

# NEW SPECIES AND NEW FORMS OF ICHNEUMONIDAE PARASITIC UPON THE GIPSY-MOTH PARASITE, APANTELES MELANOSCELUS (RATZEBURG)<sup>1</sup>

By R. A. CUSHMAN

Associate Entomologist, Taxonomic Insect Investigations, Bureau of Entomology,  
United States Department of Agriculture

## INTRODUCTION

One of the most important of the parasites of the gipsy moth introduced into the United States for the control of that insect is *Apanteles melanoscelus* (Ratzeburg). In this country its effectiveness is more or less reduced by the attack of certain native hyperparasites. Six of these hyperparasites are discussed in this paper, four being described as new species.

### *Hemiteles apantelis*, new species

*Female*.—Length 4 mm. Head minutely granulate, slightly broader than thorax; temples narrower than eyes, rather strongly convex; combined face and clypeus nearly twice as broad as long, with a median elevation extending from below antennae to apex, the clypeus not separated, broadly rounded at apex with narrow reflexed margin; malar space slightly longer than basal width of mandible; cheeks convex; mandibles neither swollen at base nor constricted in middle; antennae as long as head, thorax, and first tergite, first three flagellar joints slender, first and second equal, third slightly shorter, flagellum apically barely thicker than at base. Thorax granulate with only the posterior face of propodeum polished; notauli subobsolete; sternauli fine, extending somewhat more than half the length of pleurum; scutellum strongly convex, not margined; propodeum completely areolated, basal lateral areas large, areola hexagonal with base and sides beyond costulae much shorter than the other sides; stigma nearly three times as long as broad, radius at about the middle, apical abscissa of radius evenly curved, the radial cell shorter on metacarpus than stigma; areolet open, stub of cubitus beyond recurrent parallel with radius; base of second discoidal cell longer than apex of brachial cell; nervulus postfurcal; nervellus inclivous, broken below middle. Abdomen as long as head and thorax, granulate basally, subpolished apically; first tergite flattened, without dorsal carinae, spiracles shortly beyond middle, postpetiole twice as broad as petiole; abdomen subcompressed at apex; ovipositor sheath about twice as long as first segment, slender.

Black, with basal half of antennae, mandibles, and legs beyond coxae dark reddish; wings hyaline with dark veins and stigma and two dusky bands, one below stigma and the other (sometimes wanting) along basal vein, stigma pale at base, tegulae brown.

*Male*.—Except sexually, essentially like female, but the propodeal carinae are somewhat weaker, the areola nearly equilateral; wings hyaline; legs piceous, with apical joint of front and middle trochanters, their femora at base and apex, their tibiae in front, and extreme base of hind femur and tibia, whitish; antennae black with only scape and pedicel pale beneath; tegulae pale.

*Type locality*.—Rye, New Hampshire.

*Host*.—*Apanteles melanoscelus* (Ratzeburg).

*Type*.—Cat. No. 28058, U.S.N.M.

Described from three females and three males, the two paratype females from Saugus and Boylston, Massachusetts, the males each the progeny of one of the females. The allotype is the progeny of the type.

<sup>1</sup> Received for publication Oct. 29, 1926; issued April, 1927.

**Gelis apantelis, new species**

This species is dimorphic, the male being winged.

In Strickland's key<sup>2</sup> the female runs to *longistylus* (Strickland), but in that species the antennae are nearly as long as the body, very slender filiform, with the first joint of flagellum more than four times as long as thick at apex; the propodeum comprises fully half the total length of the thorax and is barely arched above the level of the mesoscutum; the legs are exceptionally slender; the ovipositor sheath distinctly more than one and one-half times the length of the first segment; and the abdominal color quite different. The male runs nowhere conclusively.

In Brues's key<sup>3</sup> both sexes run to *ottawäensis* (Harrington), but in that species the mesoscutum is very short, the suture separating it from the pronotum is sub-obsolete, and the species belongs to the subgenus *Micromeson* Strickland. Because of the unusually slender first tergite the true *ottawäensis* runs in Brues's key to *texanus* (Cresson).

*Female*.—Length 2 to 4 mm. Head twice as broad as thorax and slightly more than twice as long as thick medially; temples convexly sloping (in the smallest specimen the head is relatively thicker with broader, more strongly convex temples); face nearly twice as broad as long; malar space slightly longer than basal width of mandibles; eye two-thirds as broad as long; diameter of lateral ocellus from one-half to two-thirds the length of ocell-ocular line, which is normally only half as long as postocellar line, but in small specimens relatively longer; mandibles slightly swollen near the base; antennae about two-thirds as long as body, slightly thicker toward apex, flagellum 16 to 19 jointed, first and second joints subequal and about three times as long as thick, others successively shorter, subapical ones fully as broad as thick. Thorax slightly more than twice as long as broad; mesoscutum barely as long as broad, about a half longer than pronotum medially, rather broadly rounded anteriorly; scutellum rather large but very faintly separated, not much shortened; propodeum comprising distinctly less than half the dorsal length of thorax, strongly arched above level of mesoscutum and frequently medially impressed at top, apical carina obsolete to distinct and highly arched medially, pleural carina weak to obsolete; legs rather stout, hind femur hardly five times as long as deep. Abdomen twice as broad as thorax, distinctly longer than head and thorax, with sparse pubescence; first tergite rather slender, barely half as wide apically as long, the sides nearly straight; second tergite barely longer than third, gastrocoeli obsolete; ovipositor slender, sheath a half longer than first tergite.

Head, thorax, first two tergites, and legs ferruginous to fusco-ferruginous; rest of abdomen black; antennae testaceous, black at apex.

*Male*.—Head barely wider than thorax; eyes large; malar space distinctly shorter than basal width of mandible; temples narrow; diameter of lateral ocellus from twice to several times as long as ocell-ocular line; antennae slender filiform, tapering apically, nearly as long as body, first flagellar joint distinctly longer than second. Thorax normal with very large scutellum, granulate; propodeum sub-completely areolated, the longitudinal carinae between the transverse carinae subobsolete; basal area large, quadrangular, areola hexagonal, costulae far before middle; petiolar area not or but little larger than areola and of nearly the same shape; basal areas granulate, others shining rugulose; legs very slender; wings fully developed; stigma hardly three times as long as broad, radius beyond middle. Abdomen narrow, first tergite less than twice as wide at apex as petiole; tergites 1 and 2 longitudinally striate, third obscurely granulate, others sub-polished.

Head and thorax black; abdomen black, with third tergite, apices of first and second, sides of second, and frequently basal middle of fourth, yellow; scape and mandibles yellowish; palpi pale; legs testaceous, trochanters pale, hind tibia and all tarsi fuscous; wings hyaline, venation dark, stigma pale at base.

*Type locality*.—Melrose Highlands, Massachusetts.

*Host*.—*Apanteles melanoscelus* (Ratzeburg).

*Type*.—Cat. No. 28059, U.S.N.M.

Described from a series of 8 females and 13 males, all of the males the progeny of 4 of the females, reared at the Gipsy Moth Parasite Laboratory.

The allotype is the progeny of the type.

<sup>2</sup> STRICKLAND, E. H. THE PEZOMACHINI OF NORTH AMERICA. *Ann. Ent. Soc. Amer.* 5: 115. 1912.

<sup>3</sup> BRUES, C. T. DESCRIPTIONS OF NEW ANT-LIKE AND MYRMECOPHILOUS HYMENOPTERA. *Amer. Ent. Soc. Trans.* 29: 120, 121. 1903.

**Gelis inutilis, new species.**

This species is also dimorphic with winged males.

Very similar to *apantelis* Cushman, but differing constantly in the available material as follows:

*Female*.—Length 3.5 mm. Ocell-ocular line nearly as long as postocellar line (in specimens of the same size in *apantelis* it is only about half as long as ocell-ocular line); scutellum very short and broad, weakly separated; propodeum not arched above level of mesoscutum, not medially impressed at top; hind tibia nearly as thick near apex as femur; first tergite fully twice as long as wide apically; ovipositor sheath hardly a half longer than first tergite.

Color as in *apantelis*.

*Male*.—Differs from male of *apantelis* as follows: Eyes not especially large; malar space as long as basal width of mandible; diameter of lateral ocellus not or barely as long as ocell-ocular line; hind tibiae rather conspicuously stout.

*Type locality*.—Eastern Massachusetts.

*Host*.—*Apanteles melanoscelus* (Ratzeburg).

*Type*.—Cat. No. 28060, U.S.N.M.

Described from two females and five males, the males progeny of the females, all reared from the host at the Gipsy Moth Parasite Laboratory.

The allotype is the progeny of the type.

**Gelis nocuus, new species.**

Another dimorphic species with winged males.

The female runs in Strickland's key<sup>4</sup> to *similis* (Strickland), but is at once distinguishable by its much shorter and more slender legs and antennae and less distinct scutellum. In Brues's key<sup>5</sup> it runs to *micariae* (Howard), in which the antennae are even stouter and shorter, being barely longer than head and thorax, and the clypeus is so short that the labrum is partially exposed.

The male runs in Strickland's key to *flavocinctus* (Ashmead), but differs in its entirely black head and thorax and in the color pattern of the abdomen. In Brues's key it runs to *micariae* (Howard), to which it is extremely similar, but from which it can be distinguished by the fact that the clypeus is hardly twice as broad as long and is obliquely impressed on each side at the apex so that it appears subacute, while in *micariae* it is more than twice as broad as long and apically broadly rounded.

*Female*.—Length 3.5 mm. Head barely twice as broad as thorax and only slightly more than twice as broad as thick medially; temples convexly receding; eyes very slightly divergent below; face hardly twice as broad as long; malar space slightly longer than basal width of mandible, furrow distinct; mandible slightly swollen basally; antennae somewhat longer than head and thorax, rather stout especially beyond middle, flagellum 18-jointed, basal joint hardly three times as long as thick at apex, subequal to second. Thorax hardly twice as long as thick; mesoscutum with prominent tubercles laterally, scutellum large and very faintly indicated; postscutellum obsolete; propodeum with only the lateral portions of apical carina, sloping strongly from basal third and arched only slightly above level of mesoscutum; prepectal carina convergent above with anterior margin of pleurum; legs stout. Abdomen longer than head and thorax by nearly the length of first tergite; first tergite fully twice as long as broad at apex, much longer than second; second and third equal; ovipositor sheath slightly longer than first tergite.

Head and thorax dark ferruginous; antennae paler at base, fuscous at apex; legs testaceous, hind femur and tibia apically more or less infuscate; first two tergites ferruginous; second more or less piceous; others black; extreme apex brownish.

*Male*.—Head with temples convexly sloping; diameter of lateral ocellus from as long as to distinctly longer than ocell-ocular line; malar space hardly longer than basal width of mandible; antennae nearly as long as body, slender filiform. Thorax granulate, pronotum laterally and propodeum behind more or less rugulose; notauli obsolete; propodeum with apical carina strong throughout, basal carinae medially and pleural carinae distinct, the carinae more or less obsolete, areolet more or less distinctly defined, rather large hexagonal, petiolar

<sup>4</sup> STRICKLAND, E. H. THE PEZOMACHINI OF NORTH AMERICA. Ann. Ent. Soc. Amer. 5: 116. 1912.

<sup>5</sup> BRUES, C. T. DESCRIPTIONS OF NEW ANT-LIKE AND MYRMECOPHILOUS HYMENOPTERA. Amer. Ent. Soc. Trans. 29: 120. 1903.

area much longer than posterior lateral areas; wings large, stigma nearly half as broad as long, with radius beyond middle; legs slender. Abdomen granulate striate basally, subpolished apically, narrow, postpetiole much longer than broad.

Head and thorax black; mandibles, scape, lower angle of pronotum, and legs red, hind tibiae and tarsi slightly infuscate, flagellum black; wings hyaline, venation dark, stigma pale at base and apex; abdomen flavo-ferruginous, blackish at apex.

*Type locality*.—Shrewsbury, Massachusetts.

*Host*.—*Apanteles melanoscelus* (Ratzeburg).

*Type*.—Cat. No. 28061, U.S.N.M.

Described from 6 females and 9 males all reared from the host at the Gipsy Moth Parasite Laboratory, 3 of the males, including the allotype, the progeny of the type.

### *Gelis bucculatricis* (Ashmead)

*Pezolochus bucculatricis* Ashmead, 1890, U. S. Nat. Mus. Proc. 12: 420, ♀ ♂;  
Dalla Torre, 1901-02, Cat. Hym., p. 615.

*Theroscopus americanus* Ashmead, 1896, Amer. Ent. Soc. Trans. 23: 211, ♂.

*Hemiteles ashmeadii* Dalla Torre, 1901-02, Cat. Hym., p. 643 (not *americanus* Cresson).

*Pezolochus bucculatricis* Strickland, 1912, Ann. Ent. Soc. Amer. 5: 139.

*Pezomachus americanus* Strickland, op. cit.

Only two of the three specimens of the type series of *bucculatricis*, a female and a male, are left. The female is hereby designated the holotype and the male the allotype.

The unique type of *americanus* is practically identical, except in its larger size, with the allotype of *bucculatricis*. Most of the 27 specimens from *Apanteles melanoscelus* are even larger, and include the hitherto undescribed winged male.

The genotype of *Pezolochus* Foerster is unknown to the writer. That genus is said to differ from *Gelis* by its short face. The face in *bucculatricis*, while perhaps somewhat shorter than in some other species of *Gelis*, is not conspicuously so, and the species is certainly a true *Gelis*.

Much more characteristic of this species is the carination of the propodeum, which is nearly identical in all three forms. The apical carina is strong and describes nearly an even semicircle between the obsolete pleural carinae; all the other carinae are absent. In the winged male both the apical and pleural carinae are somewhat stronger than in the other two forms.

The unsatisfactory original description of the species makes redescription advisable.

*Female*.—Length 2 to 4 mm. Head nearly twice as broad as thorax; temples convexly receding; eyes fully four-fifths as broad as long, divergent below; diameter of lateral ocellus hardly half as long as ocell-ocular line; face nearly twice as broad as long; malar space nearly as long as basal width of mandibles, with a distinct malar furrow (in larger specimens the head is relatively shorter from front to back, with correspondingly less strongly convex temples, longer postocellar line, and shorter ocell-occipital line (in the series considered in this study all the gradations in these characters are not present, but this is undoubtedly due to the fact that not all the gradations in size are available); mandibles subangularly swollen near base; antennae about three-fourths as long as body, slender, slightly thickened toward apex, flagellum 17 to 20 jointed, first joint about four times as long as thick, second very nearly as long as first, those beyond gradually shorter, those of apical fourth subequal and of equal length and thickness. Thorax more than twice as long as broad; mesoscutum slightly longer than broad, acutely rounded anteriorly, about twice as long medially as pronotum, slightly impressed in posterior middle; scutellum small but distinct; prepectal suture complete, convergent with anterior margin of mesopleurum; propodeum in profile evenly arched from base to carina, thence flat, higher than mesoscutum; legs rather slender, hind femur about five times as long as deep. Abdomen as long as head and thorax, about half as broad as long and twice as broad as thorax, with very short, sparse pubescence; first tergite nearly or quite two-thirds as broad at apex as long, gradually broadening from base to apex, petiole not or only faintly constricted, least so in smallest specimens; second tergite slightly longer than third, gastrocoeli distinct; ovipositor sheath barely as long as first tergite.

Head and thorax pale ferruginous to fuscous with vertex and sutures slightly darker; mandibles pale; antennae pale testaceous basally, more or less infuscate apically; legs testaceous to fuscous, the coxae, at least below, trochanters, tibiae above and basally, and tarsi always of the lighter color; basal two tergites ferruginous, sometimes slightly infuscated with the apices yellowish, other tergites black, with apices indistinctly reddish, as are sometimes also the apical tergites.

*Wingless male*.—Of same length as female but more slender, with head distinctly less than twice as broad as thorax; larger scutellum; distinct postscutellum, tegulae, and wing vestiges; longer, more slender, filiform flagellum with first joint much longer than second; eyes larger and less strongly diverging below; diameter of lateral ocellus half to two-thirds as long as ocell-ocular line; propodeum not arched above level of mesoscutum, with medially stronger apical carina and more shining petiolar area; narrower parallel-sided postpetiole; and more slender legs.

Color arranged as in female but generally darker; on abdomen the ferruginous color is frequently replaced by fuscous or black, the apices of the first two tergites rather pale yellow.

*Winged male*.—Compared with wingless male, differs as follows: Head barely broader than thorax, diameter of lateral ocellus from two-thirds to fully as long as postocellar line; thorax of normal form, with fully developed mesothorax and wings; and propodeum relatively smaller. Wings hyaline with a faint cloud below the stigma and slightly infumate along the basal vein; stigma more than half as broad as long, fuscous with base whitish, radius beyond middle; radial cell shorter on metacarpus than stigma; discocubitus angularly broken at or near middle, ramellus frequently present; second recurrent arcuately inclivous; nervulus postfurcal; nervellus slightly inclivous and broken below middle.

Color same as in wingless male.

Redescribed from type and allotype of *bucculatricis*; type of *americanus*; one female and one wingless male from Ohio; one female reared from an *Apanteles* cocoon in Riley County, Kansas, by J. B. Norton; and 8 females, 12 wingless males, and 7 winged males all reared at the Gypsy Moth Parasite Laboratory from cocoons of *Apanteles melanoscelus*. Many of the latter lot are progeny of certain of the females.

### *Gelis urbanus* (Brues)

*Pezomachus urbanus* Brues, 1910, Wis. Nat. Hist. Soc. Bul. 8: 70, ♂.

The writer believes he is correct in referring to this species a series of 21 specimens including, in addition to the wingless male, both the female and the winged male. The last two forms were unknown to the author of the species. They are described below. A brief comparative description of the wingless male is also included.

*Female*.—Length 3 to 4 mm. Head twice as broad as thorax, about twice as broad as long medially from above; temples convexly receding; face nearly twice as broad as long; malar space fully as long as basal width of mandible, furrow distinct, eye three-fourths as broad as long; diameter of lateral ocellus from distinctly less than to about half as long as ocell-ocular line; width of ocellar triangle distinctly less than length of ocell-occipital line; (variation in the head is of the same nature as that in *bucculatricis*); mandibles not basally swollen; antennae three-fifths as long as body, rather stout, slightly thicker toward apex, flagellum 18-jointed; basal joint hardly four times as long as thick, slightly longer than second, those beyond successively shorter, subapical ones quadrate. Thorax with mesoscutum about as long as broad, acutely rounded anteriorly, less than twice as long as pronotum medially; scutellum faintly defined anteriorly; prepectal carina complete, convergent with anterior margin of mesopleurum; propodeum with apical carina complete, highly arched medially, the propodeum in profile evenly arched from base to carina, slightly higher than mesoscutum, pleural carinae wanting; legs rather stout, hind femur less than five times as long as deep. Abdomen longer than head and thorax by about the length of the first segment, half as broad as long and twice as broad as thorax, pubescence very sparse and short; first tergite nearly twice as long as broad at apex, sides nearly straight; second tergite slightly longer than third, gastrocoeli obsolete; ovipositor sheath subequal in length to first tergite.

Head fusco-ferruginous, black above; antennae ferruginous, black at tips; thorax from pale ferruginous to fusco-ferruginous with sutures darker; legs testaceous to fuscous, paler basally, and on upper surface of hind tibia; basal two

tergites ferruginous, sometimes yellowish apically; second more or less infusate basally, others black, in lighter specimens with apex of second tergite and the apical tergites somewhat reddish.

*Wingless male*.—This is the form described by Brues. Of same length as female but more slender, with distinct scutellum, postscutellum, tegulae, and vestiges of wings, larger mesoscutum and ocelli, shorter malar space, narrower face, lower propodeum, filiform antennae with basal joint of flagellum distinctly longer than second, more slender legs and abdomen. In color of head and thorax like female but averaging darker, with propodeum distinctly darker than mesothorax; abdomen black with apices of first two tergites yellowish and of third sometimes reddish.

*Winged male*.—Head barely broader than thorax; diameter of lateral ocellus from two-thirds to fully as long as ocell-ocular line; thorax and wings fully developed; propodeum nearly straight above, with only the petiolar and apical pleural areas defined, pleural carinae obsolete; wings hyaline immaculate, veins and stigma black, latter pale at base, stigma nearly three times as long as broad, radius at apical third, radial cell shorter on metacarpus than stigma, discocubitus subangular before middle; second recurrent arcuately inclivous, nervulus slightly spostfurcal, nervellus inclivous and broken below middle.

Black, the face and pronotum sometimes stained with reddish and the basal two tergites yellow at apex; antennae and legs as in wingless male.

Redescribed from a series of 7 females, 11 wingless males, and 3 winged males, all reared from cocoons of *Apanteles melanoscelus* at the Gipsy Moth Parasite Laboratory. All the males and one of the females are progeny of the other six females.