in the Arnold Arboretum, Forest Hills, from July 8 to August 15; the females are much scarcer and appear later, the first being taken July 24.

*Perdita octomaculata* (Say). At Forest Hills this little bee was seen nesting in the sandy soil of a vacant city lot; on August 10, the two sexes were found in numbers mating within the flower-heads of *Cichorium Intybus*; the female also visits *Solidago rugosa*.

*Epeoloides pilosulus* (Cresson). One male at the Blue Hills Reservation, on flowers of *Apocynum androsaemifolium*. *Epeoloides nearcticus* Ducke,<sup>2</sup> described from Pennsylvania, is in my opinion a synonym of *pilosulus*.

<sup>1</sup> Botanical Gazette, 25, 1898, p. 230; and 28, 1899, p. 36.

<sup>2</sup> Rev. d'Ent. Caen, 27, 1909, p. 39.



THE FIRST STAGE LARVA OF *CUTEREBRA AMERICANA*  
(FABR.) (DIPTERA; OESTRIDÆ).

By G. F. FERRIS,

Stanford University, California.

There appears to be but little information concerning the first stage larvæ of any species of Oestridæ, the only very detailed figures that I have seen being those given by Hadwen and Cameron<sup>1</sup> of the larvæ of three species of *Gastrophilus*. I have been fortunate enough to secure some notes on the first stage of *Cuterebra americana* (Fabr.) (det. Aldrich) and present them in order that they may not be lost, brief though they are.

A female of this species was taken in flight at Palo Alto, Calif., on October 8 and was confined in a glass jar. On this same day (perhaps partially on the following) this female deposited from 100 to 150 eggs which were placed singly and were attached to the glass by a glue so powerful that the eggs could not be detached without being destroyed. Unfortunately no notes were kept as to the shape of the eggs.

The eggs began to hatch on October 22. In the case of the species discussed by Hadwen and Cameron there has existed some doubt as to whether the eggs hatch normally without the stimulus of moisture, heat and friction, although these authors found that at least a certain percentage do. In the case of *Cuterebra americana* these factors seem to have no place as apparently all the eggs hatched.

The first stage larvæ are extremely active. Clinging to the empty egg shells they waved the head energetically about in the air and some of them deserted the egg shells and moved about, progression being accomplished by means of a looping movement much like that of a Geometrid caterpillar. No notes were kept as to the length of time that the larvæ lived without food.

*Description of the Larva.*

Length (flattened on slide) 1.4 mm.; body fusiform, tapering at both ends (Fig. A). Posterior extremity ending in a single flat lobe

<sup>1</sup> Hadwen, S. and Cameron, A. E. A Contribution to the Knowledge of the Bot-Flies, *Gastrophilus intestinalis* DeG., *G. hæmorrhoidalis* L. and *G. nasalis* L. Bull. Ent. Res., vol. 9, pt. 2, pp. 91-106, figs. (1918).

which projects well beyond the spiracles and is slightly emarginate at the tip. The actual number of segments cannot be determined from the mounts, but there are in all nine transverse series of posteriorly pointing denticles. The anteriormost series is close to the anterior end of the body and is composed of very small denticles. The second to fourth series are each composed of a single row of flat denticles, the points of which are directed toward the median line and end in a recurved hook (Fig. B). Between each two of these

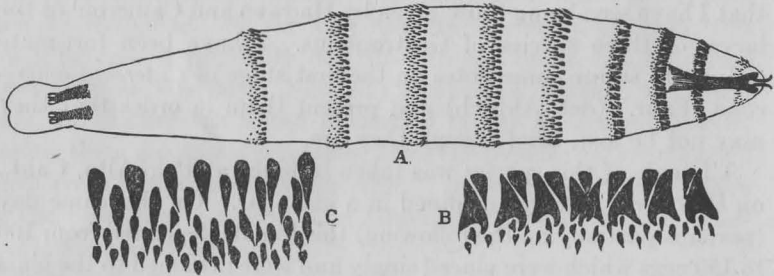


Fig. 1. *Cuterebra americana*, first stage: A, entire larva only the bases of the tracheal trunks are indicated; B, denticles from third series at the median line; C, denticles from fifth series.

denticles are smaller sharply pointed denticles and behind them are a varying number of still smaller, sharp denticles. The remaining series are all composed of numerous sharply pointed denticles, of which the anteriormost are much larger than the others (Fig. C). The cephalopharyngeal apparatus extends back to the anterior margin of the third series.

*Note.*—The above description is based upon specimens that have been cleared, stained and mounted on a slide.

A REVISION OF THE SPECIES OF THE GENUS LOXOCERA, WITH A DESCRIPTION OF A NEW ALLIED GENUS AND A NEW SPECIES.

BY CHARLES W. JOHNSON,  
Boston Society of Natural History.

Species based entirely on color, a character which further study proves to be very inconstant, are a source of considerable trouble to the student. After a great deal of collecting, and a study of some 75 specimens including Loew's types, it seems apparent that Say's *Loxocera cylindrica* represents an extremely variable species, which for convenience and to more fully emphasize this variability might be divided into four varieties according to the following table.

*Table of Species.*

1. Wings hyaline with the tips and posterior cross veins distinctly clouded. . . . . *cylindrica* Say
  - a. Anterior margin of the thorax, a dorsal line, humeri, and lateral lines, black. . . . . var. *cylindrica* Say
  - b. Anterior margin very broad, covering at least one-third of the thorax, a dorsal line, short lateral lines and about one-third of the anterior of the pleura, black  
var. *pleuritica* Loew
  - c. Dorsal line, humeri, lateral margins and the upper half of the pleura, black. . . . . var. *pectoralis* Loew
  - d. Dorsal and lateral lines (sometimes obsolete) and a spot above the yellow humeri, black. . . . var. *obsoleta* var. nov.
- Wings brownish, without the apical clouding. . . . . 2
2. Anterior third of the thorax black, dorsal and lateral lines wanting; abdomen, except the sides of the first segment, black  
*collaris* Loew
- Anterior and lateral margins and a dorsal line on the thorax, black; abdomen except at the base red. . . . *fumipennis* Coq.

*Loxocera cylindrica* Say.

*L. cylindrica* Say, Jour. Acad. Nat. Sci., Phila., III 98, 1823.

Say's description is very clear: "Thorax with an undulated

band on the anterior margin, dorsal line and an obsolete line before the wing, black; wings a little dusky, particularly at tip." This represents practically the more characteristic or intermediate form merging into the darker *pleuritica* on the one hand and the lighter colored *obsoleta* on the other. Say's "var. a" I am calling *obsoleta*. It is the prevailing form of southern Pennsylvania and New Jersey and is the only form found by the writer in southern Virginia and North Carolina. The variety *pleuritica* is the prevailing form from New Jersey northward; it is often confused with *pectoralis*, a much rarer form, of which I have typical examples from only three localities, and in each case a female, as is the type. In its dorsal thoracic markings it approaches *obsoleta*, as the anterior marginal band is interrupted in both cases.

The following records show the northern and southern distribution of the species and its varieties:

*L. cylindrica* Say (typical).

Glen House and Alstead, N. H.; Dummerston, Vt.; Auburndale, Fall River and North Adams, Mass.; Philadelphia, Pa.; Algonquin, Ill. (Dr. Nason); Minnesota (Washburn); Kansas (Snow). Type, Pennsylvania. I have not seen the specimens from Minnesota and Kansas.

var. *pleuritica* Loew.

Machias, Me.; Mt. Washington, N. H.; Norwich, Vt.; Montreal, Can.; Ithaca, N. Y.; Agricultural College, Mich.; Auburndale and Woods Hole, Mass.; Delaware Water Gap, N. J.; Kansas (Snow). Types, Connecticut, New York.

var. *pectoralis* Loew.

White Mountains, N. H.; Mt. Ascutney, Vt.; Auburndale, Mass.; Edge Hill, Pa. Type, Washington, D. C. Two specimens (♂ ♀) from Great Falls and Chain Bridge, Va. (N. Banks) have the black of the pleura interrupted below the wings.

var. *obsoleta* var. nov.

Burlington, Vt.; Plymouth, Mass.; Branford, Conn.; Delaware Water Gap, and Clementon, N. J.; Philadelphia and Natrona, Pa.; Potomac Creek and Suffolk, Va., and Hertford County, N. C.

***Loxocera collaris* Loew.**

This is usually smaller than *L. fumipennis* Coq., and readily distinguished by characters given in the above table. Specimens from Washington and Oregon I cannot separate from those of the eastern states, thus giving it a wider distribution than any of the other species. Aside from the typical locality, District of Columbia, there are specimens in the collection of the Boston Society of Natural History from Liberty, Me. (J. A. Cushman); Medford, Mass. (G. W. Barber); Salem, Mass. (A. P. Morse). Also from Great Falls, Va., May 19 (N. Banks), in the Museum of Comparative Zoölogy.

***Loxocera fumipennis* Coq.**

Except for the uniform dark brown wings, the species resembles *L. cylindrica*. It is more clearly related to the European *L. elongata* than any of the other American species. Distribution, Kansas, Texas and Colorado.

***Loxocera quadrilinea* Walker.**

The identification of this species from the description is hopeless.

***Pseudopsila* new genus.**

This represents a group intermediate between the true *Loxocera* and *Psila*. The former has the third joint of the antenna at least five times as long as the second and exceeding the length of the arista. The typical species of the genus *Psila* (*P. fimentaria* L.) has an ovate rounded third antennal joint scarcely longer than the second. In *Pseudopsila* the third joint is subcylindrical and about three times as long as the second, the latter being relatively shorter than in the typical *Loxocera*. Arista almost double the length of the third joint. One pre-dorso-central, immediately in front of the suture (these are easily broken and are present on but few of the museum specimens), one post-dorso central just in front of the scutellum, two supra alar and a small presutural bristle. Type, *Loxocera fallax* Loew.

*Table of Species.*

- |                                      |                    |
|--------------------------------------|--------------------|
| 1. Thorax entirely black.....        | <i>fallax</i> Loew |
| Thorax yellow marked with black..... | 2                  |

2. Dorsum without lateral margins of black . . . . . 3  
 Dorsum with lateral margins of black . . . . . 4
3. Humeri and upper half of the pleura black . . . *angustata* Cress.  
 Anterior margin, pleura, metanotum and a narrow dorsal line  
 black. . . . . *perpolita* sp. nov.
4. With broad lateral margins only, upper half of the pleura  
 black . . . . . *bivittata* Loew  
 With a broad anterior and lateral margins, upper half of the  
 pleura black . . . . . *collaris* Loew

***Pseudopsila fallax* (Loew).**

*Loxocera fallax* Loew, Cent., IC, 89, 1869.

In a note Loew refers to this species as being intermediate between *Loxocera* and *Psila*. It is readily distinguished by having both the thorax and abdomen shiny black. It has the following distribution: Mt. Washington, 4,000 feet, Glen House and Intervale, N. H.; Auburndale, Cohasset and Fall River, Mass.; Kaaterskill and Axton, N. Y. Type locality, Canada.

***Pseudopsila perpolita* sp. nov.**

Head yellow, upper half of the occiput and vertical triangle black; third joint of the antennæ black about three times as long as the second; aristæ white. Thorax including the scutellum yellow, with short yellow hairs, anterior margin, a stripe occupying the greater portion of the pleura and the metanotum, shiny black. A very narrow blackish dorsal line is also present, which is usually obsolete behind the suture. One pre-dorso-central just in front of the suture, and one post-dorso-central in front of the scutellum, the alar bristles are wanting. Abdomen shiny black, with short yellow hairs, ovipositor yellow. Halteres white. Wings hyaline, veins light yellow, wings noticeably large for the size of the fly, anterior cross vein slightly nearer the base of the discal cell than in *P. fallax*, *i. e.*, less than one-third the length of the cell. Legs light yellow, tips of the tarsi brown. Length 4 mm.

Seven specimens, six females, Center Harbor, N. H., September 10, 1914 (C. W. Johnson), and one male, Liberty, Me., September 9, 1915 (Dr. J. A. Cushman). Holotype and three paratypes in the collection of the Boston Society of Natural History, two paratypes

in the Museum of Comparative Zoölogy and one in the author's collection.

This species resembles *Psila lateralis* Loew in general appearance, but the longer antennæ readily separate it from that species, while from *P. collaris* Loew, it is at once distinguished by the highly polished black markings and the absence of black on the sides of the dorsum.

***Pseudopsila angustata* (Cresson).**

*Psila angustata* Cresson, Proc. Acad. Nat. Sci., Phila., 1919, p. 193.

An interesting species resembling in color *Psila lateralis* Loew, but much larger. The pre-dorsal-centrals are not present in the two specimens before me, neither are they present in the two following species. In addition to the type locality, Ithaca, N. Y., it has been taken by Mr. A. P. Morse at Woodstock, Vt.

***Pseudopsila bivittata* (Loew).**

*Psila bivittata* Loew, Cent., VIII, 67, 1869.

The form of the antennæ places this also in this group. It is common and quite widely distributed from Quebec (Osten Sacken) and Maine to Philadelphia, Pa., and probably much farther South. Type from Connecticut.

***Pseudopsila collaris* (Loew).**

*Psila collaris* Loew, Cent., VIII, 68, 1869.

This may prove to be only a variety of the preceding. Distribution, White Mountains, N. H. to Virginia. Type also from Connecticut.

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PROCEEDINGS OF THE CAMBRIDGE  
ENTOMOLOGICAL CLUB.

The annual meeting of the Cambridge Entomological Club was held January 13 at the Bussey Institution, Forest Hills, Boston, and the following officers were elected for 1920:

*President*, C. A. Frost, Framingham.

*Vice-President*, W. L. W. Field, Milton.

*Secretary*, J. H. Emerton, Boston.

*Treasurer*, F. H. Walker, Salem.

*Executive Committee*, S. W. Denton, Wellesley; L. W. Swett, Lexington; P. G. Bolster, Boston.

*Editor of Psyche*, C. T. Brues, Boston.

Mr. S. W. Denton presided and thirty-two members and guests were present.

Prof. Robert Matheson, of Cornell University College of Agriculture, spoke on the three species of plant lice of apple trees, *Aphis pomi*, *Aphis sorbi* and *Aphis avenæ*, their habits, and methods of controlling them.

Mr. S. W. Denton gave an interesting account of his experiences in buying and selling butterflies in America and England.

Mr. A. F. Burgess, secretary of the Association of Economic Entomologists, spoke of the meetings of that society and of the Entomological Society of America at St. Louis.

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#### ENTOMOLOGICAL NOTES FROM THE MUSEUM OF COMPARATIVE ZOOLOGY.

Several families of Neuroptera have recently been rearranged in new drawers. The largest of these, the Myrmeleonidæ, occupies 54 drawers and includes 2,395 specimens representing 309 named species, among which are 125 types.

Several lots of small neuropteroid insects have been obtained from Mr. Parish, collected on his Amazon trip.

In mounting a collection of insects from Anticosti Island a specimen of *Ornithomyia* was found to which were attached two specimens of Mallophaga, one on each side near the tip of the abdomen of the fly. This is doubtless one method of distribution of the parasites.

Mr. Dawson of the University of Nebraska spent the Christmas holidays at the museum studying Serica; Mr. Strickland of the Canadian Entomological Branch at Ottawa spent several weeks studying the collections of Acarina and Psocidæ, and Mr. Leonard of the Cornell University Agricultural College was at the museum in January to study the types of Leptidæ.



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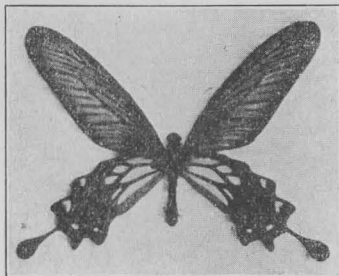
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