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**A REVIEW OF THE WORLD GENERA OF THE
TRIGONODERINI, WITH A REVISION OF THE SPECIES
OF NORTH AMERICA NORTH OF MEXICO
(HYMENOPTERA: PTEROMALIDAE)**

by

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Abstract. Cladistic analysis of the genera of the Trigonoderini *sensu* Hedqvist (1968) was conducted using the Phylogenetic Analysis Using Parsimony (PAUP) program on a matrix of 23 two state and 6 multistate characters. Outgroup taxa included *Dinotiscus* (Pteromalinae), *Panstenon* (Panstenoninae), and *Susteraia* (Miscogastrinae). Two rounds of character state optimization of the multistate characters using transformation series analysis (Mikevich 1982) were performed before the state transformations were optimized. Two equally parsimonious trees of 52 steps with a consistency index of 0.69 resulted. Analysis of these trees suggests that the Trigonoderini, *sensu* Hedqvist and authors, is actually composed of two distinct lineages. The *Trigonoderus*-group contains the genera *Plutothrix* Förster, *Trigonoderus* Westwood, *Ogloblinisca* Hedqvist, and *Miscogasteriella* Girault, and is defined by the presence of a mouth margin with a reflexed carinate rim and that is usually more or less concave laterally, a tendency toward only weak sculpture on the gena, and the prepectus with the postero-dorsal corner bent and delimited anteriorly by a sharp carina. The *Gastracanthus*-group contains *Janssoniella* Kerrich, *Platygerrrhus* Thomson, *Erdoesia* Bouček, and *Gastracanthus* Westwood, and is defined by the head being triangular in anterior view and by the presence of large and deep anterior tentorial pits. *Eutelisca* Hedqvist is hypothesized to be only distantly related to the genera of the *Trigonoderus*-group. *Trigonoderoides* Masi **n. syn.** is placed in synonymy under *Miscogasteriella* Girault, and *Hebestephus* Kamijo **n. syn.** is placed in synonymy under *Gastracanthus* Westwood. A key is provided for the world genera of the genera treated.

Each genus with Nearctic species is reviewed with some additional taxa described that had phylogenetic importance. Keys are provided for Nearctic species. *Janssoniella* includes *J. caudata* Kerrich, *J. iskophila* **n. sp.**, and *J. intermedia* Hedqvist. *Platygerrrhus* includes *P. algonquinus* (Girault), *P. americanus* Hedqvist, *P. columbianus* (Ashmead), and *P. irvingi* (Girault) **n. comb.** (from *Trigonoderus*). A lectotype is designated for *P. algonquinus*. *Gastracanthus* includes *G. conicus* (Girault). A new oriental species, *G. atrobaculus* **n. sp.**, is also described. *Plutothrix* contains *P. aerata* **n. sp.**, *P. ascita* **n. sp.**, *P. ceonotalis* **n. sp.**, *P. cisae* Hedqvist, *P. glareosa* **n. sp.**, *P. ligyptera* **n. sp.**, *P. pilosiclava* **n. sp.**, *P. recula* **n. sp.**, *P. smithi* **n. sp.**, *P. uncutta* (Girault), and *P. uncuttella* **n. sp.** No Nearctic species are described for *Trigonoderus*, but the genus is reported from the region. *Ogloblinisca* contains the Nearctic species *O. americana* Hedqvist. Two new species of *Eutelisca* are described including *E. luteocaudata* **n. sp.** and *E. metalliscapa* **n. sp.**

Platygerrrhus scolyti Ashmead, 1894 is transferred from *Roptrocerus* Ratzeburg to *Cheiopachus* Westwood as *C. scolyti* (Ashmead) **n. comb.** According to Z. Bouček, based on the examination of the type, *Ormocerus pallidipes* Ashmead should be transferred from *Gastracanthus* Westwood to *Frena* Bouček as *F. pallidipes* (Ashmead) **n. comb.** This new combination reported herein should be attributed to Z. Bouček. *Trigonoderus aegeriae* Ashmead is referred to *Halticoptera* Spinola as *H. aegeriae* (Ashmead), **n. comb.** and *Trigonoderus nonstylatus* Girault to *Seladerma* Walker as *S. nonstylatum* (Girault), **n. comb.**

Introduction. The tribe Trigonoderini is a taxon of relatively large, and often brightly metallic pteromalids. Though none of the 12 nominal genera is very speciose, species of this tribe occur throughout the world except possibly in Africa. In my experience, trigonoderines are seldom collected by sweeping, but can be collected in numbers in Malaise traps or by rearing from fleshy shelf fungi or dead wood infested with bark beetles.

Though genera of the Trigonoderini were known by the end of the last century, placement of these genera has varied widely. Early workers (Ashmead 1904, Förster 1856, Thomson 1878) grouped the genera currently comprising the Trigonoderini together with those currently forming the Cleonyminae, probably based on overall phenetic similarity. The genera of the Trigonoderini were first recognized as forming a distinct tribe by Bouček (1958), but Nearctic workers (Burks 1979, Peck 1963) continued to place the trigonoderine genera together with those of the Cleonyminae (see Graham 1969:98 for a history of the group). Graham (1969) supported Bouček's opinion that the genera of the Trigonoderini formed a distinct group and proposed that this tribe was most closely affiliated with other generic groups he placed together in his Miscogasterinae. The characters he used to support this relationship (the form of the mesosoma and antenna, the long postmarginal vein, and the asymmetrical anterior margin of the clypeus) are probably all ground plan characters within the Miscogastrinae with the possible exception of the asymmetrical clypeus. Bouček (1988:401–402) maintained the Trigonoderini as a distinct taxon, but transferred it to the Pteromalinae for reasons which were not explicitly stated. He defined the tribe on the basis of the relative narrowness of the middle lobe of the mesoscutum compared to its side lobes. This character, though useful for quick recognition of many specimens belonging to trigonoderine genera, is not universally developed within the tribe and the thoracic structure in other groups of Pteromalidae—such as Panstenoninae—is very similar.

Bouček (1988) also proposed that the Trigonoderini might be affiliated with the Colotrechninae on the evidence that some South American trigonoderine genera (such as *Eutelisca* Hedqvist) placed in the Trigonoderini *sensu* Hedqvist (1968) similarly have the axillula slightly inflated causing the scutellum to appear to be margined laterally by grooves. This hypothesis certainly deserves more study, however, as I shall show in my phylogenetic analysis, it is unclear if *Eutelisca* is really a member of the Trigonoderini.

A prime source of this taxonomic confusion is that trigonoderine genera are among the most primitive of all pteromalid genera. They are morphologically generalized and even their trophic relations, mostly as parasitoids of wood- or fungus-dwelling insects, are thought to be plesiomorphic for the Pteromalidae (Hedqvist 1961, Darling 1988, Bouček 1988:210–211). Their generalized morphology makes it difficult to find synapomorphic characters to define the Trigonoderini even though trigonoderine genera share a common gestalt. But in fact, it is possible that even this common gestalt is only the consequence of their association with wood boring insects. Other pteromalids that parasitize wood-boring insects (such as members of the Cleonyminae, and genera of the Pteromalinae such as *Dinotiscus* Ghesquière, *Rhopalicus* Förster, and *Cheiopachus* Westwood) are morphologically similar to the Trigonoderini—rather robust in build, but elongate, with gasters that are often longer than the combined length of the head and mesosoma.

I am herein undertaking this revision of the Trigonoderini as part of my continuing study of the pteromalid subfamily Miscogastrinae. This study is the first to use explicit cladistic methodology to determine relationships within the Trigonoderini. The primary objectives of this paper are to discuss characters for defining the Trigonoderini, to better characterize the included genera, to determine their phylogenetic relationships, and to revise the species of the Nearctic region. The Neotropical genus *Eutelisca* Hedqvist is revised and a new Oriental *Gastracanthus* species, *G. atrobaculus* n. sp., is described herein because these two taxa are phylogenetically significant to this analysis. A revised key to the world's trigonoderine genera is also presented since only three of the world's nine genera do not occur in the Nearctic region.

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Materials and methods. Terminology in this paper generally follows that of Graham (1969), except that genal concavity is used instead of genal hollow, the lower ocular line (abbreviated LOcL) is an imaginary line across the face between the most ventral point of the orbits, the pit in the middle of the scrobes in some genera is called the scrobal pit, club is used instead of clava, the elongate raised sensilla on the antennal flagellar segments are called multiporous plate (abbreviated MPP) sensilla, the middle body tagma including the thorax and propodeum is called the mesosoma, and the gastral terga are numbered T1–7 beginning with the first tergite after the petiole. The following abbreviations are used: median ocellar diameter is MOD, ocellar-ocular distance is OOL, posterior ocellar distance is POL, lateral ocellar distance is LOL, antennal funicular segments basally to distally are F1 through F6, antennal club segments are C1 through C3, and the gastral terga are T1 through T7. Sculpturing is defined according to Harris (1979). The units of measurement given in the descriptions can be converted to millimeters by multiplying by 0.02. The type specimens of the Trigonoderine genera were not seen except when noted. Since this group has been reviewed so many times, there is little uncertainty as to the identity of the species. However, in all cases, material certain to belong to the type species was seen.

CLADISTIC ANALYSIS

Phylogenetics. The world's genera of the Trigonoderini were last reviewed by Hedqvist (1968) who recognized eleven genera. His study typifies a recurrent problem with pteromalid genera: they are too often defined on the basis of unique combinations of characters with too little consideration of phylogenetic relationships. According to Hedqvist, the genera of the Trigonoderini show three obvious characters—whether the clypeus has an anterior denticle or not, whether the prepectus has a carina setting off its posterior corner or not, and whether the propodeum has a median sulcus or not. These three characters in various combinations are used to define trigonoderine genera; six of the eight combinations of these three characters being found among trigonoderine genera. Cladistic analysis was used in an attempt to improve trigonoderine generic definitions using these three and many other characters.

For cladistic analysis of the Trigonoderini, a character matrix of 23 two-state and 6 multistate characters of external morphology was compiled (Table 1). All characters traditionally used to separate trigonoderine genera, and all other characters I thought to be of value were included. Two autapomorphous characters were also included (Characters 5 & 24) in the data matrix and mapped onto the trees because these characters are used to define certain taxa (Character 5 for *Platygerrhus* and Character 24 for *Gastracanthus*). They were not used in the tree building and were only included to facilitate character analysis and discussion.

The taxa used to compile the data matrix are listed in Table 2. When species within a genus had different character states, the character was entered in the matrix as a variable character with every character state observed in any species represented. The only exception was

Gastracanthus nigrescens Kamijo, which was so different from other *Gastracanthus* species that it was run as a separate taxon. The character distributions within genera with such variable characters are discussed in the character definitions which follow. The multistate characters were run as unordered characters except for Characters 10, 12 and 16 for which plausible state transitions are hypothesized in the character discussions to follow. Analysis of the state transformations for the multistate characters was then performed using transformation series analysis (Michevich 1982).

The character states were polarized with respect to the three outgroup taxa—*Dinotiscus* (Pteromalinae), *Panstenon* Walker (Panstenoninae), and *Susteraia* Bouček (Miscogastrinae, Miscogastrini). These taxa were used as outgroups because they are each among the most primitive genera of the pteromalid subfamilies in which I believe the nearest relatives of the genera of the Trigonoderini probably occur. The Trigonoderini were placed in the Pteromalinae by Bouček (1988), and *Dinotiscus* is one of the most morphologically generalized of those Pteromalinae that are parasitoids of wood-boring insects. *Panstenon* is the single genus comprising the subfamily Panstenoninae. Like the Trigonoderini, *Panstenon* is a morphologically generalized taxon of uncertain affinity. *Panstenon* species are parasitoids of Diptera in grasses. The Trigonoderini were placed in the Miscogastrinae by Graham (1969) mainly because the asymmetrical anterior clypeal denticle found in several trigonoderine genera is reminiscent of the asymmetrically arranged apical denticle common in the more primitive genera of the Miscogastrinae. The miscogasterine genus phenetically most similar to the Trigonoderini is *Susteraia*. The hosts of *Susteraia* are insects living in the seeds of maple (*Acer*) (Bouček 1972).

In most cases, when there were two character states among the three outgroup taxa, the character state possessed by two of the outgroup taxa was assigned state 0. Polarity assignments in those cases where this majority rule was not followed, or in cases where all three outgroup taxa had different character states are discussed below.

1. Head shape (in frontal view): quadrate or pentagonal (figs. 50, 55, 61, 63, 64, 76, 78) [0]; triangular—genae straight and convergent with the oral fossa much narrower than the vertex (figs. 10, 18, 34) [1]. *Eutelisca metalliscapa*, n. sp. and *E. luteocaudata*, n. sp. have the head pentagonal; *E. chilensis* Hedqvist has a triangular head. *Janssoniella intermedia* Hedqvist has a quadrate head; *J. caudata* Kerrich and *J. iskophila*, n. sp. have triangular heads. *Platygyrrhus irvingi* (Ashmead) and *P. americanus* Hedqvist have quadrate heads; *P. algonquinus* (Girault) and *P. columbianus* (Ashmead) have triangular heads.

2. Anterior margin of the clypeus: truncate (fig. 34) or straight (figs. 10, 14, 71) [0]; with single asymmetrically arranged denticle (figs. 50, 55, 61, 80) [1]; emarginate medially (fig. 18) [2]; roundly produced [3].

3. Anterior tentorial pits: not visible or appearing as minute pin-pricks (figs. 55, 61, 76, 78) [0]; distinct pits at dorso-lateral corners of the clypeus (figs. 10, 14, 18, 34) [1].

4. Genal mouth margin: mouth margin without carinate rim or with simple carinate rim, convex laterally (fig. 34) [0]; mouth margin with reflexed carinate rim and usually more or less concave laterally (fig. 75) [1].

5. Genal texture: raised reticulate or coriaceous (fig. 32) [0]; smooth (fig. 75) [1]. *Plutothrix smithi*, n. sp. has the gena raised reticulate; *P. scenicus* (Walker), *P. glareosa*, n. sp., and *P. cisae* Hedqvist have the gena smooth. *Trigonoderus pulcher* Walker has the gena coriaceous; *T. cyanescens* (Förster) has the gena smooth. *Ogloblinisca maculata* Hedqvist has the gena weakly coriaceous; *O. americana* Hedqvist has the gena smooth.

6. Antennal scrobes: shallow [0]; deep (figs. 50, 55) [1]. *Eutelisca luteocaudata* n. sp. and *E. metalliscapa* n. sp. have shallow antennal scrobes; *E. chilensis* has deep antennal scrobes.

Gastracanthus atrobaculus has shallow antennal scrobes; the other *Gastracanthus* species examined all have deep antennal scrobes.

7. Scrobal pit: scrobes without median pit (fig. 34) [0]; with median pit or slit (figs. 50, 55) [1]. *Ogloblinisca americana* lacks a scrobal pit; *O. maculata* and *O. flavipes* Hedqvist have a weak scrobal pit. The scrobal pits are circular in *Trigonoderus cyanescens*, *T. princeps*, and in all New World *Trigonoderus* specimens examined; the pit is slitlike in *T. filatus* Walker, *T. pulcher*, and in all Oriental and Far Eastern *Trigonoderus* specimens examined.

8. Vertex sculpture: reticulate or coriaceous [0]; smooth [1].

9. Female claval micropilosity: none visible or patch minute (figs. 8, 12, 16) [0]; with line of micropilosity down ventral side of club (fig. 72) [1]; with micropilosity in terminal ovate patch (fig. 22) [2]; with micropilosity in ventral ovate patch (fig. 43) [3]. *Eutelisca chilensis* has a ventral ovate patch of micropilosity on the club; the other *Eutelisca* species examined have no micropilosity visible there. *Trigonoderus cyanescens* has no visible micropilosity on the club; *T. pulcher* has a line of micropilosity down the ventral side of the club. *Plutothrix scenicus* and *P. pilosiclava* n. sp. have large regions of micropilosity on the ventral side of the female club; the other *Plutothrix* species examined have no or very small patches of micropilosity on the female club.

10. Mandibular teeth: both mandibles with three teeth [0]; left mandible with three teeth; right mandible with four [1]; both mandibles with four teeth [2]. It was assumed that the number of teeth in the left and right mandibles changed along the character morphocline 3:3 to 3:4 to 4:4. Having three teeth in both mandibles was considered primitive on the recommendation of Z. Bouček (pers. comm.). Having three (or even fewer) teeth in the mandibles is common in more primitive Pteromalidae; having four teeth in at least one mandible is nearly always the rule in more derived genera.

11. Pronotal length: pronotal length less than half its width (figs. 77, 79, 84) [0]; pronotal length more than half its width (fig. 21) [1]. This character was included in the analysis, not because of any proven gap in the proportions of the pronotum among trigonoderine genera, but because it has traditionally been used to define the Trigonoderini, and especially to separate *Gastracanthus* from related genera. *Gastracanthus* species were said to have the pronotal length more than half its width; other genera have its length less than half its width. However, there is considerable variability in this character within species and genera. The ratio of pronotal length to width varied between 0.57–0.72 in the three females of *G. pulcherrimus* measured, and from 0.37–0.48 in the four females of *Janssoniella intermedia* measured. Male *Janssoniella* may even have the pronotum more than half as long as wide (ratios= 0.55 and 0.63 for two male *Janssoniella intermedia* measured). Both males and females of *Platygerrhus algonquinus* and *P. columbianus* have the pronotum more than half as long as wide (range for *P. algonquinus* was 0.55–0.77; for *P. columbianus* was 0.52–0.64); *P. irvingi* has the pronotum length less than half its width, and females have their pronotum almost half as long as wide (range 0.37–0.48).

12. Pronotal collar: pronotum declining immediately from the anterior margin of the mesoscutum (figs. 9, 17) [0]; pronotum with a short anterior horizontal strip, called the collar, that is margined anteriorly by a transverse carina (figs. 52, 77, 79) [1]; the pronotal collar without the anterior transverse carina (figs. 19, 20, 25, 54) [2]. *Panstenon oxylus* (Walker) has a pronotal collar but it lacks an anterior carina; *P. agylla* (Walker) has the pronotal collar carinate. *Eutelisca chilensis* and *E. metalliscapa* have a pronotal collar but it lacks an anterior carina; *E. luteocaudata* has the pronotum carinate anteriorly. *Ogloblinisca maculata* has the pronotal collar carinate anteriorly, but *O. americana* has the pronotal collar very weakly carinate and so

Ogloblinisca was coded as ambiguous (1, 2). It was originally hypothesized that no collar is the primitive state and that a horizontal collar must be present before it can develop an anterior transverse carina. Evolutionary character analysis of this character set suggested that the primitive state is having a collar with an anterior carina, and that sometimes the entire collar is lost (State 0) and sometimes just the anterior carina is lost (State 2).

13. Pronotal shape: the lateral edges of the pronotal collar roughly parallel in dorsal view (figs. 21, 65) [0]; the lateral edges of the pronotal collar convergent posteriorly in dorsal view (figs. 77, 79) [1].

14. Notauli: visible as furrows or grooves and extending to the hind margin of the mesoscutum (figs. 9, 17, 19, 21, 52, 54) [0]; notauli not visible in the posterior part of the mesoscutum [1]. Complete notauli were coded as plesiomorphic even though both *Panstenon* and *Dinotiscus* have incomplete notauli because complete notauli are probably the groundplan state of the Chalcidoidea and almost certainly also of the Pteromalidae. Complete notauli occur in almost all subfamilies of the Pteromalidae and also occur widely in closely related chalcidoid families such as the Torymidae and Eurytomidae.

15. Frenum: frenal length more than 1/5th the scutellar length (figs. 19, 33, 49, 51, 53) [0]; frenal sulcus displaced posteriorly so the frenal length is less than 1/7th the scutellar length (figs. 17, 31) [1].

16. Prepectal corner: prepectus flat, reticulate, and without a carina delimiting the posterior corner (fig. 30, 32, 35) [0]; prepectus with the posterior corner bent and in a different plane from the remainder of the prepectus, this corner delimited antero-ventrally by at most a weak carina (fig. 81) [1]; this bent posterior corner delimited antero-ventrally by a strong carina (figs. 56, 70) [2]. *Eutelisca chilensis* and *E. metalliscapa* have the hind corner of the prepectus bent but not delimited anteriorly by a carina; *E. luteocaudata* has the bent posterior prepectal corner margined anteriorly by a weak carina formed by the raised edges of the alveolate sculpturing. The carina exhibited by species in the other genera of the *Trigonoderus*-group is sharp and straight, and occurs even though the prepectus has irregular sculpture or lacks sculpture altogether. In polarizing Character 16, a similar argument to that used in Character 12 is proposed—the prepectal corner must be bent before it can become carinate. In the Pteromalidae to my knowledge, a carina setting off the hind corner of the prepectus only occurs when that corner is bent relative to the anterior basal portion.

17. Prepectal setae: posterior corner of prepectus bare (fig. 56) [0]; posterior corner setose (fig. 70) [1]. This character was not coded for in those taxa lacking any bend or carina delimiting the posterior corner because of the lack of a homologous region in these taxa. However, the prepectus in all these taxa is asetose, so that condition was chosen for the primitive state. Of all the *Trigonoderus* species examined, only *Trigonoderus cyanescens* has the posterior corner bare.

18. Coxal shield: area posterior to the fore coxae may be delimited by convergent grooves, but this area not elevated (fig. 30) [0]; the delimited area posterior to the fore coxae elevated relative to the remainder of the mesosternum (fig. 32) [1].

19. Propodeum: flat or carinate medially (fig. 31, 49, 51, 53) [0]; with median longitudinal groove (figs. 77, 79) [1]. The propodeum of *Trigonoderoides* Kamijo is divided into two parts (fig. 79). The anterior half is depressed relative to the posterior part, as in *Neocatolaccus* Ashmead, and is carinate medially; the posterior median part has a median longitudinal costate groove. *Trigonoderoides* was assigned state 1 because the longer posterior part of the propodeum is hypothesized to be homologous with the median propodeal panels of other genera. The

depressed anterior portion may be created by a broadening of the anterior transverse groove present to a greater or lesser degree on the propodeum of most Pteromalidae.

20. Alar speculum: present (figs. 3, 7, 9, 13, 48) [0]; greatly reduced or absent (fig. 69) [1].

21. Hind tibial spurs: two spurs [0]; one spur [1]. Two spurs is assumed to be the primitive state in this analysis because this condition is probably the ground plan state of the Chalcidoidea and probably the Pteromalidae.

22. Female petiole: indistinct (figs. 9, 17) [0]; distinct (figs. 19, 25, 65) [1].

23. T1 emargination: not emarginate (figs. 9, 17, 27, 47) [0]; emarginate (figs. 29, 45) [1]. This character is of limited phylogenetic significance because the development of the emargination varies among and even within species. *Plutothrix unguetella* and some specimens of *P. unguetta* have the hind margin of T1 nearly entire.

24. T1 hind margin: straight (figs. 9, 17, 27) [0]; produced (fig. 26) [1].

25. Male flagellar texture: setae of average length and density, MPP sensilla sparse (figs. 6, 23, 24, 60) [0]; setae very short or nearly absent, MPP sensilla dense (figs. 59, 74) [1]. *Platygerrius irvingi* has the flagellum setose and with few MPP sensilla; *P. algonquinus* has the flagellum nearly bare and with numerous MPP sensilla; the state of the antennal setae in the other *Platygerrius* species included in this analysis are unknown. Among *Plutothrix* species examined, only *P. unguetta* has antenna as characterized by state 1.

26. Male flagellar setae: setae absent or reclinate (figs. 59, 60, 74) [0]; setae erect (figs. 23, 24, 58) [1]. *Janssoniella caudata* and *J. iskophila* have the flagellar setae reclinate; *Janssoniella intermedia* has the setae erect. Among *Plutothrix* species examined, only *P. senicus* and *P. smithi* have the setae erect.

27. Male flagellar setae papillate: flagellum smooth, setae not arising on small tubercles (or papillae) (fig. 60) [0]; flagellum granular, setae arising on small papillae (fig. 58) [1]. Among *Plutothrix* species examined, only *P. senicus* and *P. smithi* have the setae papillate.

28. Male claval articulation: terminal three flagellar segments forming a compact club (figs. 6, 23, 59, 60) [0]; only the terminal two segments forming a compact club (fig. 24) [1]; all flagellar segments independently articulated (figs. 66, 74) [2].

29. Male petiole: transverse [0]; nearly as long or longer than wide [1].

Parsimony analysis was performed using PAUP (Version 3.0f) for the Macintosh computer (Dave Swofford, Illinois Natural History Survey). The branch swapping option was set to general, MULPARS was on, and the addition sequence was simple. All characters were given equal weights.

Cladistic analysis gave two trees of 50 steps (fig. 1). Branch and bound analysis confirmed that these two trees are the shortest for this data set. The c.i., excluding autapomorphous characters, is 0.71. Constraining the program to use all available data, and add steps for the character changes required if terminal taxa have multiple character states, increases the tree length to 76 steps, and lowers the c.i. for informative characters to 0.47.

The two trees differed only in the branching order of *Eutelisca* and *Susteraia*. The two characters that behave differently are character 16, the shape of the prepectus, and character 23, the emargination of the hind margin of T1. Tree A is intuitively more likely than tree B because it

only requires an extra reversion to the primitive state in character 23 on the branch going to *Eutelisca*. character 23, the shape of the hind margin of T1, is variable within trigonoderine genera and even within some species of *Plutothrix*. Tree B requires the reversion of character 16 to the primitive state on the branch leading to *Susteraia*. Character 16, the structure of the prepectus, is a complex character that is constant within other genera of the Trigonoderini and so is probably less liable to reversion. Tree A is the one that is used during the remainder of this discussion, but because of the great similarity between the two trees, nearly all of the conclusions reached remain the same.

Evolutionary Character Analysis. Transformation series analysis (Mickevich 1982) was performed on the multistate characters used in order to analyze the state transformations for these characters. Character state trees for the six multistate characters, derived according to the methods outlined in Mickevich and Weller (1990), are shown in figure 2.

Transformation series analysis suggested that most of the characters were correctly interpreted initially. In Character 2, the condition of the anterior clypeal margin, the single asymmetrical tooth and the median emargination arise independently from the primitive state—zclypeal margin either straight or truncate. The origination of the roundly produced clypeus is uncertain. In Character 9, the condition of the micropilosity on the female club, each of the derived states originates independently from the ancestral state. Character 10, the number of teeth on the mandibles, is an ordered character with state transitions occurring in the order hypothesized. The cladogram character for Character 16, the condition of the prepectus, differs for the two trees. In Tree A, it is an ordered character with transitions occurring as hypothesized in the original coding; in Tree B, each of the derived states originates independently from the ancestral state. Character 28, the condition of the male club, is an equitransitive character with each state changing into each of the other two states on the cladogram.

Character 12, the condition of the pronotal collar, is the only character for which a different interpretation of character evolution from that originally proposed was suggested by the evolutionary character analysis. It was originally hypothesized that no developed horizontal collar was the primitive state (State 0), and that the development of a horizontal collar (State 2) preceeded the development of an anterior transverse carina (State 1) which further strengthened the pronotum. Evolutionary character analysis for this data set suggests that the primitive condition is having a collar with an anterior carina, and that sometimes the entire collar is lost and sometimes just the anterior carina is lost. Recoding Character 12 to reflect this change and reanalysing the data set reduced the tree length by two steps, but left the structure of the trees derived intact.

After two rounds of analysis, the character state changes as evidenced by their behavior on the cladogram were the same as those used to code the characters, so the analysis was considered completed *sensu* Mickevich (1982)].

REVIEW OF TRIGONODERINE GENERIC CLASSIFICATION

Several shortcomings in the current classification of the genera in the Trigonoderini are obvious on Tree A. The first is the lack of evidence for the monophyly of the Trigonoderini. The trigonoderine fauna of Europe has been reviewed twice (Kerrich and Graham 1957, Graham 1969) and the world's fauna three times (Ashmead 1904, Bouček 1958, Hedqvist 1968), and always with very little discussion of a definition for the group. The final couplets of keys to the Trigonoderini often take the form of "either/or statements". Even the placement of this taxon within the Pteromalidae has always been uncertain. As mentioned before, the genera making up the Trigonoderini have been grouped with the genera which currently form the Cleonyminae (Förster 1856, Thomson 1878, Ashmead 1904, Schmiedeknecht 1909, Kerrich and Graham 1957),

Miscogastrinae (Graham 1969), Pteromalinae (Bouček 1988), or were left unplaced (Bouček 1957, Hedqvist 1968).

The cladistic analysis undertaken herein suggests that the trigonoderines are probably a polyphyletic taxon of two independent groups of genera. The *Trigonoderus*-group (excluding *Eutelisca*) (stem 19), is defined by the presence of a mouth margin with a reflexed carinate rim and usually more or less concave laterally (4:0→1), a tendency toward weak sculpture on the gena (5:0→1), and the prepectus with the postero-dorsal corner bent and delimited anteriorly by a sharp carina (16:1→2). The *Gastracanthus*-group (stem 26) is defined by the head being triangular in anterior view (1:0→1) and by the presence of large and deep anterior tentorial pits (3:0→1). This latter character may not be a autapomorphy defining the *Gastracanthus*-group since similar deep anterior tentorial pits are found in the enigmatic Macromesinae and other pteromalid genera such as *Acaenacis* Girault (Pteromalinae).

Splitting the trigonoderines into two separate taxa along the lines outlined above is probably advisable sometime in the near future, but I believe it is a little premature to do so now for two reasons. First, the pteromalid fauna of the Neotropical region is rapidly becoming better known and several taxa occur there that may be important for improving the classification of the Trigonoderini. Revision of the Neotropical Colotrechninae is especially important. The known Neotropical fauna contains genera such as *Eutelisca* that are transitional between the genera of the *Trigonoderus*- and *Gastracanthus*-groups. Second, molecular phylogenies for the Pteromalidae will probably soon be available to refute or corroborate this hypothesis. In the meantime, the keys in such works as Bouček (1988) and Bouček and Rasplus (1991) are sufficient for identifying genera of this 'tribe'.

A second and related problem is the taxonomic status of *Eutelisca*. In view of its lack of the synapomorphies which unite the other genera of the *Trigonoderus*-group — the reflexed mouth margin and the sharp anterior carina on the prepectus — and its possession of inflated axillulae and a general gestalt reminiscent of some Neotropical Colotrechninae, I believe it should be excluded from the *Trigonoderus*-group as defined herein. Nonetheless, *Eutelisca* is morphologically similar to what a hypothetical ancestor of the *Trigonoderus*-group might be like. I treat the genus in this paper because I found specimens of males of the genus and two new species. The character state information gained from these new taxa greatly improved the phylogenetic analysis by improving our knowledge of the range of character states within *Eutelisca*.

Another problem with the classification of the Trigonoderini is that 5 of the 11 trigonoderine genera in the analysis are without proof of monophyly — *Plutothrix*, *Trigonoderus*, *Ogloblinisca*, *Miscogasteriella*, and *Janssoniella*.

In some cases, this problem can be readily solved by synonymizing genera. In the *Trigonoderus*-group, synonymizing *Trigonoderoides* with *Miscogasteriella* creates a single taxon defined by three autapomorphous characters: 1) the vertex virtually without sculpture (8:0→1); 2) the pronotum distinctly constricted posteriorly (13:0→1; figs. 77 & 79); 3) the propodeum with a median costate groove (19:0→1; figs. 77 & 79). There is also biogeographic support for such a taxon; both genera are known only from the Australasian region. *Trigonoderoides* Masi is herein placed in synonymy under with *Miscogasteriella* Girault **n. syn.** with its single included species now known as *M. nigricans* (Masi) **n. comb.**

Cladistic analysis was not successful in resolving other generic problems in the *Trigonoderus*-group. The genera *Plutothrix*, *Trigonoderus*, and *Ogloblinisca* each lack defining characters. A possible solution to the lack of a definition for *Ogloblinisca* would be to synonymize *Ogloblinisca* and *Miscogasteriella*. The difficulty with this solution is that we would be synonymizing a well-defined genus, *Miscogasteriella* (+ *Trigonoderoides*), into a less well-defined genus (*Ogloblinisca*). The branch between *Trigonoderus* and *Ogloblinisca* is defined by three reversion apomorphies: 1. a loss of the clypeal tooth (2:1→0). This character state would

be variable for such a genus since a clypeal tooth is present in *Miscogasteriella nigricans* (Masi); 2. a reversion from deep to shallow antennal scrobes (6:1→0). This character, by itself, is unsuitable as a generic character since, without a series of species of various genera available for examination, deciding whether the scrobes are shallow or deep is a subjective decision; 3. the loss of the unique scrobal pit possessed by *Plutothrix* and *Trigonoderus* species (19:1→0). This character state is not useful for defining a genus since the appearance of the scrobes after the loss of the scrobal pit is indistinguishable from the plesiomorphic condition occurring in nearly all other Pteromalidae whose ancestors never had such a pit. In addition to the weakness of these three defining characters, there is a lack of geographic confirmation. Species of *Ogloblinisca* are restricted to the New World; species of *Miscogasteriella* and *Trigonoderoides* are restricted to Old World regions along the western Pacific rim.

An alternative solution would be to define a taxon that included *Trigonoderus*, *Ogloblinisca*, and *Miscogasteriella* (+ *Trigonoderoides*). This taxon would be defined by four characters: 1) having the delimited triangle on the prepectus setose (17:0→1; fig. 70) (except in *T. cyanescens*); 2) having the alar speculum reduced in size (20:0→1; fig. 69); 3) having the club segments of the male flagellum independently articulated (28:0→1; figs. 66 & 74); 4) having the male petiole nearly or longer than wide (29:0→1). I believe this is inadvisable because two of these characters (characters 28 and 29) apply to one sex only, another character is variable with such a taxon (character 17), and character 2 is more of a clinal than a discrete character. In any case, such a solution would still leave *Plutothrix* without cladistic definition.

No attempt will be made herein to radically alter the generic concepts of *Plutothrix*, *Trigonoderus*, and *Ogloblinisca*. A short differential diagnosis for these genera is as follows: *Plutothrix* species have the anterior margin of the clypeus with an apical clypeal denticle, the scrobes with a distinct median pit, the prepectus bare, and the speculum present. *Trigonoderus* species have the anterior margin of the clypeus with an apical denticle, the scrobes with either a distinct pit or slit, the prepectus setose except in *T. cyanescens*, and the specular area setose. *Ogloblinisca* species have the anterior margin of the clypeus either weakly bilobed, straight, or with weak traces of an anterior clypeal denticle (as in *O. americana*); the scrobes lacking or with a weak pit; the prepectus setose; and the specular area setose. I describe several new *Plutothrix* species, and I have seen specimens of a number of undescribed Central and South American *Ogloblinisca* and *Trigonoderus* species and they all fall into one of these three taxa.

In the *Gastracanthus*-group some synonymy is also needed. *Hebestephus* has traditionally been separated from *Gastracanthus* because it has quadridentate mandibles, the hind margin of the first three gastral terga emarginate, and the male antennal club has the basal segment moveably articulated with the two fused apical segments. Previously described *Gastracanthus* species had only 3 teeth on the left mandible, the first three gastral terga produced or straight, and the basal segment of the male club fused with the two distal segments. After examining most of the world's described trigonoderine species and the characters of *G. atrobaculus*, I find that use of those characters for differentiating *Hebestephus* and *Gastracanthus* is either impractical or unreliable.

The mandibles are not always spread in dried specimens, so the number of teeth is not a good character to separate genera on a practical basis. This same difference in the number of mandibular teeth was abandoned for the separation of *Pteromalus* Swederus and *Habroclytus* Thomson (Bouček and Graham 1978).

The condition of the hind margin of the gastral terga is also not a good character to separate *Hebestephus* from *Gastracanthus* because as more *Gastracanthus* species are described, the condition of the hind margin of T1–3 has been found to vary. Most species of *Gastracanthus* have T1 roundly produced and T2–3 produced to a lesser extent or straight (fig. 26), *G. nigrescens* has the hind margin of T1–3 straight (fig. 27), but *G. atrobaculus* has the hind margin of T1–3

shallowly concave (fig. 28). It is only an incremental step between this latter condition and having T1–3 emarginate as in *Hebestephus* (fig. 29).

This leaves only the moveably articulated basal segment of the male antennal club in *Hebestephus* to separate the two genera. I believe that basing a genus solely by a character present in only one sex is inadvisable, especially in pteromalids because male pteromalids are less commonly collected than females. I also feel this character is difficult to use due to variability. Palearctic species of the miscogasterine genera *Lamprotatus* Westwood and *Thektogaster* Delucchi are separated by this same character, but I have found this character very difficult to apply in singleton males of Nearctic species of *Lamprotatus* or *Thektogaster*. *Hebestephus* Kamijo is herein placed in synonymy under *Gastracanthus* Westwood **n. syn.** with its only species now known as *G. acutus* (Kamijo) **n. comb.**

In synonymizing *Hebestephus* with *Gastracanthus*, autapomorphic characters that will define *Gastracanthus* are a raised shield-shaped area behind the fore coxae (18:0→1)(fig. 32) and the presence of a large circular patch of micropilosity on the tip of the female club (9:0→2)(fig. 22). The male of *Erdoesia* is unknown but the flagellum of male *Gastracanthus* species always has its setae on minute papillae, giving the flagellum a granulate appearance (26:0→1, 27:0→1), and the male petiole is as wide as long (29:0→1). These may be yet other characters defining *Gastracanthus*. Another character that will often separate *Gastracanthus* species from most other trigonoderine species is the pronotum being more than half as long as wide (11:0→1).

Erdoesia is the sister genus to *Gastracanthus* and the gestalt of these two genera is very similar. *Erdoesia* is defined only by the median deep and narrow emargination on the anterior margin of the clypeus (2:0→2; fig. 18). The clypeal emargination gives the clypeus a bidentate appearance. A character supporting a sister group relationship between *Gastracanthus* and *Erdoesia* is the fact that the female petiole is more than 1/2 as long as wide (22:0→1). Other possible characters uniting these genera may be the presence of erect papillate setae on the male flagellum and the male petiole being as wide as long, but confirmation awaits examination of the male of *Erdoesia*.

Two other taxa shown to be sister taxa by the analysis are *Platygerrhus* and *Janssoniella*. *Platygerrhus* is by far the largest genus in the Trigonoderini and is readily defined by the rearward displacement of the frenal suture (15:1→1; figs. 17, 31). The rearward migration of the frenal sulcus is unique among miscogasterine pteromalids. In addition, the axillula is often inflated in *Platygerrhus*. Though the body sculpture in *Platygerrhus* is coarser than that in species of *Janssoniella* and *Gastracanthus*, the individual alveoli are much smaller. In *Platygerrhus* species, the body color is often blue; *Janssoniella* and *Gastracanthus* species are usually green. The scutellum of almost all *Platygerrhus* species has a distinct median longitudinal strip of sculpturing with elongate alveoli (fig. 31); *Platygerrhus irvingi*, *Erdoesia*, *Gastracanthus nigrescens*, and all species of *Janssoniella* examined have the scutellum uniformly alveolate with the alveoli round. The remaining species of *Gastracanthus* have a median longitudinal strip of rounded, cobbled sculpture (fig. 33). *Platygerrhus* species also tend to be more flattened than species in related genera. Another unique character state which is common in *Platygerrhus* but not universal is the presence of numerous setae on the metapleuron. In other related trigonoderine genera, the metapleuron is bare.

Janssoniella is the most morphologically plesiomorphic genus of the *Gastracanthus*-group and cannot be defined by any autapomorphic characters. Synonymizing *Janssoniella* with *Platygerrhus* will not create a cladistically definable taxon since a reversion apomorphy would define such a taxon—the loss of the pronotal collar, resulting in the reappearance of the primitive conical pronotal collar (12:1→0). It is my opinion that since *Platygerrhus* is such a well-defined genus, it should be kept separate from *Janssoniella* with the proviso that *Janssoniella* may be a paraphyletic taxon.

KEY TO THE TRIGONODERINE GENERA

1. Clypeus with deep anterior tentorial pits (figs. 10, 18, 34); prepectus flat, shaped like an equilateral triangle, and uniformly reticulate (figs. 30, 32, 35); head usually subtriangular in anterior view (figs. 10, 18, 34)..... 2.
- Clypeus lacking deep anterior tentorial pits (figs. 50, 55, 71); prepectus bent, irregularly sculptured, and usually with a carina setting off the posterior corner (figs. 56, 70, 81); head usually more quadrate or oval in anterior view (figs. 50, 55, 76, 78)..... 5.
2. Frenal sulcus displaced posteriorly nearly to the apical end of the scutellum (fig. 17, 31); scutellum usually with a longitudinal strip of coriaceous sculpturing (fig. 31); body color often dark blue with violaceous reflections. Metapleuron usually setose *Platygerrhus* Thomson
- Scutellum with the frenal sulcus placed well before its apical end (figs. 33, 49, 51, 53); scutellum either uniformly alveolate, or with a median longitudinal strip of colliculate sculpture (fig. 33); body color seldom dark blue and lacking violaceous reflections. Metapleuron bare..... 3.
3. Anterior margin of the clypeus emarginate (fig. 18)..... *Erdoesia* Bouček
- Anterior margin of the clypeus straight or roundly produced (fig. 34)..... 4.
4. Females with the pronotum more than half as long as wide (fig. 21); club with a terminal circular patch of micropilosity (fig. 22). Males with the petiole half or more as long as wide. Both sexes with the pronotum with a horizontal strip along its posterior margin (figs. 20, 25). Mesosternum with a raised shield-shaped area behind the fore coxae (fig. 32) *Gastracanthus* Westwood
- Females with the pronotum less than half as long as wide (figs. 4, 5); club without any visible micropilosity. Males with the gaster sessile. Both sexes with the collar descending immediately from the anterior margin of the mesoscutum (fig. 9). Mesosternum without raised shield-shaped area behind the fore coxae (fig. 30) *Janssoniella* Kerrich
5. Fore wing with speculum present (figs. 48, 87, 88); prepectus always bare (fig. 56)..... 6.
- Fore wing with specular area setose (fig. 69); prepectus usually setose (fig. 70)..... 7.
6. Prepectus bent, but with at most a weak carina delimiting the posterior corner (fig. 81); clypeus with sharp apical denticle (fig. 80). (Chile) *Eutelisca* Hedqvist
- Prepectus bent, and with sharp carina delimiting the posterior corner (fig. 56); clypeus with broad, rounded apical denticle (figs. 50, 55). (Holarctic)..... *Plutothrix* Förster
7. Pronotum with sides converging posteriorly (figs. 77, 79); propodeum either with median costate groove (fig. 77) or posterior median pit (fig. 79); vertex smooth *Miscogasteriella* Girault
- Pronotum with sides parallel (fig. 64); propodeum either flat or with a median carina (fig. 65); vertex alveolate or coriaceous 8.
8. Anterior margin of clypeus with a distinct apical denticle (fig. 61); scrobes with a distinct median pit or slit (fig. 61)..... *Trigonoderus* Westwood
- Anterior margin of clypeus weakly bilobed (fig. 63), straight, or with weak traces of an anterior denticle (fig. 64); scrobes lacking median pit or slit (figs. 63, 64) *Ogloblinisca* Hedqvist

Character #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Hdsph	AmCly	AnTP	GMtr	GText	AmSc	SePt	Vscl	ClMpl	Mndth	Proh	ProCl	ProSh	Notal	Frem
<i>Dinotiscus</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
<i>Panstenon</i>	0	0	0	0	0	0	0	0	0	1	1	1,2	0	1	0
<i>Susteraia</i>	0	1	0	0	0	1	0	0	0	?	0	0	0	0	0
<i>Eutelsca</i>	0,1	1	0	0	0	0,1	0	0	0	?	0	1,2	0	0	0
<i>Jansoniella</i>	0,1	0	1	0	0	1	0	0	0	1	0	0	0	0	0
<i>Planerthus</i>	0,1	0	1	0	0	1	0	0	0	0,1	0,1	0	0	0	1
<i>Erdesia</i>	1	2	1	0	0	1	0	0	0	1	0	2	0	0	0
<i>Gastracanthus</i>	1	0	1	0	0	0,1	0	0	2	0,1	1	2	0	0	0
<i>G. nigrescens</i>	1	3	1	0	0	1	0	0	2	1	1	2	0	0	0
<i>Hebesticphus</i>	1	3	1	0	0	1	0	0	2	1	1	2	0	0	0
<i>Pluothrix</i>	0	1	0	1	0,1	1	1	0	0,3	1	0	1,2	0	0	0
<i>Trigonoderus</i>	0	1	0	1	0,1	1	1	0	0,1	1	0	1	0	0	0
<i>Ogloblinisca</i>	0	0	0	1	0,1	0	0	0	0,1	1	0	1,2	0	0	0
<i>Trigonoderoides</i>	0	1	0	1	1	0	0	1	1	1,2	0	1	1	0	0
<i>Miscogasterella</i>	0	0	0	1	1	0	0	1	1	1	0	1	1	0	0

Character #	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	Prps	TrSt	CxShd	Prodm	Alshp	HTdSp	Ptol	TIEmg	TI MP	FITex	AnSt	AnTP	ClAt	Ptol
<i>Dinotiscus</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Panstenon</i>	0	0	0	0	1	1	1	0	0	0	0	0	0	1
<i>Susteraia</i>	0	0	0	0	0	0	0	1	0	1	0	0	0	0
<i>Eutelsca</i>	1	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Jansoniella</i>	0	0	0	0	0	0	0	0	0	0	0,1	0,1	0	0
<i>Planerthus</i>	0	0	0	0	0	0	0	0	0	0,1	0	0	0	0
<i>Erdesia</i>	0	0	0	0	0	0	1	0	0	?	?	?	?	?
<i>Gastracanthus</i>	0	0	1	0	0	0	1	0	1	0	1	1	0	1
<i>G. nigrescens</i>	0	0	1	0	0	0	1	0	0	?	?	?	?	?
<i>Hebesticphus</i>	0	0	1	0	0	0	1	1	0	0	1	1	1	1
<i>Pluothrix</i>	2	0	0	0	0	0	0	0,1	0	0,1	0,1	0,1	0	0
<i>Trigonoderus</i>	2	0,1	0	0	1	0	0	1	0	1	0	0	2	1
<i>Ogloblinisca</i>	2	1	0	0	1	0	0	1	0	1	0	0	2	1
<i>Trigonoderoides</i>	2	1	0	1	1	0	0	1	0	1	0	0	1	0
<i>Miscogasterella</i>	2	1	0	1	1	0	0	1	0	1	0	0	2	1

Table 1. Data matrix for cladistic analysis of the Trigonoderini.

Trigonoderine Taxa*Erdoesia tessellata* Bouček*Eutelisca chilensis* Hedqvist*E. luteocaudata* Heydon*E. metalliscapa* Heydon*Gastracanthus acutus* (Kam.)*G. atrobacculus* Heydon*G. conicus* (Girault)*G. nigrescens* Kamijo*G. pulcherrimus* Westwood*Janssoniella caudata* Kerrich*J. intermedia* Hedqvist*J. iskophila* Heydon*Miscogasteriella nigricans* Masi*M. sulcata* Kamijo*M. sp.* (undescribed species
from Nepal)*Ogloblinisca americana* Hedqvist*O. maculata* Hedqvist*Platygyrrhus algonquinus* (Girault)*P. americanus* Hedqvist*P. columbianus* (Ashmead)*P. irvingi* (Girault)*Plutothrix aerata* Heydon*P. ascita* Heydon*P. ceonotalis* Heydon*P. cisae* Heydon*P. glareosa* Heydon*P. ligyptera* Heydon*P. pilosiclava* Heydon*P. scenicus* (Walker)*P. smithi* Heydon*P. unguitta* Heydon*P. unguittella* Heydon*Trigonoderus cyanescens* (Förster)*T. pulcher* Walker*T. princeps* Westwood*Trigonoderus sp.* (undescribed
Nearctic species)**Outgroup Taxa**

Panstenoninae

Panstenon agylla (Walker)*P. oxylus* (Walker)*P. poaphilum* Heydon

Miscogastrinae

Susteraia acerina Bouček

Pteromalinae

Dinotiscus eupterus (Walker)

Table 2. Taxa examined for compilation of character state matrix.

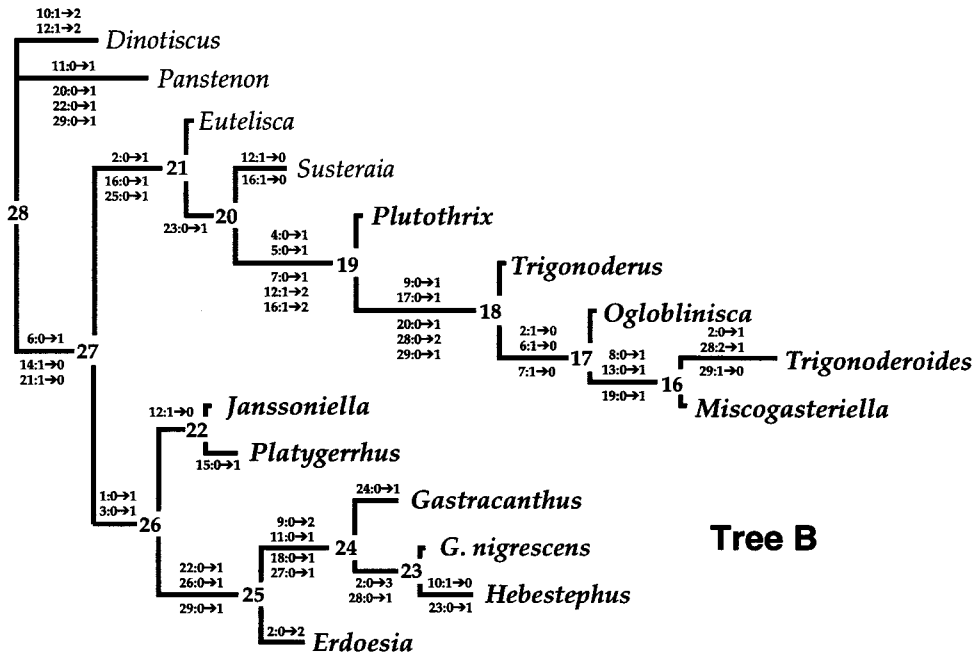
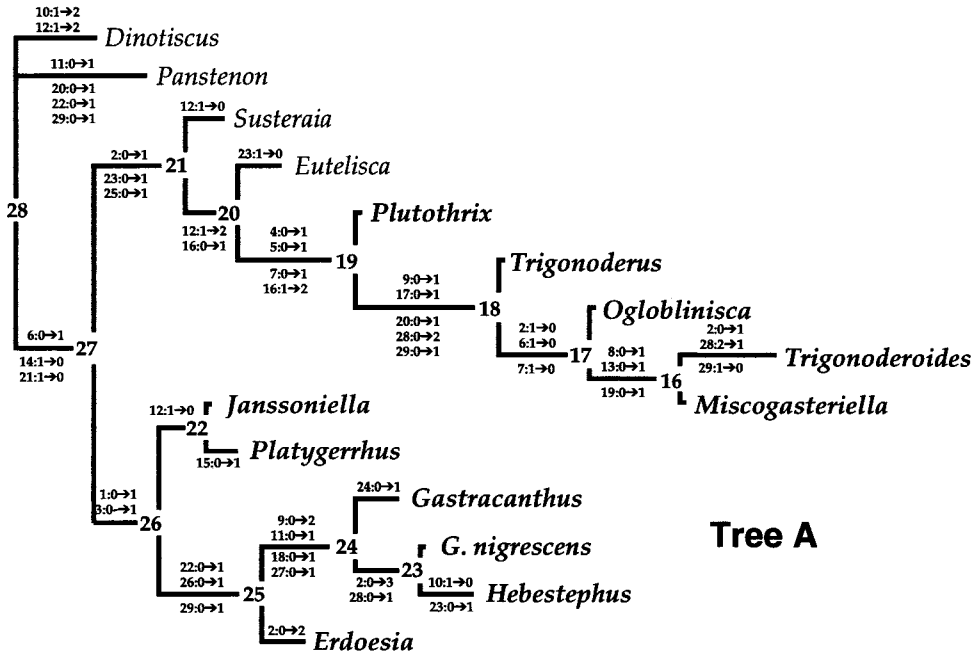


Figure 1. Two equally parsimonious cladograms of the relationships among genera of the Trigonoderini based on the character matrix given in Table 1. Character state changes for each character are shown on the cladograms (character:initial state → final state).

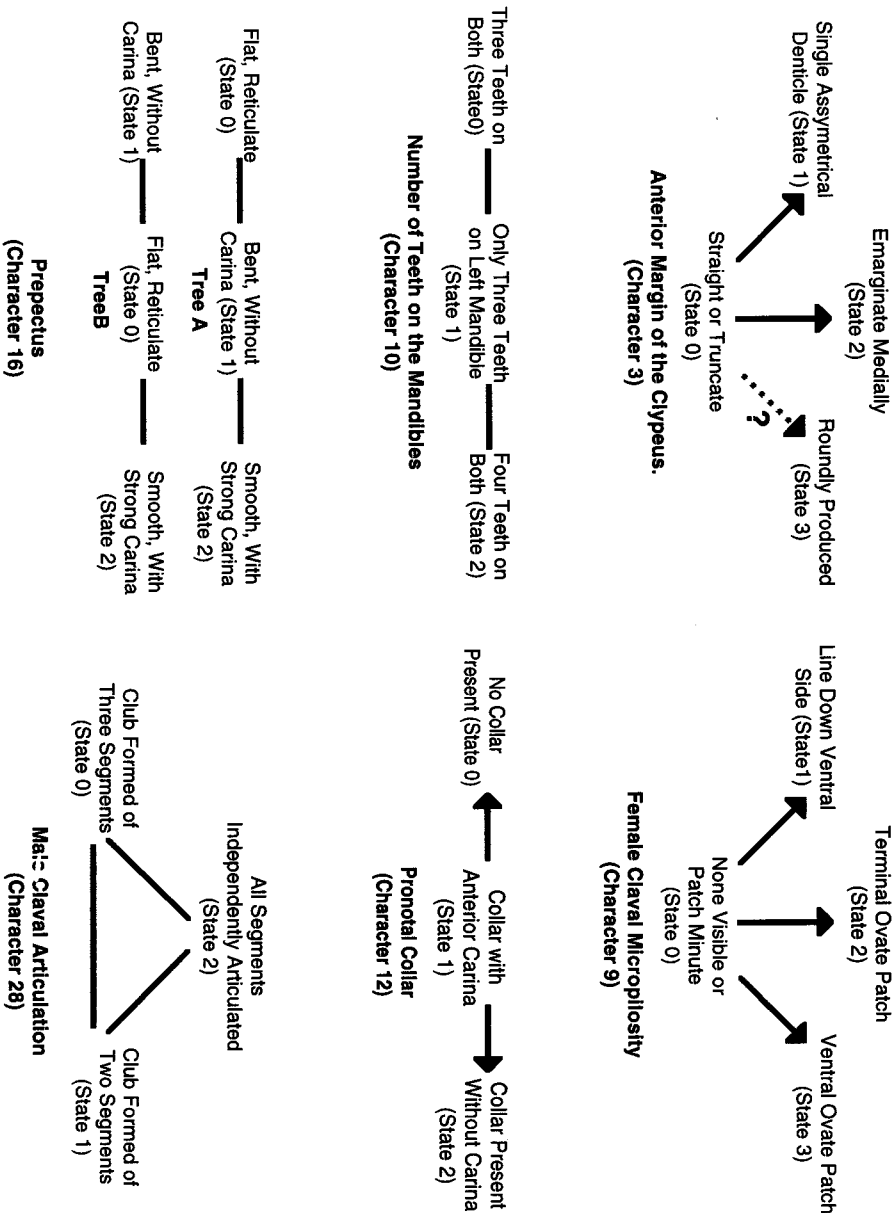


Figure 2. Hypothesized character state transformations of the multistate characters after Transformation Series Analysis *sensu* Mickevich and Weller (1990).

TAXONOMIC TREATMENT

Janssoniella Kerrich

Janssoniella Kerrich, *In*, Kerrich and Graham, 1957:303–304, 309 (Type species: *Janssoniella caudata* Kerrich, 1957; original designation.) Bouček, 1958:365. Ferrière, 1958:24, 30. Peck, 1963:750. Bouček and Hoffer, 1964:35. Hedqvist, 1968:56–59. Graham, 1969:98, 106–108. Burks, 1979:777. Dzhanokmen, 1978:117, 120. Vago, 1989:1–2. Bouček and Rasplus, 1991:38, 44.

Diagnosis. Female. Head with anterior margin of clypeus weakly sinuous or shortly and broadly truncate; anterior tentorial pits deep; gena coriaceous; mandibles with four teeth on the right mandible, three teeth on the left mandible. Antennal club without terminal or subterminal patch of micropilosity. Mesosoma with pronotum length less than half its width, immediately declivitous from anterior margin of mesoscutum; prepectus flat, uniformly reticulate (fig. 28); frenal sulcus not close to hind margin of scutellum; mesosternum lacking raised shield-shaped region behind fore coxae (fig. 28). Gaster with petiole transverse, its length less than 1/4 its width; hind margin of T1 straight. A habitus of *J. iskophila* is shown in figure 9.

Male. Antenna with flagellar setae usually reclinate and smooth, erect and papillate only in *Janssoniella intermedia*; club comprised of three segments. Gaster with petiole not as long as wide.

Discussion. *Janssoniella* was described by Kerrich (*In*, Kerrich and Graham 1957) and contained the Holarctic type species *J. caudata* Kerrich, 1957 and the two Palearctic species *J. ambigua* Kerrich, 1957 and *J. major* Kerrich, 1957. Kamijo (1960) described a new Japanese *Janssoniella* species, *J. notata* Kamijo, and Hedqvist (1968) described a new Holarctic species *J. intermedia* Hedqvist. Herein, I am describing a new Nearctic species, *J. iskophila* Heydon.

Biology. Species of *Janssoniella* have been reared from insects in Polyporaceae. *Janssoniella caudata* has been reared in association with coleopterous (Ciidae) and hymenopterous (Braconidae) hosts.

Key to the Nearctic species of *Janssoniella* Kerrich

1. Antenna short relative to head width, combined length of pedicel and flagellum 1.0–1.2X head width (fig. 5); setal row of costal cell interrupted mesally for a length equal to the width of costal cell (fig. 9); femora with broad brown bands *iskophila*, n. sp.
- Antenna with combined length of pedicel and flagellum greater than 1.5X head width in females (fig. 4) and 1.6X in males; setal row(s) of costal cell complete (figs. 3 and 7); femora and tibiae both yellow–brown 2.
2. Females with costal cell with two or more complete rows of setae (fig. 7); basal funicular segments of antenna long enough to have three non–overlapping rows of MPP sensilla (fig. 8). Males with flagellum black and granulately sculptured; combined length of flagellum and pedicel more than 2X head width. In both sexes, body length usually 3 mm or more *intermedia* Hedqvist
- Females with costal cell with only one complete row of setae (fig. 3); basal funicular segments of antenna with two rows of MPP sensilla (fig. 4). Males with flagellum brown and smooth; combined length of flagellum and pedicel less than 2X head width. In both sexes, body length 3 mm or less *caudata* Kerrich

***Janssoniella caudata* Kerrich**

Figs. 3–4, 30

Janssoniella caudata Kerrich, *In*, Kerrich and Graham, 1957:304–305, 306 (Holotype, ♀; Zool. Inst., Lund: not seen) Ferrière, 1958:30. Hedqvist, 1968:57, 58, 59. Graham, 1969:106, 107. Burks, 1979:777. Vago, 1989:2.

Diagnosis. *Janssoniella caudata* is the most common of the described Nearctic *Janssoniella* species. *Janssoniella caudata* can be recognized by the following combination of characters: 1. The lower face and gena often weakly metallic and brown or with purplish reflections*¹. 2. The scape is brownish yellow, the coxae are more or less metallic, and the femora are brownish yellow and concolorous with the femora. 3. The female body size of specimens examined ranged from 2.1–2.9 mm; the male body size ranged from 1.5–2.6 mm. 4. The eye length is greater than 5.2X the temple length (fig. 4). 5. The female antenna has F1 appearing distinctly longer than the pedicel (fig. 4); the combined length of the pedicel and flagellum ranged from 1.5–1.7X the head width* (fig. 4). 6. The male flagellum is brown and smooth in texture; the combined length of the pedicel and flagellum ranged from 1.5–1.9X the head width. 7. The mesosoma length ranged from 1.7–1.8X its width. 8. The costal cell has a single complete setal row, and a partial second row in the apical 1/2* (fig. 3). 9. The marginal vein is long, its length ranged from 2.2–2.7X the stigmal vein length*.

Material Examined. I examined a total of 31 females and 24 males collected as follows (NMNH, OSUC, UCDC, UWEC): Canada. BRITISH COLUMBIA: Vancouver, 4.VI, 1♀. United States. CALIFORNIA: Charles Tilden Regional Park, nr. Berkeley, 8.X.1960 (on *Trametes versicolor*), 3♀, on *T. versicolor* on *Umbellularia*, 1♀; Berkeley, 18.VIII.1961 (*T. versicolor*), 1♀, 10.IX.1961 (*T. versicolor*), 2♂; Oakland, 27.XI.1960 (*T. versicolor* on *Quercus agrifolia*), 2♂; 7 mi ne. Bucks Lake, 5.XI.1960 (*Trametes versicolor* on *Alnus rhombifolia*), 2♀, 5♂. DISTRICT OF COLUMBIA: Washington, 26.VIII, 1♀, 22.XI.1897 (bred with *Ennearthron thoracicornes*), 1♂. ILLINOIS: Algonquin, 5.IX.1895, 1♀. MAINE: Katahdin, 5.VI.1959, 1♂. MARYLAND: College Park, 22.VIII.1983, 10♀, 5♂; Patuxent Research Station (Prince George's Co.), 18–25.V.1986, 1♂. NEW JERSEY: Middlesex Co. 22.III (*Trametes versicolor*), 1♀, 1♂. OHIO: Tuscarawas Co., 27.V.1962, 1♀. PENNSYLVANIA: Harrisburg, 8.VI.1916 (*Aliolus tomoxiae*), 2♂. VIRGINIA: nr. Annandale, Fairfax Co., 11–16.VI.1989, 1♀, 12–18.VI.1988, 1♀ 1♂ 3–9.VIII.1988, 2♂; 4 miles s. Cuckoo, 13–27.VII.1988, 3♀. WISCONSIN: Oneida Co., 12–19.VII.1977, 1♂. *Janssoniella caudata* is known from Britain, Sweden, Germany and Czechoslovakia in Europe (Graham 1969).

Biology. *Janssoniella caudata* has been reared in association with two insects — a ciid, *Ennearthron thoracicornes* Zeigler, and a braconid, *Aliolus tomoxiae* (Rohwer). This braconid is a parasitoid of *Tomoxia lineella* LeConte (Mordellidae)(Marsh 1979). The larvae of many mordellids, and including those of *Tomoxia*, live in decaying wood (Craighead 1950). This is the first record of a trigonoderine on a hymenopterous host and needs confirmation. *Janssoniella caudata* has also been reared from the polypore *Trametes versicolor* (Fries)Pilát (Polyporaceae) on *Umbellularia* (Lauraceae), *Quercus agrifolia* Neé (Fagaceae) and *Alnus rhombifolia* Nuttall (Betulaceae). Palearctic rearing records include a fungus on *Quercus* L. and with a species of *Cis* Latreille (Ciidae) reared from *Polyporus* (Kerrich and Graham 1957).

¹ Characteristics marked by an asterisk are distinct for that species and can be used to distinguish it from other species of the same genus.

***Janssoniella intermedia* Hedqvist**

Figs 7–8

Janssoniella intermedia Hedqvist, 1968:57, 58 (Holotype, ♀; Hedqvist coll.: not seen). Burks, 1979:777.

Diagnosis. *Janssoniella intermedia* can be recognized by the following combination of characters: 1. The lower face and gena are metallic and concolorous with the frons and vertex. 2. The scape, coxae, and femora are non-metallic and with an orange tint*. 3. The female body length in specimens examined ranged from 3.4–6.5 mm; the body length of the two males examined was 2.8 and 3.7 mm. 4. The eye length ranged from 3.1–4.7X the temple length*. 5. The female antenna has F1 appearing distinctly longer than the pedicel (fig. 8); the combined length of the pedicel and flagellum ranged from 1.8–1.9X the head width*. 6. The male flagellum is black and granulate in texture*; the combined length of the pedicel and flagellum in the two males examined was 2.2 and 2.3 times the head width*. 7. The mesosoma length ranged from 1.8–2.0X its width. 8. The costal cell has two setal rows except at the very base*, and is generally setose in the apical 1/3* (fig. 7). 9. The marginal vein length ranged from 1.8–2.0X the stigmal vein length.

Material examined. A total of 7 females and 2 males were seen as follows (CNCI, NMNH, UMMZ, UWEC): Canada. BRITISH COLUMBIA: Robson, 6.VIII.1947, 1♀. ONTARIO: Ottawa, 6.VI.1958, 1♂. QUEBEC: Cascapedia River, 10.VII.1934, 1♂. United States. MICHIGAN: Huron Mountain Club (Marquette Co.), 24–25.VI.1984, #V, 4.VIII.1984, 1♀. WISCONSIN: Oneida Co., 25.VI–3.VIII.1977, 1♀, 19–26.VII.1977, 1♀. ? Accession No. 7414a, 1♀. *Janssoniella intermedia* is known from Finland in Europe (Hedqvist 1968).

Biology. The specimen with Accession No. 7414 was reared from a Colydiidae.

***Janssoniella iskophila* Heydon,
new species**

Figs. 5–6, 9

Diagnosis. *Janssoniella iskophila* can be recognized by the following combination of characters: 1. The lower face and gena are metallic and concolorous with the frons and vertex. 2. The scape is brownish yellow, the coxae metallic, and the femora are brown and distinctly darker than the tibiae*. 3. The female body size in specimens examined ranged from 2.1–3.0 mm; the male body size was 2.2 mm. 4. The eye length was greater than 5.5X the temple length (fig. 5). 5. The female antenna has F1 appearing shorter than or as long as the pedicel* (fig. 5); the combined length of the pedicel and flagellum ranged from 1.0–1.2X the head width* (fig. 5). 6. The male flagellum is brown and smooth in texture; the combined length of the pedicel and flagellum was 1.1X the head width*. 7. The mesosoma length ranged from 1.4–1.6X its width*. 8. The costal cell has a single setal row in the basal 1/4, setose in the apical 1/3, and bare in the middle* (fig. 9). 9. The marginal vein length ranged from 1.6–1.9X the stigmal vein length (fig. 9).

Description. Holotype, female. Color: Head dark blue–green; mesosoma dark green dorsally, pleural regions and venter dark blue; gaster dark brown. Antenna with scape yellow–brown, remainder brown. Legs with coxae wholly metallic dark blue, remainder brownish yellow except femora and pretarsi mostly brown. Fore wing veins pale brown, parastigma brown; membrane clear.

Sculpture: Head alveolate except occiput coriaceous; mesosoma alveolate, cells on scutellum half the size of those elsewhere; dorsellum, propodeum alveolate; gaster with T1–2 smooth, T3–7 coriaceous.

Structure: Body length 2.9 mm. Head (fig. 5) width 1.3X height (33.5:26.5), 2.2X length (33.5:15.0); eye height 1.2X length (16:13), 2.0X malar distance (16:8), length 6.5X temple length (13:2); torulus just above LOcL; ratio of MOD, OOL, POL, LOL as 3:5:7:3. Antenna (fig. 5) with combined length of pedicel and flagellum 1.2X head width (40.0:33.5); relative lengths of scape, pedicel, annelli, F1–6, club as 13.0:5.0:2.0:4.0:5.0:4.0:4.5:4.5:3.5:9.5; relative widths of F1, F6, club as 3.5:3.5:4.0; F1, F2 with two partially overlapping rows of MPP sensilla, remainder with one row. Mesosoma length 1.4X width (43:30); pronotal length 0.25X width (5:20); petiole width 10X median length (10:1). Fore wing (fig. 9) length 2.4X width (102:42); ratio of lengths of submarginal, marginal, postmarginal, stigmal veins as 42:19:27:11; costal cell with apical half having 2 irregular setal rows, with single row on basal 1/4; basal cell bare; basal vein setose. Gaster (fig. 9) lanceolate, length 3.1X width (75:24); ovipositor sheaths extending 1.0X length of T7 (10:10); hypopygium extending a little over 1/3 gaster length (75:31); T7 brown and sclerotized to tip.

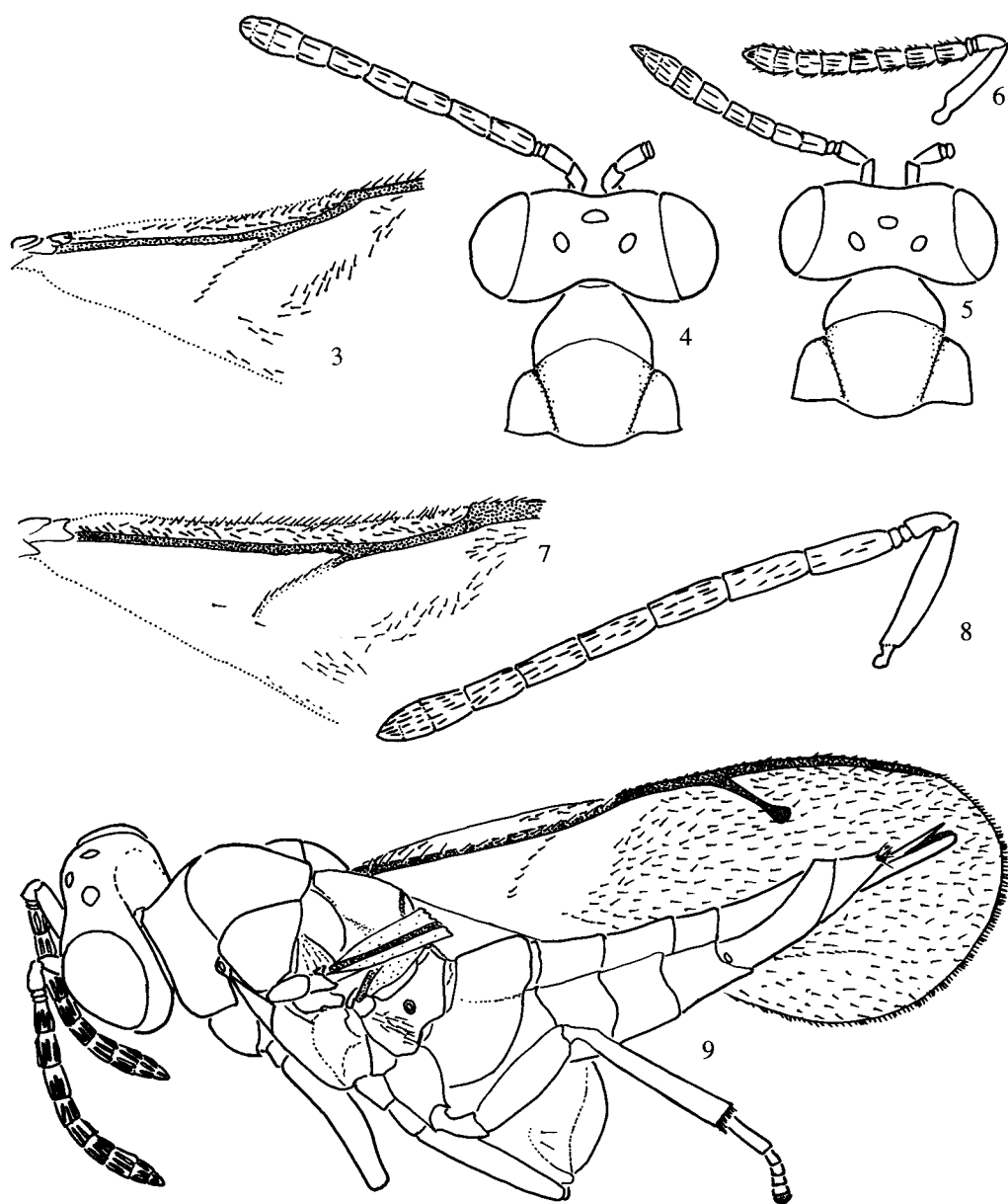
Allotype, male. Body length 2.2 mm. Similar to female except as follows: Color. Body dark green with mesoscutum and pleural region with dark purple reflections. Structure. Antenna (fig. 6) with length of pedicel plus flagellum 1.1X head width (39.5:34.5); ratio of lengths of scape, pedicel, annelli, F1–6, club as 12.0:4.0:1.0:5.0:4.5:4.0:4.5:4.0:4.0:7.5; widths of F1, F6, club as 3.0:3.5:4.0; flagellum nearly smooth, flagellar setae very short, MPP sensilla in single apical row of 3–4 per side; club lacking terminal spine. Petiole transverse. Gaster length 2.0X width (46:23).

Variation. The body length of females examined varied from 2.1–3.0 mm. The combined length of the pedicel and flagellum varied between 1.0–1.2X the head width (fig. 5). The femora in females examined were at least brown in the basal half; in some females, the femora was almost wholly dark with dark purplish reflections.

Etymology. The species name comes from the Greek word *iska*, meaning fungus on trees, and *philia*, meaning love, and refers to the occurrence of the host of *J. iskophila* in shelf fungi.

Type Material. The holotype, allotype (both NMNH) and 5 female paratypes were collected on 17 August 1960 at Squaw Valley, Placer County, California (United States), by J. F. Lawrence. Eight additional paratypes were collected as follows (NMNH, UCDC): Canada. BRITISH COLUMBIA: Kanaka Bay, 3·XI·1968 (bracket fungus), 1♀. United States. CALIFORNIA: Cambria, 16.IV.1961 (on *Cryptoporus volvatus* on *Pinus radiata*), 3♀; 6 miles e. Sierraville, 13.VII.1962 (on *Cryptoporus volvatus*), 1♀; Strawberry, 13.VIII.1960 (on *Cryptoporus volvatus* on *Abies concolor*), 1♀. IDAHO: Latah Co., 25.VII.1971 (*Polyporus* on fir), 1♀.

Biology. The insect host(s) of *J. iskophila* is unknown, but it has been reared in association with *Cryptoporus volvatus* (Peck) Hubbard (Polyporaceae) on *Pinus radiata* D. Don (Pinaceae), and on *Abies concolor* (Gordon and Glend)(Pinaceae).



Figures 3–9. *Janssoniella*. 3–4, *J. caudata*, female. 3. Fore wing. 4. Head with antenna, pronotum and mesoscutum. 5–6, 9, *J. iskophila*. 5. Female, head with antenna, pronotum and mesoscutum. 6. Male, antenna. 9. Female, habitus. 7–8, *J. intermedia*, female. 7. Fore wing. 8. Antenna.

Platygerrrhus Thomson

Platygerrrhus Thomson, 1878:4, 13–14 (Type species: *Platygerrrhus gracilis* Thomson; monobasic.)
 Ashmead, 1904:284, 285. Schmiedeknecht, 1909:156, 157, 169. Nikol'skaya, 1963:213.
 Bouček, 1954:67. Kerrich and Graham, 1957:300–303. Bouček, 1958:364. Ferrière, 1958:30.
 Erdős, 1960:187. Szczepanski, 1961:3–11. Peck, 1963:750. Peck, Bouček, and Hoffer 1964:35.
 Hedqvist, 1968:35:36–39. Graham, 1969:108–122. Burks, 1979:776. Dzhankmen, 1978:117,
 118–120. Bouček and Rasplus, 1991:44.

Diagnosis. *Platygerrrhus* can be recognized by the following combination of characters:
 Female. Head with anterior margin of clypeus straight or weakly sinuous; anterior tentorial pits deep; gena coriaceous; right mandible with four teeth, the number of teeth on the left mandible is unknown to me. Antennal club without terminal or subterminal patch of micropilosity. Mesosoma with pronotum length varying from more to less than half its width, immediately declivitous from anterior margin of mesoscutum; prepectus flat, uniformly reticulate; frenal sulcus very close to hind margin of scutellum (fig. 29); mesosternum lacking raised shield-shaped region behind fore coxae. Petiole transverse, length less than 1/4 width. Gaster with hind margin of T1 straight across. A habitus for *P. irvingi* is shown in figure 17.

Male. Antenna with flagellar setae reclinate and smooth, some species with flagellum almost glabrous but densely covered with MPP sensilla; club comprised of three segments. Petiole not as long as wide.

Two other unique characters are present in most *Platygerrrhus* species. The scutellum of nearly all *Platygerrrhus* species (except *Platygerrrhus irvingi*) has a distinct median longitudinal strip of sculpturing with elongate alveoli; related genera have the scutellum either uniformly alveolate or with a median longitudinal strip of colliculate sculpture. Many *Platygerrrhus* species have numerous setae on the metapleuron; related trigonoderine genera have the metapleuron bare.

Discussion. *Platygerrrhus* is the most speciose genus of the Trigonoderini. Species from the Palearctic region include *P. affinis* Walker, 1836; *P. dolosus* (Walker, 1836); *P. ductilis* (Walker), 1836; *P. longigena* Graham, 1969; *P. maculata* Erdős, 1957; *P. millenius* Szczepanski, 1961, *P. subglaber* Graham, 1969; *P. tarrha* (Walker, 1848); and *P. unicolor* Graham, 1969. The seven Australian species *Platygerrrhus* described by Girault were recently transferred to *Parepistenia* Dodd (Bouček 1988). I am treating four Nearctic species in this revision—*P. algonquinus* (Girault), 1917; *P. americanus* Hedqvist, 1968; *P. columbianus* (Ashmead), 1896; and *P. irvingi* (Girault), 1915 n. comb. All that remains of the type of *P. scolyti* is a male gaster and hind leg. However, this type and male *Cheiopachus* both have the two terminal gastral terga uniquely structured—T6 broadly concave posteriorly, and T7 about as long as wide and its upper surface densely covered with short erect bristles that are papillate in larger specimens. *Platygerrrhus scolyti* Ashmead, 1894 is herein transferred from *Roptrocerus* Ratzeburg to *Cheiopachus* Westwood as *C. scolyti* (Ashmead) **n. comb.** The type specimen was reared in association with *Scolytus rugulosus* (Ratzeburg) in apple at Morgantown, West Virginia.

Biology. *Platygerrrhus* species have been reared in association with bark beetles of both conifers and flowering plants. The families of known hosts include Anobiidae [*Anobium punctatum* DeGeer—*Platygerrrhus ductilis* and *P. affinis* (Graham 1969)], Cucujidae [*Laemophloeus ater* (Oliver)—*Platygerrrhus dolosus* (Ferrière and Kerrich 1958)], and Scolytidae [*Ips suturalis* Gyll. in spruce bark—*Platygerrrhus ductilis* (Kerrich and Graham 1957), possibly *Scolytus ensifer* Eichhoff—*Platygerrrhus ductilis* (Szczepanski 1961), scolytids in *Libocedrus* Endlicher—*Platygerrrhus americanus*, and from *Populus tremuloides* Michaux infested with *Procrystalus mucronatus* (LeConte) and *Trypophloeus populi* Hopkins—*Platygerrrhus americanus*]. Szczepanski (1961) reports that *P. ductilis* is an external parasitoid on its scolytid host.

The Nearctic *Platygerrrhus* species will need to be critically reevaluated when reared series containing both males and females are available. *Platygerrrhus* species are taxonomically difficult

because, like most bark beetle parasites, individuals vary greatly in size. Since no reared series were available for this study, the role that allometry may play in changing the proportions of body parts, such as antennal segments, could not be properly addressed. Additionally, at least in Europe, the males are more distinct than the females (Graham 1969). There were no series containing males and females I felt confident were associated. Consequently, to minimize the chances of synonymizing valid species, I elected to define the species rather narrowly. The species complex involving *P. americanus* and *P. columbianus* is especially difficult. The types of these two species are quite distinct, but of 29 female specimens examined, only 18 could be confidently segregated into one species or the other. The remaining 11 specimens may belong in new undescribed species or may represent ranges of variation outside that recognized in this study.

Key to Females of the Nearctic Species of *Platygerrhus* Thomson

1. Fore wing membrane darkly pigmented basally (fig. 15); basal cell with a row of setae just posterior to the submarginal vein (fig. 15), propodeum with its sculpture only slightly raised above its surface; metapleuron bare. (*columbianus* complex)..... 2.
- Fore wing membrane clear at base (fig. 16); basal cell bare; propodeum coarsely reticulate; metapleuron with five or more setae 3.
2. Antenna relatively slender, F6 appearing longer than wide and at least F1–F3 with two rows of MPP sensilla (fig. 16); eye length $<5X$ temple length (fig. 15); eye height $\leq 2.1X$ malar distance (fig. 14); head pentagonal in anterior view, width of oral foramen $\geq 0.61X$ the length of the LOcL (measured from genal sulcus to genal sulcus)(fig. 14). (western United States and Canada)..... *americanus* Hedqvist
- Antenna with F6 quadrate to transverse, F2 usually and F3 always with only 1 row of MPP sensilla (fig. 12); eye length $>5X$ temple length (fig. 11); eye height $\geq 2.1X$ malar distance (fig. 10); head broadly ovate, width of the oral foramen $\leq 0.60X$ the length of the LOcL (measured from genal sulcus to genal sulcus)(fig. 10). (eastern United States and Canada)..... *columbianus* (Ashmead)
3. Scape metallic, blue; basal vein darkly pigmented (fig. 17); scutellum uniformly reticulate; legs brown..... *irvingi* (Girault)
- Scape nonmetallic, pale yellow; basal vein lacking pigment (as in fig. 13); scutellum reticulate laterally, coriaceous mesally; legs pale yellow *algonquinus* (Girault)

Platygerrhus algonquinus (Girault)

Trigonoderus algonquina Girault, 1917:396–397 (Lectotype, ♀; USNM, Type No. 20899; examined.)
Platygerrhus algonquina (Girault); Kerrich and Graham, 1957:303. Hedqvist, 1968:36–37.

Diagnosis. *Platygerrhus algonquinus* can be recognized by the following combination of characters: 1. Scape pale yellow. 2. Legs mostly pale yellow. 3. Fore wing with brown macula behind stigma*; basal vein without pigment. 4. Face coriaceous laterad of clypeus.* 5. Scutellum with median longitudinal strip of coriaceous sculpturing. 6. Dorsellum weakly alveolate. 7. Propodeum alveolate. 8. Eye height about $2.2X$ malar distance; its length about $7.5X$ the temple length. 9. Antenna with combined length of pedicel and flagellum about $1.9X$ head width.* 10. Spiracular sulcus developed.* 11. Metapleuron setose. 12. Basal cell bare dorsally. 13. Speculum not margined posteriorly by a line of setae.

The type material for *P. algonquinus* consists of two female cotypes, one of which has the head crushed and placed on a slide along with the fore wing. The intact female is herein

designated as the lectotype for *P. algonquinus*. The following redescription of *P. algonquinus* is based on this lectotype female.

Lectotype, female. Color: Head, mesosoma blue-green with inner orbits on frons and vertex blue; face, pronotal collar, scutellum with yellow reflections; gaster brown with strong blue reflections on T1, weak greenish yellow reflections on succeeding terga. Antenna with scape pale yellow; pedicel brownish yellow; flagellum brown. Legs with fore coxa blue-green in basal half; pretarsi brown; remainder of legs pale yellow. Fore wing membrane clear at base; with diffuse brown patch below stigma; veins pale brown; basal vein not pigmented.

Sculpture. Clypeus finely coriaceous; face, gena coriaceous; frons, vertex weakly alveolate, alveolae transverse; pronotum, mesoscutum, axilla coarsely alveolate, alveolae of middle lobe of scutellum larger than those of surrounding parts; scutellum alveolate laterally, coriaceous mesally with alveolae 2-3X as long as wide; dorsellum finely alveolate; entire epimeron coriaceous except alveolate along ventral margin; entire propodeum (except for spiracular sulcus) alveolate; T1 smooth, T2-T7 weakly coriaceous.

Structure. Body length 3.7 mm. Head triangular in anterior view, width 1.3X height (35:27), 2.1X length (35:17); eye height 1.2X length (18:15), 2.2X malar length (18:8), length 7.5X temple length (15:2); torulus located 1X own diameter above LOC; ratio of MOD, OOL, POL, LOL as 3:4:7:2.5. Antenna with combined length of pedicel and flagellum 1.9X head width (65:35); scape extending above vertex; relative lengths of scape, pedicel, annelli, F1-6, club as 17.0:6.0:2.5:9.5:8.5:8.5:7.5:7.0:6.0:11.0; widths of F1, F6, club as 3.5:3.5:4.0; MPP sensilla in 3 rows on F1, 2 rows on F2-6. Mesosoma length 1.9X width (58:31); frenal sulcus visible as punctate line near hind margin of scutellum; metapleuron with 7 setae; dorsellum with median length subequal to lateral length; propodeum with median carina complete and sharp, spiracular sulcus developed, spiracles 2X own diameter from anterior margin of propodeum. Fore wing with relative lengths of submarginal, marginal, postmarginal, stigmal veins as 42:24:30:11; costal cell with two rows of setae on apical third, middle third bare, single row in basal third; basal cell bare; cubital vein, basal vein with single row of setae; speculum open posteriorly. Gaster length 3.9X width (106:27.5); hypopygium extending to just over halfway to tip of gaster; ovipositor sheaths exerted 0.42X length of T7 (5:12).

Males. Male *P. algonquinus* are similar, but differ as follows: The body lengths of two of the males were 2.1 and 2.3 mm. The combined lengths of their pedicels and flagella are 2.3 and 2.4X their head widths (66:29; 68:28). The average relative lengths of their scape, pedicel, annelli, F1-6, club are 12.0:5.5:2.0:8.5:9.0:8.8:8.2:8.0:6.2:11.8, and the relative widths of F1, F2, and the club in both males are 3.0:3.0:3.0. The male flagellum has the MPP sensilla in three rows on F1-5 and in 2 rows on F6; the funicular setae are semireclinate with the setal length equal to 1/4 the funicular segment length. The petiole length is 0.60X its width (3:5). The length of the gaster is 2.6X its width in both males (45:17; 49:19).

Variation. The body length of females examined varied from 1.1-1.8 mm, and the two males are 0.96 and 1.0 mm in length. The color of the clypeus and face varies from violet to green. Those specimens with green faces tend to be larger than those with violet faces and tend to have distinct coriaceous sculpturing on the face; those specimens with purple faces have the face nearly smooth. Many specimens have many distinct piliferous punctures on the face while others have relatively few. The setation pattern of the costal cell is also variable. The female from Maryland is virtually identical to those from South Carolina, but it has a distinct break in the ventral row of setae in the costal cell; those from South Carolina have the row complete. I saw three female *Platygerrius* specimens from Oneida County, Wisconsin that have no macula on the fore wing and an incomplete row of setae on the section of the cubital vein behind the basal cell; but otherwise, they are structurally similar to the type of *P. algonquinus*. Whether these belong in the range of variation of *P. algonquinus* or represent a new species will have to await further study.

Material Examined. The lectotype and paralectotype females were collected from Algonquin, Illinois, on 11 May 1895. I examined a total of 25 females and 5 males of *P. algonquinus* collected as follows (AEIC, CNCI, NMNH, UCDC, UWEM): Canada. ONTARIO: McDonald Island, St. Lawrence Islands National Park (near Mallorytown), 28.VIII.1976, 1♀. QUEBEC: La Trappe, 18.VI.1949, 1♀, 27.VI.1946, 1♀. United States. CONNECTICUT: South Windham, 19.IV.1936 (emerged from elm), 1♀. DISTRICT OF COLUMBIA: Washington, 6.VI.1913, 1♀, 1♂. ILLINOIS: Algonquin, 21.V.1896, 1♀. MARYLAND: Takoma Park, 4.VII.1942, 1♀. NEW HAMPSHIRE: Durham, 19.X.1953, 1♀. SOUTH CAROLINA: Columbia, 15.VIII.1951, 1♀, 1♂, 16.VIII.1951, 1♂, 18.VIII.1951, 1♀; Pendelton, 1–7.VII.1987, 1♀. VIRGINIA: Arlington, 2–3.V.1938 (stored hardwood), 1♀; near Annandale, 8–14.V.1988, 1♀, 11–16.V.1989, 1♀, 19–25.VI.1988, 1♂, 25.VI–1.VII.1989, 1♂, 26.VI–2.VII.1988, 1♀, 9–15.VII.1989, 1♀, 10–16.VII.1988, 1♀ 3–9.VIII.1988, 1♀, 9.VIII.1987, 1♀ 10.VIII.1987, 1♀, 13–19.VIII.1987, 1♀; 4 mi s. Cuckoo, 25.IV–13.V.1988, 1♀, 28.VII–11.VIII.1988, 1♀. WISCONSIN: Grant Co., 16–23.IX.1975, 1♀.

Biology. The host(s) of *P. algonquina* are unknown, but like other *Platygerhrus* species, they are likely to be bark beetles. One specimen from South Windham, Connecticut, emerged from elm and one from Arlington, Virginia, was reared from stored hardwood.

***Platygerhrus americanus* Hedqvist**

Figs. 14–16

Platygerhrus americanus Hedqvist, 1968:36, 38–39, (Holotype, ♀; USNM, Type No. 70578: examined.) Graham, 1969:120.

Diagnosis. In addition to the details of antennal and head shape proportions given in the key, *Platygerhrus americanus* can be recognized by the following combination of characters: 1. Scape brownish yellow. 2. Legs mostly brown. 3. Fore wing with base of wing membrane brown; basal vein without pigment. 4. Face alveolate laterad of clypeus. 5. Scutellum with median longitudinal strip of coriaceous sculpturing. 6. Dorsellum smooth to weakly alveolate. 7. Propodeum weakly alveolate. 8. Eye height about twice malar distance; its length about 5X the temple length. 9. Antenna with combined length of pedicel and flagellum about 1.4X head width. 10. Spiracular sulcus nearly absent. 11. Metapleuron bare. 12. Basal cell with 2 dorsal rows of setae posterior to submarginal vein. 13. Speculum margined posteriorly by a line of setae.

Redescription of holotype female. Color: Head with anterior aspect yellowish copper colored, frons with transverse dark green stripe; vertex blue–green. Mesosoma with pronotum yellowish copper mesally purplish blue laterally; mesoscutum with part of middle lobe extending anterior to lateral lobes yellowish coppery, remainder blue–green; scutellum yellowish coppery anteriorly, blue–green posteriorly; dorsellum blue; propodeum yellowish green mesally, blue laterad of that, spiracular sulcus and callus purple; metapleuron purple; prepectus yellowish coppery. Gaster dark brown with bluish violet reflections dorsally, more yellowish green laterally. Antenna with scape brownish yellow; pedicel, flagellum brownish back. Legs with fore coxa yellowish green; middle, hind coxa bluish violet; femora, basal 1/2 of tibiae, pretarsi brown; apical 1/2 of tibiae, remainder of tarsi yellowish brown. Fore wing with membrane brown in basal 1/2 of basal cell, remainder of membrane clear; veins brown except basal 1/3 of submarginal vein brownish black; basal vein not pigmented.

Sculpture: Head (including gena) alveolate, alveolae of frons larger than those of remainder of head; pronotum, mesoscutum, axilla alveolate, side lobes and axilla with alveolae smaller than those of middle lobe of mesoscutum; scutellum alveolate laterally, coriaceous mesally with cells elongate; dorsellum weakly alveolate, almost smooth; propodeum weakly alveolate; entire epimeron coriaceous; gaster with T1 smooth, remainder coriaceous.

Structure: Body length 4.0 mm. Head ovate in anterior view (fig. 14), width 1.3X height (42:33), 2.3X length (42:18); eye height 1.4X length (19.5:14.0), 2.0X malar distance (19.5:10.0), length 4.7X temple length (14:3) (fig. 15); torulus located 1/2X own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 3.0:6.0:9.0:3.5. Antenna (fig. 16) with combined length of pedicel and flagellum 1.4X head width (59:42); relative lengths of scape, pedicel, annelli, F1-6, club as 18.0:5.5:2.5:9.0:7.0:6.5:6.0:6.0:5.0:11.5; widths of F1, F6, club as 4:4:5; MPP sensilla in 1 submarginal row on F4-6, in more than 1 row on F1-3. Mesosoma length 1.8X width (69:38); frenal sulcus at posterior end of scutellum; dorsellum just longer mesally than laterally; metapleuron bare; propodeum uniformly rounded from side to side with spiracular sulcus lacking; median carina present; spiracles ovate, 2X own diameter from anterior margin of propodeum. Fore wing length 2.4X width (132:54); speculum bordered posteriorly by single row of setae; relative lengths of submarginal, marginal, postmarginal, stigmal veins as 57:31:36:13; costal cell with 1 complete ventral row, generally setose in apical 1/3; basal cell with 2 anterior dorsal rows; basal vein with single row meeting with complete setal row down cubital vein; speculum closed posteriorly. Gaster fusiform, length 2.6X width (102:39); hypopygium extending to just less than 1/2 gastral length; ovipositor sheaths exerted to 2/3 T7 length.

Male. Unknown. The 9 males belonging to this complex I examined had two distinct types of antennae. The males from Ottawa, Ontario; Oneida Co., Wisconsin; and Saginaw Co., Michigan have the combined length of the flagellum plus pedicel about 1.5 times the head width; the funiculus wider than the pedicel, with each funicular segment sparsely covered with fine subrecinate setae whose length is less than half the width of the segment and with 10-20 short MPP sensilla distributed irregularly; F1 about as long as wide; and F6 about as long as wide. Males from Laniel, Quebec; Aweme, Manitoba; Alpine Lake and Lake Wohlford, California; and Mt. Ranier and Lake Cushman, Washington have the combined length of the pedicel plus flagellum about 1.7 times the head width; the funiculus narrower than the pedicel, with each funicular segment covered with semierect setae whose length is about equal to the width of the segment and with an irregular subterminal row of approximately three MPP sensilla; F1 about 2.4 times as long as wide; and F6 about 1.5 times as long as wide. Males with either of these antennal types cannot be associated with females of *P. americanus* or *P. columbianus* as yet.

Discussion. After examination of the type specimens of *P. americanus* and *P. columbianus*, I believed I had seven good characters for distinguished these two species. When these characters were applied to the non-type specimens of the *columbianus*-complex, none were found to covary consistently with any others. Eventually, fairly consistent differences in the proportions of the antennal segments, dispersions of the MPP sensilla, and the head shape were found for some specimens. These differences in the antenna are used in key couplet 2. The ratio of the eye length to the temple length for *P. americanus* varies between 3.7 and 4.7, with one outlier at 6.0. This last specimen has the head slightly collapsed during drying, so this may not be a true measure of this ratio in this specimen. The ratio of eye length to temple length in *P. columbianus* varies between 5.5 and 8.0, with one outlier at 4.0. The head of *P. americanus* appears more distinctly pentagonal in anterior view than the head of *P. columbianus* because it has a wider oral foramen. The ratio of the oral foramen divided by the length of the LOcL (as measured from malar sulcus to malar sulcus) was either 0.61 or 0.62 for 6 of 7 female specimens of *P. americanus*, with one outlier at 0.67; this same ratio in the 10 specimens of *P. columbianus* varied between 0.53 and 0.60. The ratio of the eye height divided by the genal distance for *P. americanus* was either 1.9 or 2.0, with one outlier at 2.1; this same ratio for *P. columbianus* varied from 2.1-2.5. *Platygerrius americanus* and *P. columbianus* may need to be synonymized in the future, but I am reluctant to do so until the males of these two species are known; the males of Palearctic *Platygerrius* species are more easily distinguished than the females (Graham 1969).

Graham (1969) gives differences to separate females of *Platygerrius columbianus* from the most similar Palearctic species, *P. longigena*.

Material Examined. The holotype was reared from caged ponderosa pine (*Pinus ponderosa* Laws) infested with *Ips lecontei* Swaine (Scolytidae) and other bark beetle parasites and predators from near Prescott in the Prescott National Forest on 18 June 1959, by H. E. Oatmark. Six other females of *P. americanus* examined were collected as follows (CNCI, CSUC, NMNH, UCDC): Canada. BRITISH COLUMBIA: Hixon, 29.VII.1965, 1♀; Robson, 27.VIII.1947, 1♀. SASKATCHEWAN: Indian Head, 19.V.1965 (ex borer in lodgepole pine), 1♀. United States. CALIFORNIA: Bass Lake, 20.IV.1964 (ex scolytids in *Libocedrus*), 1♀. COLORADO: Estes Park, VI.1939, 1♀. UTAH: 4 miles n. Aspen Grove, 1.VIII.1975 [ex *Populus tremuloides* infested with *Procrichthys mucronatus* (LeConte)(Scolytidae) and *Trypophloeus populi* Hopkins (Scolytidae)], 1♀.

Biology. The exact host(s) of *P. americanus* are not known, but this species has been reared in association with Scolytidae in lodgepole pine, incense cedar [*Libocedrus* (Cupressaceae)], and American aspen [(*Populus tremuloides* Michaux)(Salicaceae)].

Platygerrius columbianus (Ashmead)

Figs. 10–13, 31

Panstenon columbiana Ashmead, 1896:276 (Holotype, ♀; NMNH Type No. 41230: examined.)

Platygerrius columbianus (Ashmead): Bouček, 1988:471 (synonymy).

Diagnosis. In addition to the details of antennal and head shape proportions given in the key, *P. columbianus* can be recognized by the following combination of characters: 1. Scape brownish yellow. 2. Legs mostly brown. 3. Fore wing with base of wing membrane brown; speculum clear; basal vein without pigment. 4. Face alveolate laterad of clypeus. 5. Scutellum with median longitudinal strip of coriaceous sculpturing. 6. Dorsellum smooth or weakly alveolate. 7. Propodeum weakly alveolate. 8. Eye height about 1.4X malar distance; its length about 6X the temple length. 9. Antenna with combined length of pedicel and flagellum about 1.2–1.4X head width. 10. Spiracular sulcus nearly absent. 11. Metapleuron bare. 12. Basal cell with 2 dorsal rows of setae posterior to submarginal vein. 13. Speculum margined posteriorly by a line of setae.

The following redescription is based on the type female, which is missing the flagellum from both antennae.

Holotype, female. Color: Head green with face with coppery reflections, vertex and upper part of occiput purple; mesosoma blue–green except anterior lateral corners of collar, side lobes of mesoscutum, posterior and lateral parts of propodeum purple; petiole pale brown; gaster with T1 purple, remainder brown. Antenna with scape brownish yellow, brown at tip; pedicel, annelli brown. Legs beyond coxae pale reddish brown. Fore wing with membrane brown in basal 1/2 of basal cell, remainder of membrane clear; veins brownish yellow except basal 1/3 of submarginal vein brown; basal vein not pigmented.

Sculpture: Clypeus, gena coriaceous; rest of head finely reticulate; pronotum, mesoscutum, axilla alveolate, alveolae of middle lobe of mesoscutum larger than those of surrounding structures; scutellum coriaceous with cells down median portion elongate; entire epimeron coriaceous; dorsellum smooth; propodeum finely and weakly reticulate; gaster with T1 smooth, T2–7 coriaceous.

Structure: Body length 2.7 mm. Head pentagonal in anterior view (fig. 10), width 1.4X height (34:25), 2.4X length (34:14); eye height 1.4X length (17:12), 2.4X malar length (17:7), length 6X temple length (12:2) (fig. 11); torulus inserted 3X own diameter above LOL; ratio of MOD, OOL, POL, LOL as 3:5:7:3. Antenna (fig. 12) with relative lengths of scape, pedicel, annelli as 9:5:2; scape extending above vertex. Mesosoma length 1.8X width (50:28); frenal sulcus near hind margin of scutellum; dorsellum just longer mesally than laterally; metapleuron bare; propodeum uniformly rounded from side to side with spiracular sulcus lacking, with shallow

median sulcus, spiracles ovate and 2X own diameter from anterior margin of propodeum. Fore wing (fig. 13) length 2.4X width (101:42); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 32:25:28:9; costal cell with single complete setal row; basal cell with row of setae along anterior margin; basal vein with row of fine setae; cubital vein with complete row of fine setae from base of wing, closing speculum posteriorly. Gaster broadly fusiform, length 2.5X width (74:30); hypopygium extending just under halfway to tip of gaster; ovipositor sheaths exerted a little more than length of T7.

Males. See *P. americanus* Hedqvist.

Variation. *Platygerthus columbianus* is variable in size and color. The body length of females varies from 1.0–4.0 mm, the males from 1.7–2.6 mm. Female body color varies from a dark purplish blue to a bluish green. The purple coloration of the head and pleural region is nearly absent in two specimens. The leg colors vary from amber-colored to brown. The combined length of the antennal pedicel and flagellum is about 1.2–1.4 times the head width. The antennal funiculus is parallel-sided and F1 is between 1.5 and 2.2 times as long as wide. The holotype and two paratypes have a median sulcus on the propodeum, the remaining specimens have a median carina.

Discussion. For a discussion of the relationship between *P. columbianus* and *P. americanus*, see the Discussion section for this latter species.

Distribution. The holotype was collected from Washington, D.C. I examined 9 female *P. columbianus* from the following localities (CNCI, INHS, NMNH, UWEM): Canada. ONTARIO: Ottawa, 28.VII.1959, 1♀; Pt. Pelee National Park (near Leamington), 9.VI.1968, 1♀; Thwartway Island, St. Lawrence Islands National Park (near Mallorytown), 9.VIII.1976, 1♀, 10.IX.1976, 1♀. United States. ILLINOIS: Rockton, 4.VIII.1948, 1♀. NEW HAMPSHIRE: Albany, 2.VII.1958, 1♀. TEXAS: 1♀. VIRGINIA: Blacksburg, 27.V.1962, 1♀. WISCONSIN: Oneida County, 19–26.VII.1977, 1♀.

Biology. The host(s) of *P. columbianus* are unknown, but like other *Platygerthus* species, they are likely to be bark beetles.

Platygerthus irvingi (Girault), comb. nov.

Fig. 17

Trigonoderus irvingi Girault, 1917:15 (Holotype, ♀; NMNH, Type No. 20946: examined.) Hedqvist, 1968:46.

Diagnosis. *Platygerthus irvingi* can be recognized by the following combination of characters: 1. Scape metallic blue.* 2. Legs mostly dark brown. 3. Fore wing with one brown macula centered over the speculum and another extending along posterior edge of stigmal vein and on to the center of the wing;* basal vein pigmented.* 4. Face alveolate laterad of clypeus. 5. Scutellum without median longitudinal strip of coriaceous sculpturing.* 6. Dorsellum alveolate.* 7. Propodeum alveolate. 8. Eye height about 1.3X malar distance; its length about 3.2X the temple length.* 9. Antenna with combined length of pedicel and flagellum about 1.3X head width. 10. Spiracular sulcus developed.* 11. Metapleuron setose. 12. Basal cell nearly bare dorsally. 13. Speculum not margined posteriorly by a line of setae.

This species was described from a single female, but while searching through the unsorted material at the NMNH, I found three females and three males of *P. irvingi* collected in the same series as the type. The following redescription of *P. irvingi* is based primarily on the type female, but since the head of the type is crushed on a slide, supplemental information on structures destroyed or not visible on the type are taken from intact females and are included in brackets.

Holotype, female. Color: [Head golden green along mouth margin, remainder of face blue; frons, lateral parts of vertex yellowish green, mesal parts of vertex purplish.] Mesosoma dark blue–green except mesoscutum and scutellum dark purple mesally, coppery just outside that, lower mesepisternum violet; gaster dark brown with metallic blue reflections. [Antenna with scape, pedicel dark green; flagellum dark brown.] Legs with coxae dark blue green, remainder dark brown. Fore wing membrane clear except for brown patch in parastigmal region and one extending from apex of marginal vein, along basal side of the stigmal vein and extending to middle of wing disc; veins pale brown, basal vein with brown pigment.

Sculpture: [Head including malar region and above anterior tentorial pits coarsely alveolate, alveolae smaller than on mesosoma.] Pronotum, mesoscutum, scutellum, axilla, frenum, dorsellum, entire propodeum coarsely alveolate; upper epimeron smooth, lower epimeron alveolate; gaster with T1–5 smooth, T6–7 coriaceous.

Structure: [Body length $\bar{x}$ =3.6 mm (range 3.3–3.7 mm). Head subtriangular in anterior view, width ~1.3X height, ~2.0X length; eye height ~1.3X length, ~1.4X malar length, length ~3.2X temple length; torulus on LOC; ratio of MOD, OOL, POL, LOL approximately as 2.0:5.5:9.0:5.0. Antenna with length of pedicel plus flagellum ~1.3X head width (52:39); scape extending above vertex.] Relative lengths of scape, pedicel, annelli, F1–6, club as 15.0:5.0:2.0:4.5:4.0:4.0:4.0:4.5:3.5:10.0; widths of F1, F6, club as 2.5:3.5:4.0; MPP sensilla in single subapical row, 1–3 visible at a time on each flagellomere. Mesosoma length 1.7X width (49:29); frenum long enough for two rows of alveolae; dorsellum with median length subequal to lateral length; metapleuron with seven setae; propodeum uniformly rounded from side to side with spiracular sulcus only weakly developed, with median carina sharp, spiracles round and 1.0X own diameter from anterior margin of propodeum. Fore wing length 2.5X width (109:43); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 41:18:31:10; costal cell with one complete row of setae and a second row in distal 1/3; basal cell with one seta in each wing; basal vein, cubital vein with single row of setae; speculum open posteriorly. Gaster length 3.6X width (76:21); hypopygium extending about halfway to tip of mesosoma; ovipositor sheaths exerted 1.5X T7 length (15:10).

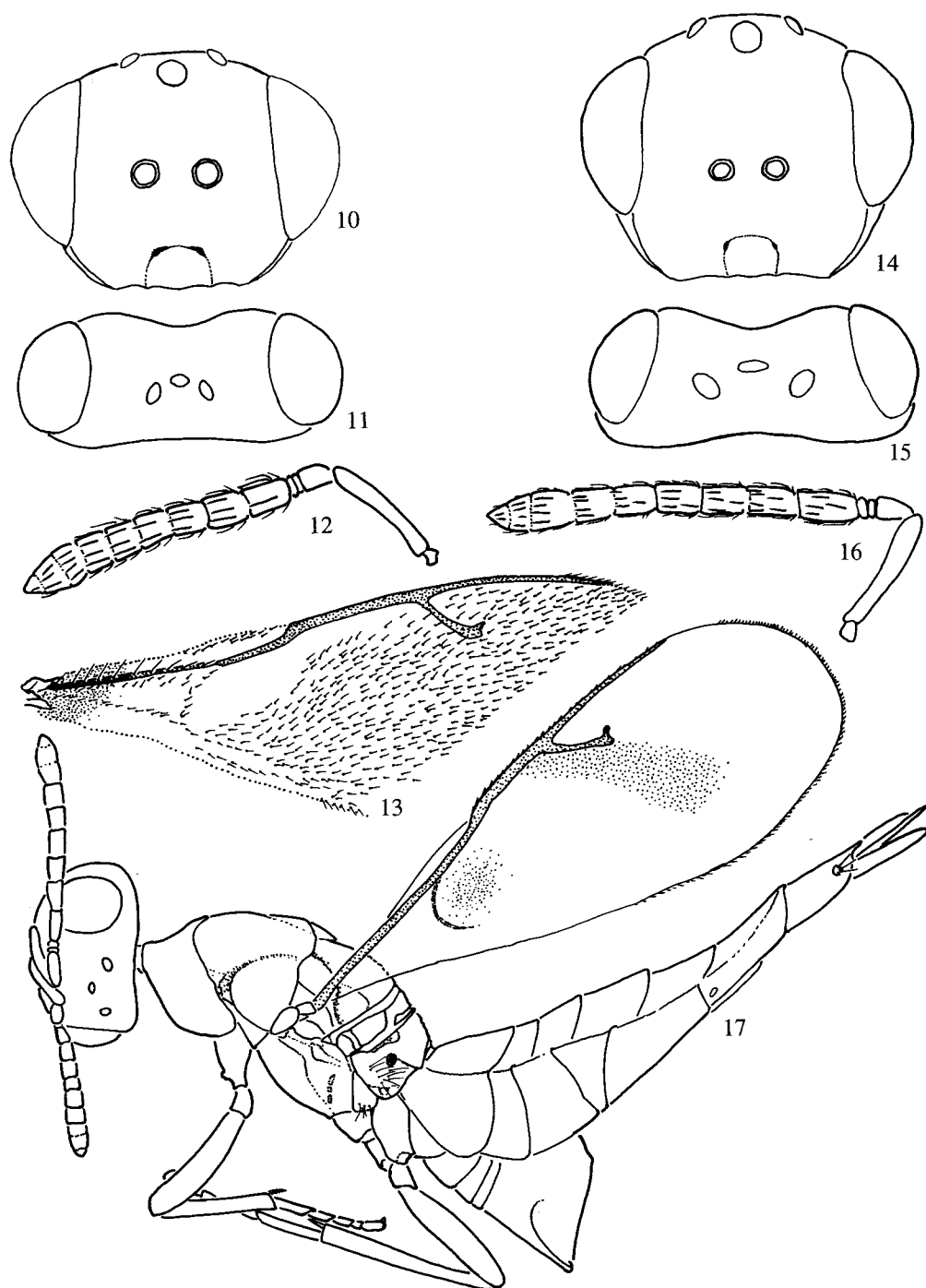
The male is similar to the females in color pattern and sculpture. Their body lengths measured 2.2 mm. The antenna has the length of the pedicel plus flagellum 1.3 and 1.4 times the head width in the two specimens with antennae; in one male measured, the relative lengths of the scape, pedicel, annelli, F1–6, club were 10.5:5.0:1.5:4.5:4.0:4.0:4.0:3.5:3.0:8.0; the relative widths of F1, F6 and the club were 2.0:3.5:4.0; the MPP sensilla are sparse (1–2 visible per segment) and distributed in a single subapical row; and the flagellum is covered with semierect setae whose length is about equal to the length of F3. The gaster length ranges from 2.1–2.4 times its width.

Variation. The body lengths of the three intact females are 3.3, 3.7, and 3.7 mm. One of the three intact females has a dark stripe down the dorsum of the mesosoma like the holotype, one has a faint stripe and has the dorsum uniformly blue–green. This last female also has the face, pleural regions, and propodeum violet; and no brown patch on the stigma.

Discussion. *Platygerthus irvingi* is in some ways intermediate between *Platygerthus* and *Janssoniella* because its frenum, though greatly reduced, is still long enough to show a reticulate surface. Its scutellum also lacks the distinctive mesal coriaceous stripe with elongate engraved reticulation present in other species of *Platygerthus*. *Platygerthus irvingi* is placed in *Platygerthus* because of the much shortened frenum and also because the body sculpturing is finer than the three Nearctic *Janssoniella* species and similar to that of *Platygerthus* species. *Platygerthus irvingi* resembles the Palearctic species in the *Platygerthus maculatus*–group (Graham 1969) because it has a brown maculae on the fore wing and because it has several setae on the metapleuron. This latter character is an autapomorphy for the *P. maculatus*–group.

Material Examined. The holotype female (NMNH) and three other females and three males (NMNH) were collected at Chamber's Lake, Colorado, on 18 September 1895 by sweeping by C. F. Baker. One other female seen was collected 25 June 1928 in Nantucket, Massachusetts, USA (NMNH).

Biology. Nothing is known of the host(s) of this species.



Figures 10–17. *Platygerrhus*. 10–13, *P. columbianus*, female. 10. Head, anterior view. 11. Head, dorsal view. 12. Antenna. 13. Fore wing. 14–16, *P. americanus*, female. 14. Head, anterior view. 15. Head, dorsal view. 16. Antenna. 17. *P. irvingi*, female, habitus.

Erdoesia Bouček

Erdoesia Bouček, 1957:157–159. (Type species: *Erdoesia tessellata* Bouček, 1957; original designation.) Hedqvist, 1968:36, 56. Graham, 1969:98, 123. Bouček, 1977:36. Bouček, 1978:228. Dzhankmen, 1978:117. Bouček and Rasplus, 1991:44.

Diagnosis. *Erdoesia* can be recognized by the following combination of characters: Female. Head with anterior margin of clypeus emarginate (fig. 18); anterior tentorial pits deep; gena alveolate; mandibles with three teeth on the left mandible, four on the right. Antennal club without terminal or subterminal patch of micropilosity. Mesosoma with pronotum length less than half its width, horizontal collar developed, rounded anteriorly; prepectus flat, uniformly reticulate; frenal sulcus not close to hind margin of scutellum (fig. 19); mesosternum lacking raised shield-shaped region behind fore coxae. Gaster with petiole transverse; hind margin of T1 rounded but not noticeably produced medially. A habitus for *E. tessellata* is shown in figure 19.

Male. Not seen.

Discussion. *Erdoesia* contains only the Palearctic species *E. tessellata* Bouček, 1957.

Biology. The host(s) of *Erdoesia* are unknown.

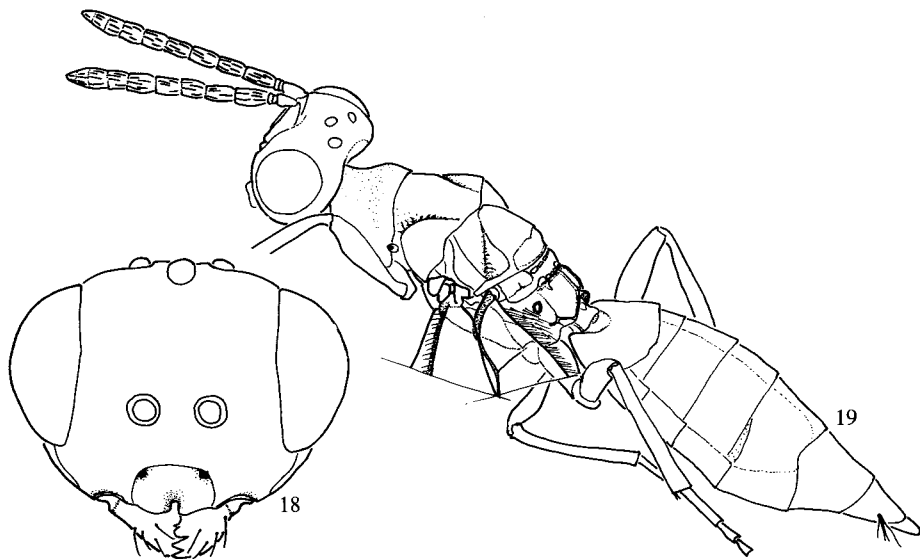
Erdoesia tessellata Bouček

Figs. 18–19

Erdoesia tessellata Bouček, 1957:159–161 (Holotype, ♀; Národní Museum, Prague: not seen). Hedqvist, 1968:56. Graham, 1969:123. Dzhankmen, 1978:118.

Distribution. *Erdoesia tessellata* is said to occur throughout Europe, but is only locally distributed (Bouček 1977). Published distribution records report *E. tessellata* being collected in England, Germany, Czechoslovakia, and Hungary.

Material Examined. One female (BMNH) from Praha–Kunratice, Bohemia, Czechoslovakia collected in 1962 by Z. Bouček and identified by Z. Bouček and one female (UCDC) taken 14 September 1988 at Tintern, Wales.



Figures 18–19. *Erdoesia tessellata*, female. 18. Head, anterior view. 19. Habitus.

Gastracanthus Westwood

Gastracanthus Westwood, 1833:121 (Type species: *Gastracanthus pulcherrimus* Westwood; autobasic.) Kerrich, *In*, Kerrich and Graham, 1957:281–284. Bouček, 1958:365. Ferrière, 1958:24–25, 29. Kamijo, 1960:105–106. Peck, 1963:750. Bouček and Hoffer, 1964:35. Hedqvist, 1968:36, 58, 60–62. Graham, 1969:99, 122–123. Burks, 1979:777–778. Bouček, 1991:203. Bouček and Rasplus, 1991:44.

Hetroxys Westwood, 1833:495 (n. n. for *Gastracanthus* Westwood).

Etroxys Förster, 1856:66, 71 (emendation). Thomson, 1878:48, 86.

Aetroxys Walker, 1872:110 (emendation).

Photismus Thomson, 1878:4, 15 (Type species: *Photismus nubilosus* Thomson; monobasic genus: not seen). Schmiedeknecht, 1909:156, 157, 165–166. Nikol'skaya, 1963:215. Kerrich, 1957:281–284 (synonymy).

Heteroxys Dalla Torre, 1898:101 (emendation).

Cleoblabena Szélényi, 1981:404–405 (Type species: *Cleoblabena gracilis* Szélényi; original designation: examined). Bouček, 1990:203 (synonymy).

Hebestephus Kamijo, 1960:106 (Type species: *Hebestephus acutus* Kamijo; original designation: examined). **syn. nov.**

Diagnosis. *Gastracanthus* can be recognized by the following combination of characters: Female. Head (fig. 34) with anterior margin of clypeus usually shortly and broadly truncate (broadly convex in *G. nigrescens* Kamijo and *G. acutus* Kamijo); anterior tentorial pits deep; gena coriaceous; mandibles with three teeth on the left mandible, four on the right except *G. acutus* with three teeth on both mandibles. Antenna with terminal or subterminal ovate patch of micropilosity (fig. 22). Mesosoma with pronotum length more than half its width (fig. 21), collar developed, rounded anteriorly; prepectus flat, uniformly reticulate (fig. 32); frenal sulcus remote from hind margin of scutellum; mesosternum with raised shield-shaped region behind fore coxae (fig. 32). Gaster distinctly petiolate, petiole length about 1/3 width; hind margin of T1 produced in most species (fig. 26), emarginate in *G. acutus* and *G. atrobaculus* (figs. 23, 24). A habitus of a female *G. conicus* is shown in figure 25.

Male. Antenna with flagellar setae erect, papillate; club comprised of three segments except only two segments in *G. acutus* (fig. 24). Gaster petiolate, petiole as long or longer than wide.

Discussion. *Gastracanthus* Westwood contains four Palearctic species [*G. acutus* (Kamijo), 1960; *G. japonicus* Kamijo, 1960; *G. nigrescens* Kamijo, 1960; and *G. pulcherrimus* Westwood, 1833] and one Nearctic species [*G. conicus* (Girault), 1917]. I am herein describing *G. atrobaculus* **n. sp.** from Taiwan.

After examination of the type, I believed Baltazar (1966) mistakenly moved *Ormocerus pallidipes* Ashmead, 1905 to *Gastracanthus*. The type was shown to Z. Bouček (BMNH) and he identified it as a new species of *Frena* Bouček, 1988. The new combination, *Frena pallidipes* (Ashmead) **n. comb.**, reported herein, should be attributed to Bouček. The synonymy of *Hebestephus* Kamijo with *Gastracanthus* is explained in the phylogeny section above.

Szélényi (1981) described *Cleoblabena* Szélényi which contains only the type species, *C. gracilis* Szélényi. Only the holotype male is known. *Cleoblabena gracilis* has deep anterior tentorial pits, a reticulate and acarinate prepectus, a truncate clypeus, an elongate pronotum, an elongate male petiole, and a distinct frenum. This character combination is diagnostic for *Gastracanthus*. Szélényi separated *Cleoblabena* from *Gastracanthus* by the 'cylindrical funicle joints' of *Cleoblabena*. Despite what Szélényi says, the antennae of male *Gastracanthus* species is very similar to that drawn for *Cleoblabena gracilis* (fig. 6 in Szélényi 1981). Both genera have the male antennae with a six-segmented funiculus with cylindrical funicular segments many times as long as wide and a three-segmented club. The flagellum is covered with erect setae longer than the width of the funicular segments. Szélényi also says *Cleoblabena* has no speculum, but this is not the case. The type lies on its right side on a card with the right fore wing overlying the right hind

wing; both are tightly appressed to the card. The setae of the hind wing show through the glabrous speculum of the fore wing, and so it appears setose. The left fore wing is free of the card (and the left hind wing) and has a distinct speculum. Examination of the type showed that *C. gracilis* is a synonym of *Gastracanthus pulcherrimus* Westwood as reported by Bouček (1991).

Biology. Despite the fact that *Gastracanthus* is one of the most commonly collected genera of the Trigonoderini, the hosts for this genus remain unknown. Graham (1969) records one unconfirmed record of *G. pulcherrimus* Westwood on an imago of *Byrrhus fasciatus* (Förster) (Byrrhidae) found under stones.

***Gastracanthus atrobaculus* Heydon new species**

Figs. 20, 22–23, 28

Holotype, female. Color: Head, mesosoma, petiole, gaster dark green with strong yellow and coppery reflections, tubercle between clypeus and toruli blue-green. Antenna with scape brownish yellow, with apex brown; pedicel brown; remainder black. Legs brownish yellow except hind coxa with brown triangle on ventrolateral face and pretarsi darker. Fore wing with membrane faintly yellowish brown; fore wing tip and discal patch just perceptibly darker; wing veins brown; basal vein and parts of cubital vein faintly pigmented. Hind wing membrane clear.

Sculpture: Clypeus with ventral 1/2 smooth; dorsal 1/2 finely alveolate; gena coriaceous; remainder of head alveolate; antenna with flagellum granulate; mesosoma alveolate except dorsellum, lower epimeron, metapleuron, callus coriaceous; scutellum colliculate; upper epimeron smooth; petiole, T1–2 smooth; T3–7 coriaceous.

Structure: Body length 5.6 mm. Head triangular in anterior view, width 1.3X height (53:40), 2.1X length (53:25); clypeus with anterior margin shortly truncate; eye height 1.3X length (28:22), 3.5X malar distance (28:8), length 11X temple length (22:2); torulus located 1.5X own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 4.5:7.0:9.0:4.0. Antenna (fig. 22) with length of pedicel plus flagellum 1.9X head width (101:53); ratio of lengths of scape, pedicel, annelli, F1–6, club as 19.0:5.0:2.0:14.5:14.0:13.0:12.0:10.0:18.5; widths of F1, F6, club as 4.5:6.0:7.5; MPP sensilla in 4 rows on F1, 3 on F2–6, 5 rows on club; club blunt terminally, tip with circular patch of micropilosity. Mesosoma length 2.4X width (95:40); pronotum length 0.65X width (19:29), collar with anterior edge crested; prepectus acarinate, nearly horizontal (fig. 20); dorsellum rectangular; propodeum with sharp carina down middle, median panels bordered posteriorly and laterally by W-shaped lamellate carina; spiracles shortly ovate, 1X own diameter from anterior margin of propodeum. Fore wing length 3.0X width (204:67); speculum closed behind; ratio of lengths of submarginal, marginal, postmarginal, stigmal veins as 81:59:49:20; costal cell with band of setae extending entire length; basal cell completely setose; basal vein with cuticular border. Petiole length 0.33X width (4:12); lacking lateral setae. Gaster length 12X width (164:14), 2.7X combined length of head and mesosoma (164:61); hind margin of T1–5 concave, T6–7 produced posteriorly.

Allotype, male. Similar to female except as follows: Color. Head, mesosoma bluish green with yellow reflections on face, lateral region of pronotum copper-colored; gaster brownish black, basal 1/2 T1 with strong dark green metallic reflections, apical 1/2 T1–T3 paler than T4–7. Legs with fore and middle coxae brown at base; hind coxa dark green except at tip. Structure. Body length 3.8 mm. Antenna with length of pedicel plus flagellum 2.6X head width (114.0:44.5); ratio of lengths of scape, pedicel, annelli, F1–6, club as 13.0:4.0:1.5:17.0:17.0:–16.0:15.0:13.0:11.5:19.0; widths of F1, F6, club as 4.0:3.5:3.5; MPP sensilla sparse, in many rows on each funicular segment; setae semierect, on basal papillae; club (fig. 23) three-segmented, with terminal spine. Petiole length 1.1X width (8:7), with two fine perpendicular setae on each side. Gaster length 4.0X width (101:25).

Variation. The female body length varies from 4.5–5.6 mm in length; the male body length varies from 2.4–4.6 mm. In both sexes, the smaller specimens are much darker than the larger specimens. In small females, portions of the head and thorax may be bronzy purple and the following structures dark: the scape dorsally, the base of the fore and middle coxae, the basal 1/2 of the hind coxa, the hind tibia apically, and the tarsi beyond the basal half of the basitarsus. In small males, the head and mesosoma may become purplish or greenish black, the whole antenna brownish black, the fore and hind coxae dark metallic green, the middle coxa and all femora dark brown, and the fore wing clear. The number of pairs of lateral setae on the petiole varies from 4 in large males to 1 on small males. In small males, the combined length of the pedicel and flagellum may be only 2X the head width. The papillae of the funiculus are hardly present in small specimens.

Etymology. The specific name is derived from the Latin words *ater*, meaning black, and *baculus*, meaning rod or staff, and refers to the long, black, blunt-tipped female flagellum.

Type Material: The holotype, ♀ (AEIC), was collected 3 May 1983 at Meifeng, Taiwan, by Henry Townes; the allotype (AEIC) was collected at the same locality on 29 May 1983. Eleven female and 41 male paratypes were collected from Taiwan as follows (AEIC, TAMU): Meifeng, 26.IV.1983, 1♀, 2♂; 3.V.1983, 4♀, 10♂; 10.V.1983, 3♀, 11♂; 15.V.1983, 3♂; 22.V.1983, 2♀, 3♂; 29.V.1983, 3♂. Nantou Hsein, Meifeng, 22.V.1982, 3♂; 23.V.1982, 1♂. Wushe, 16.III.1983, 1♂; 26.IV.1983, 1♀, 1♂; 3.V.1983, 1♂; 10.V.1983, 2♂.

Biology. The host(s) of *G. atrobaculus* are unknown.

***Gastracanthus conicus* (Girault)**

Figs. 21, 25, 26

Trigonoderus conicus Girault, 1917:396 (Holotype, ♀; NMNH, Type No. 20902: examined.)

Gastracanthus conicus (Girault): Kerrich and Graham, 1957:283 (synonymy). Kamiyo, 1960:103. Bouček, 1958:365. Hedqvist, 1968:60. Burks, 1979:777–778.

The holotype is a female whose head is crushed and mounted on a slide along with the right hind leg. Both mandibles, the scape to F5 of the left and the scape to F1 of the right antenna are visible on the slide. The type specimen was collected in Arizona by E. A. Schwarz (Girault 1917). The following redescription is based on the type specimen.

Holotype, female. Color: Head green; mesosoma green with weak coppery reflections; gaster greenish purple but with distal half of T1, all of T2, basal half of T3 dark reddish brown, basal half of T1 green. Antenna with scape pale yellow; pedicel brown; funiculus black. Legs (including coxae) cream-colored, pretarsus only slightly darker. Wings hyaline; veins translucent, brown.

Sculpture: Mesoscutum reticulate; scutellum coriaceous; frenum reticulate; dorsellum coriaceous; upper epimeron smooth; propodeum with median panels reticulate; gaster with T1 nearly smooth, T2–7 coriaceous.

Structure: Mesosomal length 1.9 mm. MOD:POL:LOL as 4.0:8.0:4.5. Right mandible with four teeth; left with three teeth. Antenna with ratio of lengths of scape, pedicel, annelli, F1–5 as 22.0:5.5:2.0:14.0:13.0:12.0:12.0:11.0; ratio of widths of F1, F5 as 4.0:4.5; MPP sensilla arranged irregularly in at least three rows over funicular segments. Mesosoma length 2.2X width (93:42); collar with anterior edge rounded; frenum with distinct longitudinal median sulcus; dorsellum quadrate, width 2.6X length (13:5); propodeum with distinct median carina, plicae faint anteriorly. Fore wing length 2.9X width (199:66); ratio of lengths of submarginal, marginal, postmarginal, stigmal veins as 78:41:51:20; stigmal vein straight, stigma rectangular and about 2X as wide as long; basal cell bare; basal vein with double row of setae; cubital vein with single row beneath basal cell and speculum; speculum developed. Petiole terete; smooth; length 0.33X width (4:12). Gaster lanceolate (fig. 26), length 7.6X width (198:26); T1 with hind margin

produced (fig. 26), with flange ventrally at base; ovipositor sheaths exerted 0.53X length of T7 (10:18).

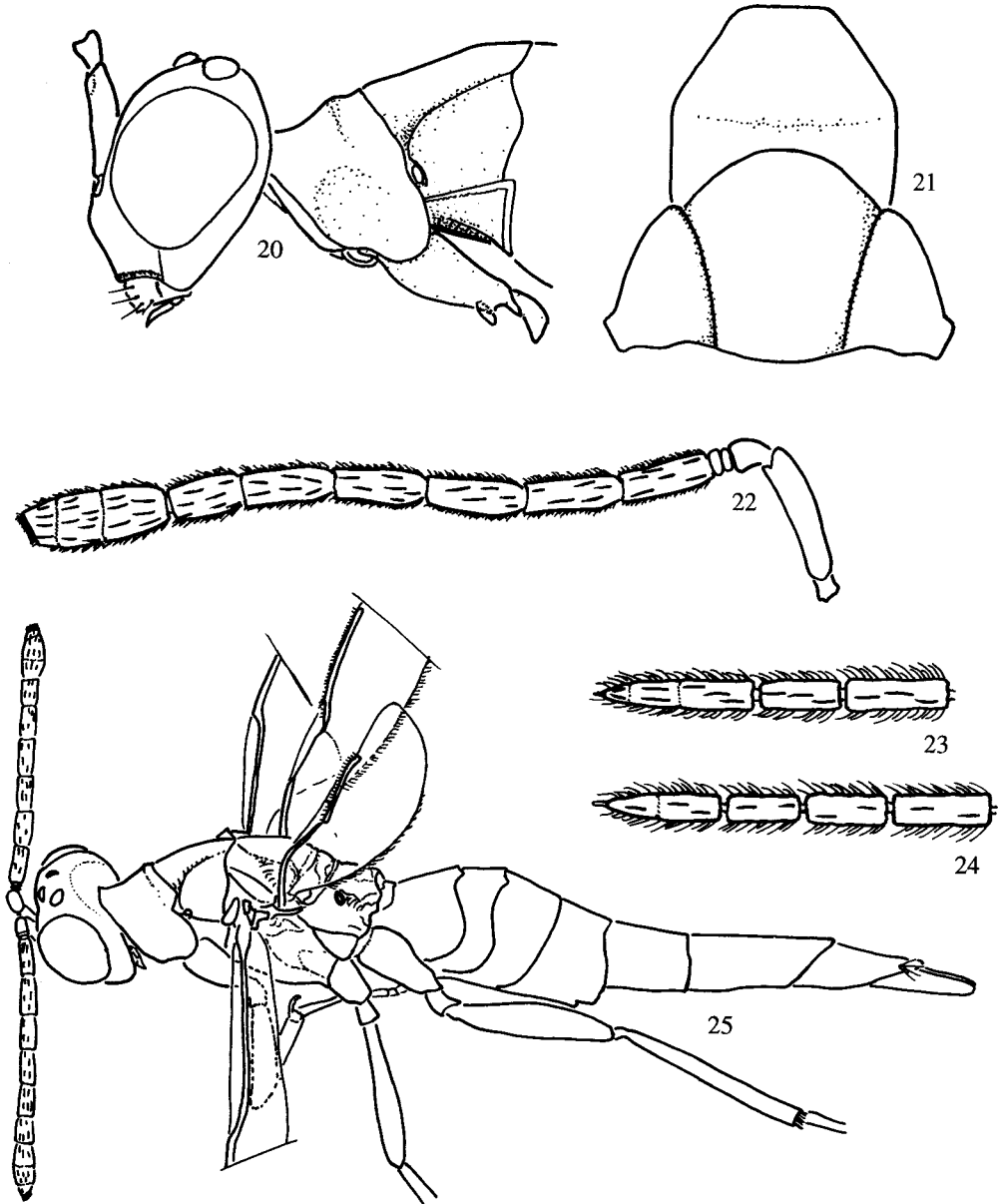
Males. Color pattern similar to females, but body usually blue-green, inner orbits blue, fore coxae with metallic coloration ventrally at base. The antenna has the funicular segments elongate (fig. 23), and covered with erect papillate setae whose length is nearly equal to the flagellar width. The proportions of the flagellar segments is variable. In 12 specimens measured, F1 varied from 3.3–4.6 times as long as wide, and F6 from 2.4–3.2 times as long as wide. The observed variation was continuous and was not related in any obvious way to the size or geographic origin of a specimen.

Variation. Females vary in length from 3.5–7.5 mm; males from 2.0–4.4 mm.

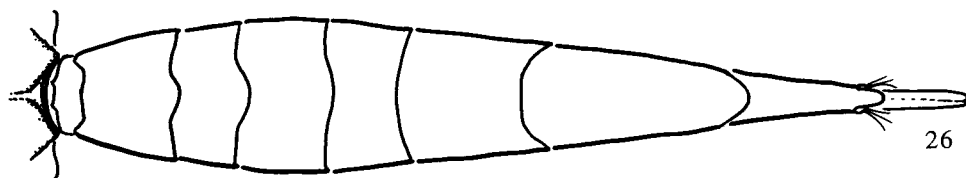
Discussion. All North American *Gastracanthus* specimens examined belonged in one variable species. *Gastracanthus conicus* females differ from those of the Palearctic species *G. pulcherrimus* in the following ways: 1. *Gastracanthus conicus* females have the fore wing either clear or with a very weak brown band from the middle of the basal vein to the stigma; *G. pulcherrimus* female fore wings have a distinct dumbbell-shaped reddish patch. 2. The hind coxa of *G. conicus* is almost entirely nonmetallic; the hind coxa of *G. pulcherrimus* is metallic on the basal third or more. 4. The gaster of *G. conicus* is metallic ventrally; the gaster of *G. pulcherrimus* is nonmetallic ventrally. Kamijo (1960) gives differences between *G. conicus* and *G. japonicus* and *G. nigrescens*.

Distribution. A total of 47 females and 42 males were seen (AEIC, CNCI, CUIC, INHS, NMNH, TAMU, UCDC). The geographic distribution of specimens is as follows: Canada. BRITISH COLUMBIA: Burnaby; Courtenay, Vancouver Island; Milner; Kleanza Creek, 7 mi sw. Terrace; Kleanza Creek, 14 mi e. Terrace; 33 mi w. Terrace. MANITOBA: Minette; Ridge Mountain National Park. NEW BRUNSWICK: Chatham; Kouchibouquac National Park. ONTARIO: Cumberland; Gloucester; Ottawa; Grendier I., St. Lawrence Islands National Park; Spencerville; Stittsville; Vernon, Waubamie. QUEBEC: Chelsea; Gatineau Park; La Treppe; Old Chelsea; Parke Reserve; Rigaud. United States. ALASKA: Salmon Creek, Seward. ARIZONA. ILLINOIS: Starved Rock State Park. INDIANA: Lafayette. MAINE: Bar Harbor. MARYLAND: Plummer's Island. MICHIGAN: Brevort; Delta Co.; Mason Co.; Missawdii Co.; Sanilac Co. NEW HAMPSHIRE: Randolph. NEW YORK: Bemus Point; Canadarago Lake; Canajoharie; Hemlock Ridge, McLean Reservoir; Ithaca; Lake Placid; McLean Reservoir; Oneonta; Poughkeepsie; Rodchester; Troy. NORTH CAROLINA: Base of Wayah Bald; Clingman's Dome; Crabtree Mound, Yancey Co.; Indian Gap, Great Smokey Mountain National Park; Looking Glass Rock, nr. Pisgah Forest; Pisgah. PENNSYLVANIA: Jeannette. WISCONSIN: Washburn Co. WASHINGTON: Seattle.

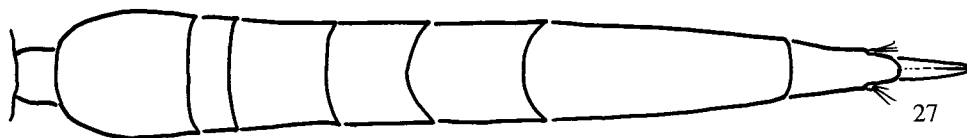
Biology. There is probably two generations per year in the United States. Most of the specimens from the United States were collected from late May to early July, and again from August to early October. Despite the great number of specimens seen, none had rearing information and the host(s) of *G. conicus* remains unknown.



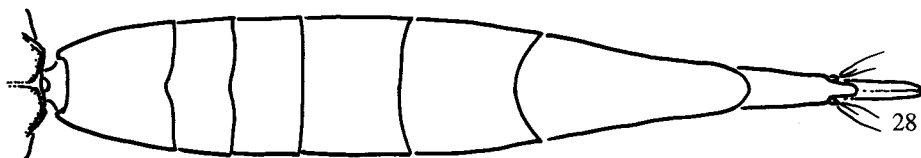
Figures 20–25. *Gastracanthus*. 20, *G. atrobaculus*, female, head and pronotum, lateral view. 21, *G. conicus*, female, pronotum. 22, *G. atrobaculus*, female, antenna. 23, Male, club. 24, *G. acutus*, male, club. 25, *G. conicus*, female, habitus.



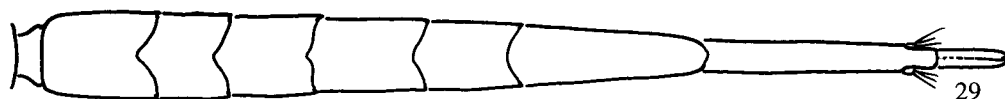
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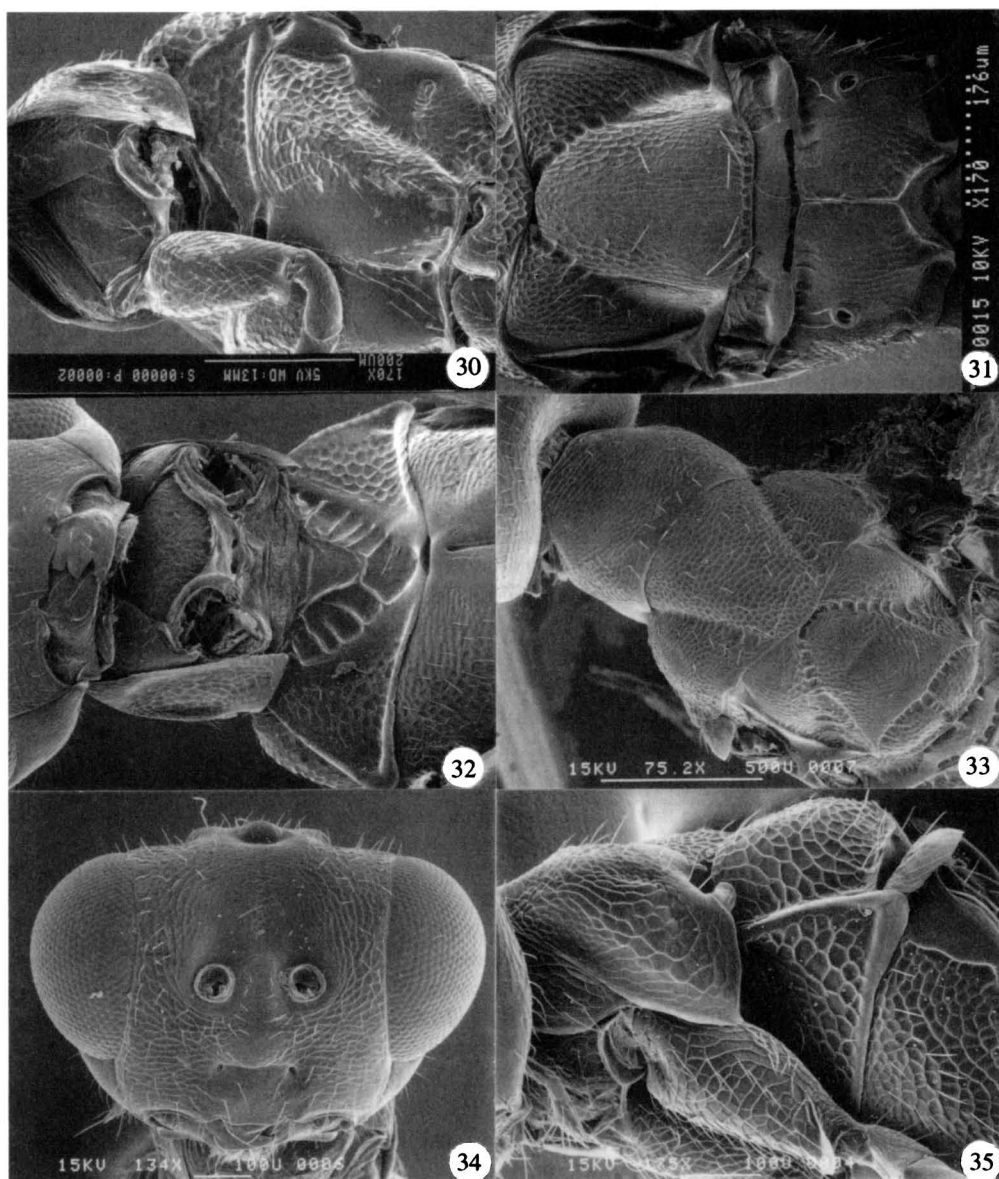


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Figures 26–29. *Gastracanthus*. 26, *G. conicus*, female, gaster. 27, *G. nigrescens*, female, gaster. 28, *G. atrobaculus*, female, gaster. 29, *G. acutus*, female gaster.



Figures 30–35. 30, *Janssoniella caudata*, mesosoma, ventral view. 31, *Platygerrius columbianus*, male, scutellum and frenalum. 32–35, *Gastracanthus*, female. 32, *G. atrobaculus*, mesosoma ventral view. 33–35 *G. conicus*., 33, Mesosoma, dorsal view. 34, Head, anterior view. 35, Prepectus.

Plutothrix Förster

Plutothrix Förster, 1856:46, 49 (Type species: *Plutothrix försteri* Mayr, 1904; sub. desig. Mayr, 1904.) Thomson, 1878:11–13. Mayr, 1904:586–588. Nikol'skaya, 1963:212. Kerrich and Graham, 1957:284–299. Ferrière and Kerrich, 1958:27–28. Hedqvist, 1968:36, 40, 42–44, 45. Bouček and Hoffer, 1964:35. Graham, 1969:102–106. Dzhankmen, 1978:117, 122–123. Bouček and Rasplus, 1991:45.

Anoglyphis Förster, 1878:49 (Type species: *Anoglyphis nubilosa* Förster, 1878; original designation.)

Trigonoderus Westwood (in part): Schmiedeknecht, 1909:156, 157, 166–167.

Diagnosis. *Plutothrix* can be recognized by the following combination of characters: Female. Head (figs. 50, 55) ovate or quadrate in anterior view; clypeus with rounded anterior denticle, anterior tentorial pits shallow; gena smooth or coriaceous; antennal scrobes developed, circular scrobal pit present; vertex alveolate. Antenna with club either without micropilosity (figs. 36, 37, 39, 41, 46) or micropilosity forming a line or ovate patch down ventral side of club (fig. 43). Mandibles with three teeth on the left mandible and four on the right (fig. 38). Mesosoma with sides of pronotum parallel in dorsal view, collar with anterior transverse carina (except in *P. ascita* n. sp.) (figs. 52, 54); prepectus with posterior corner bent and set off by a carina, without setae (fig. 56); propodeum with median carina more or less developed (figs. 49, 51, 53). Fore wing with alar speculum present (fig. 48). A habitus of *P. smithi* is shown in figure 62.

Male. Antennal flagellum with setae well developed and MPP sensilla sparse (figs. 58, 59) [except in *P. unguetta* nearly lacking setae and with numerous MPP sensilla (fig. 59)]; club of three compact segments. Petiole transverse, its length less than 1/2 its width.

Discussion. Described species of *Plutothrix* include the Palearctic species *P. canariensis* Hedqvist, 1974; *P. coelius* (Walker); *P. scenicus* (Walker, 1836); *P. trifasciatus* (Thomson, 1878), the Holarctic species *P. cisae* Hedqvist, and the Nearctic species *P. unguetta* (Girault). I am describing nine new Nearctic species—*P. aerata*, n. sp.; *P. ascita*, n. sp.; *P. ceonotalis*, n. sp.; *P. glareosa*, n. sp.; *P. ligyptera*, n. sp.; *P. pilosiclava*, n. sp.; *P. recula*, n. sp.; *P. smithi*, n. sp.; and *P. unguetella*, n. sp.

Biology. The recorded hosts of *Plutothrix* species are commonly beetles associated with dead wood or fungi (Anobiidae, Anthribidae, Eucnemidae, and probably either Trogossitidae or Tenebrionidae), but two species may be parasitoids of dipterans. A long series of *P. cisae* from Ontario was reared from Platypedidae and a specimen of *P. pilosiclava* was reared with Diptera from a puffball. Many *Plutothrix* species are associated with hosts inhabiting fungi. Among Nearctic *Plutothrix* species, four [*P. glareosa* n. sp., *P. ligyptera* n. sp., *P. unguetta* (Girault), and *P. unguetella* n. sp.] were collected in association with shelf fungi (Polyporaceae) and *P. pilosiclava* was reared from puffballs. Other species are less closely associated with fungi; the Palearctic species *Plutothrix coelius* (Walker) was reared from the wood boring anobiid *Anobium punctatum* DeGeer (Kerrich and Graham 1957, Lyngnes 1956) and *P. scenicus* is recorded from this same host in the stems of gorse (Kerrich and Graham 1957). *Anobium punctatum* is not especially associated with fungi.

Details of the life history are known for only one *Plutothrix* species. The study of *Plutothrix coelius* by Lyngnes (1956) contains descriptions of the female genitalia and reproductive organs, courtship, and oviposition behavior. *Plutothrix coelius* was found to parasitize *Anobium punctatum* when the mature beetle larvae constructed their pupal cavities near the surface of the wood. Last instar larvae, pupae, and pharate adults all seemed to be suitable as hosts. Parasitism, or at least emergence from, pharate adult beetles is also reported herein for *P. ceonotalis* on *Isorhipis ruficornis* (Say) (Eucnemidae).

Plutothrix is one of the taxonomically most difficult genera of the Trigonoderini. The following review of the Nearctic species of *Plutothrix* is a preliminary treatment of the genus. Little reared material or material from the western United States and Canada was available for

study. There appears to be a difficult complex of species similar to *P. unguetta* and *P. unguetella*. Based on study of the females only, I was inclined to assume there was only one variable species. However, males associated with these females show at least two different antennal morphologies. I separate what I believe are distinct species (*P. unguetta* and *P. unguetella*) that can be associated with males of each of the two antennal types. To minimize ambiguity and the chance of error, I defined these species rather strictly, with the result that a number of specimens, sometimes collected in the same malaise traps, are not within the range of variation of either species. These specimens may eventually be found to belong to one or the other of these species, but rearing studies are needed to assess the true range of morphological variation of *P. unguetta* and *P. unguetella*.

Key to Females of Nearctic *Plutothrix* Species

The following key is given to the females of the described species; the diagnosis given for each species can be used to confirm identifications. Examination of specimens under florescent light or with incandescent light diffused through Mylar film is necessary to accurately determine sculpturing. Due to the extreme similarity of the males of several species, a key to the males will not be given. Characteristics of the male funiculus are given when helpful for determining species. Unless otherwise stated, the male funiculus has only a few scattered MPP sensilla and is moderately densely covered with semierect setae.

1. Upper epimeron completely smooth 2.
- Upper epimeron usually coriaceous or alveolate ventrally (fig. 54), but sometimes with only a longitudinal strip of coriaceous sculpturing (fig. 52).....3.
2. Basal funicular segments distinctly paler than remainder of flagellum (fig. 36); pronotal collar with anterior transverse carina (as in fig. 52); annelli transverse (fig. 36); base of clypeus with fine parallel wrinkles, but overall smooth and polished (as in fig. 55). (southeastern U.S.)*aerata*, n. sp.
- Funiculus the same color throughout (fig. 37); pronotal collar rounded anteriorly, without any trace of a transverse anterior carina; annelli usually almost as long as wide (fig. 37); basal half of clypeus finely alveolate, dull (fig. 38). (eastern U.S. and Canada).....*ascita*, n. sp.
3. Scutellum (fig. 52) highly convex, colliculate between lateral setal rows (fig. 53); upper epimeron smooth except for mesal longitudinal strip of fine coriaceous sculpturing (fig. 52); dorsellum (fig. 53) large (about as long medially as frenum), pentagonal (much longer medially than laterally)..... *glareosa*, n. sp.
- Scutellum flat to convex (fig. 54), coriaceous, alveolate or imbricate between lateral setal rows (figs. 49, 51, 54); upper epimeron coriaceous or alveolate ventrally (fig. 54); dorsellum shorter than frenum (figs. 49, 51), with front and hind margins parallel or dorsellum slightly longer mesally than laterally 4.
4. Club blunt and appearing only a little longer than the terminal funicular segment (fig. 44), tip of terminal club segment ringed by fringe of stiff white setae (fig. 57); frenum coriaceous. [Male funiculus densely covered with short erect setae (fig. 58)] *smithi*, n. sp.
- Club rounded or pointed apically and appearing distinctly longer than terminal funicular segment (figs. 39, 41, 43, 46), tip of terminal segment not ringed with fringe of white setae; frenum alveolate with raised sculpturing similar to that of scutellum (figs. 49, 51, 54) 5.

5. Scutellum flat between lateral setal rows, posterior 3/4 of scutellum, dorsellum and propodeum all in same plane in lateral view; body color dark green; female fore wing with weak diffuse maculae over center of wing *recula*, n. sp.
- Scutellum convex between lateral setal rows, dorsum of mesosoma arched (the plane of dorsellum or propodeum at different angles from that of scutellum in lateral view); body color paler — green to blue — green; fore wing clear or with a brown macula extending only posteriorly from stigma (fig. 48).....6.
6. Scutellum with short anterior median furrow (fig. 49); clypeus almost entirely covered with parallel wrinkles (fig. 50); propodeum completely and finely but distinctly alveolate (fig. 49); middle coxa nonmetallic *ceonotalis*, n. sp.
- Scutellum lacking anterior median furrow (figs. 51, 54); clypeus mostly smooth (as in fig. 55); propodeum usually either nearly smooth or with irregular sculpture (figs. 51, 54); middle coxae usually at least partially metallic.....7.
7. Fore wing with macula extending posteriorly from stigma (fig. 48); dorsellum coriaceous, about as long medially as laterally (fig. 49).....8.
- Fore wing clear; dorsellum nearly smooth, longer medially than laterally (figs. 51, 53)..... 10.
8. Ventral length of club almost or fully as long as combined length of F4–6, club with a large ventral patch of micropilosity that extends basad to the basal club segment (fig. 43) *pilosiclava*, n. sp.
- Ventral length of club at most just longer than combined length of F5–6, club without visible patch of micropilosity or with a small patch on ventral side of terminal club segment (fig. 46).....9.
9. Fore femur brown on posterior face, distinctly darker than tibia; hind margin of T1 shallowly emarginate (fig. 47); dorsellum with posterior face at about 45° from vertical (as in fig. 52); mesoscutum length less than 1/2 its width; body length varying from 3.4–4.5 mm (Male flagellum, fig. 60)..... *unguttella*, n. sp.
- Fore femur with posterior face brownish yellow, nearly concolorous with tibia; hind margin of T1 usually deeply emarginate (fig. 58); dorsellum tilted so that its posterior face is nearly vertical (fig. 42); mesoscutum length more than 1/2 its width; body length often more than 4.5 mm. [Male flagellum with numerous MPP sensilla, with no upstanding setae. (fig. 47)] *ungutta* (Girault)
10. Middle coxa usually yellowish brown, concolorous with femora and nonmetallic. Female body length less than 2.4 mm; funicular segments with only one row of MPP sensilla (fig. 39); gaster length 3.2–4.2 times its width (fig. 40), its length 1.1–1.2 times the combined length of the head and mesosoma..... *cisae* Hedqvist
- Middle coxa brown, at least basally, and with metallic green reflections. Female body length 2.7–3.4 mm; most funicular segments with two rows of MPP sensilla (fig. 41); gaster length only 2.3–3.0 times its width (fig. 42), length only 0.9–1.0 times the combined length of the head and mesosoma *ligyptera*, n. sp.

***Plutothrix aerata* Heydon,
new species**

Fig. 36

Diagnosis. 1. Body color dark bronze-colored. 2. Clypeus almost smooth, not slanted relative to upper face. 3. Anelli transverse. 4. Female antenna (fig. 36) with F1 and F2 paler

than remainder, club a little longer than F5–6, micropilosity lacking, club terminus rounded. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense, semierect setae. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.48X width. 8. Scutellum alveolate, moderately convex, without anterior median furrow; frenum alveolate. 9. Dorsellum smooth or coriaceous, longer medially than laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron completely smooth. 11. Propodeum with weak rugae. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa pale. 14. Female fore wing with faint brown macula below stigma and disk often with yellowish tinge, speculum open posteriorly. 15. Gaster length about 2.7X its width, about 1.1X combined length of head and mesosoma; T1 broadly emarginate; hypopygium length 1/3 to 1/2 gaster length.

Unique character states of *P. aerata* include the dark bronze body color and the two basal funicular segments being paler than the succeeding segments (fig. 36). The body color of other Nearctic *Plutothrix* species is paler, varying from dark green with bronze reflections to blue-green, and the funiculus a uniform color. *Plutothrix aerata* and *P. ascita* both have the upper epimeron completely smooth and the center of the wing membrane often with a yellowish tint; other Nearctic *Plutothrix* species have at least some coriaceous or alveolate sculpturing on the upper epimeron and the wing membrane transparent.

Description. Holotype, female. Color: Head, mesosoma, gastral tergites dark bronze, propodeum and T1 with greenish reflections; gastral sternites yellowish brown. Antenna with scape, pedicel yellow-brown; F1, F2 pale orangey brown; remainder dark brown. Legs with fore, hind coxae dark bronze; middle, hind tarsi pale yellow-brown; remainder of legs pale brown. Fore wing veins pale brown; disc of wing with faint brown macula below stigma.

Sculpture: Clypeus almost smooth; head, mesosoma coarsely alveolate except upper epimeron and dorsellum smooth; propodeum with weak rugae; gaster with T1–3 smooth, T4–7 weakly alveolate.

Structure: Body length 2.5 mm. Head ovate in anterior view, width 1.2X height (36:29), 2.1X length (36:17); clypeus in nearly same plane as rest of face; eye height 1.4X length (17:12), 2.1X malar distance (17:8), length 4.0X temple length (12:3); torulus 1/2 own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 3.0:6.5:7.5:3.0. Antenna with combined length of pedicel and flagellum 1.3X head width (46:36); relative lengths of scape, pedicel, annelli, F1–6, club as 17.0:5.0:1.0:7.5:6.5:6.0:6.0:5.0:5.0:11.0; relative widths of F1, F6, club as 3.0:3.5:4.0; annelli transverse; MPP sensilla in 1 or 2 irregular rows per funicular segment; club rounded apically, with minute ventral patch of micropilosity on terminal segment. Mesosoma length 1.8X width (44:25); collar with weak anterior transverse carina; mesoscutal length 0.48X width (12:25); scutellum with shallow broad anterior median furrow; dorsellum longer mesally than laterally. Fore wing length 2.6X width (97.5:38.0); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 37:20:27:11; costal cell with a single complete ventral row of setae, apical 1/3 setose; basal cell setose; speculum open posteriorly. Gaster length 2.7X width (65:24), 1.1X combined length of head and mesosoma (65:60); hind margin of T1 deeply emarginate; hypopygium extending 1/2 gaster length.

Male. Unknown.

Variation. The body length varies from 2.5–3.5 mm. The South Carolina specimens have the center of the fore wing faintly yellowish and the dorsellum coriaceous.

Etymology. The species name, derived from the Latin *aeratus*, meaning (in part) made of bronze, refers to the dark bronzy color of this species.

Type Material. The holotype (NMNH) is a female, collected by malaise trap exposed 19 September through 1 October 1987 by J. Kloke and D. R. Smith, 4 mi s. Cuckoo, Virginia (USA). Two paratype females were collected as follows (both AEIC): United States. SOUTH CAROLINA: Cleveland, 16.IX.1975; Wattocoo, 16.V.1959.

Biology. Nothing is known of the host(s) of *P. aerata*.

***Plutothrix ascita* Heydon,
new species
Figs. 37–38**

Diagnosis. 1. Body color dark green with bronzy reflections. 2. Clypeus with basal 2/3 striate alveolate (fig. 38), not slanted relative to upper face. 3. Anelli (fig. 37) usually as long as wide, quadrate in profile. 4. Female antenna with funiculus uniformly dark, club a little shorter than F5–6, micropilosity in minute ovate patch, club terminus rounded. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense, semierect setae. 6. Pronotum smoothly rounded anteriorly, acarinate. 7. Mesoscutum length about 0.69X width. 8. Scutellum imbricate with postero–median colliculate patch, moderately convex, without anterior median furrow or notch; frenum alveolate. 9. Dorsellum weakly alveolate, not longer medially than laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron completely smooth. 11. Propodeum finely alveolate with coarse rugae. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic. 14. Fore wing without macula, but disk with yellowish tinge, speculum closed posteriorly. 15. Gaster length about 3.6X its width, about 0.81X length of head and mesosoma; T1 broadly emarginate; hypopygium length 13 gaster length.

Unique character states of *P. ascita* include having the basal half of the clypeus finely alveolate (fig. 38), the lack of an anterior transverse carina on the pronotum, and annelli that are usually as long as wide and quadrate in profile (fig. 37). Other Nearctic *Plutothrix* species have a transverse carina on the pronotal collar, annelli that if quadrate in profile, are much wider than long, and the clypeus wrinkled or more or less smooth. Character states shared with only a few other Nearctic *Plutothrix* species include a weakly alveolate dorsellum, the hypopygium short and extending only 1/3 the gaster length, and the mesoscutum relatively long with its length only about 2/3rds its width. Most *Plutothrix* species have the dorsellum without raised sculpture, the hypopygium between 1/3 and 1/2 the gaster length, and the mesoscutum more transverse.

Description. Holotype, female. Color: Body dark green except anterior aspect of face blue-green, gastral sternites dark brown with weak metallic reflections. Antenna with scape brownish yellow; pedicel brown; flagellum black. Legs with fore, middle mostly, hind coxa dark green; remainder brownish yellow. Fore wing with faint yellowish discal tinge; veins brownish yellow except parastigma reddish brown.

Sculpture: Clypeus with basal 2/3 striate–alveolate, apical 1/3 smooth (fig. 38); remainder of head and mesosoma (including dorsellum) alveolate except upper epimeron smooth and scutellum with posterior median patch of coriaceous sculpture; propodeum with distinct rugae; gaster with T1 smooth, remainder coriaceous.

Structure: Body length 4.7 mm. Head quadrate in anterior view, cheeks buccate; width 1.3X height (53.0:40.5), 1.9X length (53.0:27.5); clypeus in nearly same plane as rest of face; eye height 1.4X length (26:19), 2.4X malar distance (26:11), length 3.8X temple length (19:5); ratio of MOD, OOL, POL, LOL as 4.0:9.0:10.0:4.5. Antenna (fig. 49) with combined length of pedicel and flagellum 1.2X head width (64:53); relative lengths of scape, pedicel, annelli, F1–6, club as 20.0:7.0:5.0:8.0:8.0:7.0:7.0:6.5:6.0:12.0; relative widths of F1, F6, club as 4.0:5.5:6.0; annelli long, rectangular in profile; MPP sensilla in 1 or 2 irregular rows per funicular segment; club rounded apically, with minute ventral ovate patch of micropilosity on terminal segment. Mesosoma length 1.9X width (79:42); pronotal collar without anterior transverse carina; mesoscutal length 0.69X width (29:42); scutellum with no trace of anterior median furrow; dorsellum slightly longer mesally than laterally. Fore wing length 2.6X width (140:54); speculum closed posteriorly by a line of setae; relative lengths of submarginal, marginal, postmarginal, stigmal veins as 63:21:38:18; costal cell with 2 complete ventral setal rows, apical 1/2 generally setose; basal cell setose. Gaster length 3.6X width (126:35); 0.81X combined length

of head and mesosoma (102:126); hind margin of T1 deeply emarginate; hypopygium extending 1/3 gaster length.

Male. Unknown.

Variation. Body length varies from 3.7–5.0 mm; otherwise, individuals of *P. ascita* examined have a rather uniform appearance.

Etymology. The species name, derived from the Latin *ascitus*, meaning foreign or derived, refers to the many unusual character states present in this species.

Type Material. The holotype (NMNH) is a female collected 18 May 1986 by D. R. Smith near Annandale, Fairfax County, Maryland (USA). Five paratype females were collected as follows (CNCI, NMNH): Canada. ONTARIO: Ottawa, McCarty Woods, 30.V.1987, 1♀; Ottawa, 27.VI.1967, 1♀. United States. MARYLAND: Prince Georges County, Patuxent Research Station, 18–25.V.1986, 1♀. VIRGINIA: Fairfax County, near Annandale, 23.V.1981, 1♀, 25.V.1986, 1♀.

Biology. The host(s) of *P. ascita* is unknown.

Plutothrix ceonotalis Heydon, new species

Figs. 49–50

Diagnosis. 1. Body color blue–green. 2. Clypeus usually mostly wrinkled (fig. 50), not slanted relative to upper face. 3. Anelli transverse. 4. Female antenna with funicular segments uniform in color, club a little shorter than F5–6, micropilosity lacking, club terminus rounded. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense, semierect setae. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.58X width. 8. Scutellum (fig. 49) alveolate, moderately convex, with deep anterior median notch often followed by shallow groove; frenum (fig. 49) very weakly alveolate. 9. Dorsellum (fig. 49) weakly alveolate, as long medially as laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron coriaceous. 11. Propodeum alveolate with a few rugae. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa pale. 14. Female fore wing with or without macula, speculum often closed posteriorly. 15. Gaster length about 2.3X its width, about 1.1X length of head and mesosoma; T1 broadly emarginate; hypopygium length 1/3 to 1/2 gaster length.

Plutothrix ceonotalis exhibits no unique character states except the clypeus is usually wrinkled over most of its surface (fig. 50). *Plutothrix ascita* has the clypeus finely alveolate dorsally and the remaining Nearctic *Plutothrix* species have the clypeus smooth, at least medially. *Plutothrix ceonotalis* has the scutellum with a deep anterior median notch, which is often followed posteriorly by a shallow furrow (fig. 49). *Plutothrix aerata* sometimes has a shallow groove extending the entire length of the scutellum while other species, such as *P. glareosa*, sometimes have a minute anterior median notch in the scutellum. In comparison with other Nearctic *Plutothrix* species, *P. ceonotalis* has a relatively long and distinctly alveolate propodeum (fig. 49).

Description. Holotype, female. Color: Head, mesosoma blue–green with strong yellow reflections on frons, vertex, mesoscutum, scutellum; gaster brown with blue–green metallic coloration laterally and on basal 1/2 of T1. Antenna with scape brownish yellow, pedicel brown; flagellum black. Legs with fore, hind coxa blue–green; middle coxa nonmetallic with lateral brown spot; middle, hind tarsi cream-colored; remainder of legs yellow–brown. Fore wing with diffuse triangular reddish brown macula extending from stigma to center of wing; submarginal vein brownish yellow; remainder of veins pale brown.

Sculpture: Clypeus smooth with parallel longitudinal wrinkles (fig. 50); mesoscutum alveolate, alveolae of middle lobe of mesoscutum larger posteriorly; scutellum (fig. 49) alveolate,

frenum coriaceous; upper epimeron coriaceous; dorsellum finely alveolate (fig. 49); propodeum alveolate with a few sharp rugae posteriorly (fig. 49); gaster with T1–3 smooth dorsally, remainder coriaceous.

Structure: Body length 4.3 mm. Head quadrate in anterior view (fig. 50), cheeks not buccate; width 1.2X height (57:47), 2.0X length (57:29); clypeus in nearly same plane as rest of face; eye height 2.5X length (29.0:11.5), 2.4X malar distance (29:12), length 2.3X temple length (11.5:5.0); torulus located just above LOcL; ratio of MOD, OOL, POL, LOL as 4.5:8.0:9.5:5.0. Antenna with combined length of pedicel and scape 1.2X head width (71:57); relative lengths of scape, pedicel, annelli, F1–6, club as 22.0:6.0:3.0:10.0:9.0:8.0:8.0:7.0:7.0:13.0; relative widths of F1, F6, club as 5.0:6.0:6.0; annelli transverse; MPP sensilla in 2 irregular rows per funicular segment; club rounded apically, without visible micropilosity. Mesosoma length 1.7X width (80:48); pronotal collar with anterior edge carinate; mesoscutal length 0.54X width (26:48); scutellum with deep anterior median sulcus (fig. 49); dorsellum hardly longer mesally than laterally (fig. 49). Fore wing length 2.5X width (160:65); speculum closed posteriorly by single row of setae; relative lengths of submarginal, marginal, postmarginal, stigmal veins as 70:29:40:18; costal cell bare along posterior 1/3; basal cell setose anteriorly but more or less bare in posterior 1/2. Gaster length 2.3X width (110:48), 1.0X combined length of head and mesosoma (110:105); hind margin of T1 broadly emarginate; hypopygium extending 2/5 gaster length.

Male. The only known male still has remnants of the pupal integument covering the antenna and so probably died soon after eclosion. The male funiculus appears to be covered with moderately dense, semireclinate setae.

Variation. Body length of female specimens examined varied between 4.3 and 3.2 mm. In some females, the fore wing has a distinct reddish brown macula, while in other specimens, the macula is nearly absent.

Etymology. The species name, derived from a combination of the Greek words *keio*, meaning split, and *noton*, meaning back, refers to the deep anterior median scutellar sulcus.

Type Material. The holotype (NMNH) is a female collected by D. Wahl in a malaise trap exposed 18–25 August 1986, at the Patuxent Research Station, Prince Georges County, Maryland (USA). Eleven female and 1 male paratypes were collected as follows (NMNH, OSUC): Canada. QUEBEC: Hull, 18.VI.1957, 1♀. United States. MARYLAND: Silver Spring, 2.II.1909 (ex *Isorhipis ruficornis* in *Acer*), 1♀, 1♂, 8.III.1909 (from *I. ruficornis* in *Acer*), 1♀. OHIO: Delaware Co., 3♀. VIRGINIA: near Annandale, 15–21.V.1988, 1♀, 18–25.V.1988, 1♀, 11–16.VI.1989, 1♀; 4 mi s. Cuckoo, 22.VI–3.VII.1989, 1♀. WEST VIRGINIA: Hardy Co., Lost River State Park, 19.VI.1951, 1♀.

Biology. Three specimens of *P. ceonotalis* were reared from *Isorhipis ruficornis* Say (Eucnemidae) in *Acer* L. (Aceraceae) collected in Maryland. Eucnemids are commonly called cross-cut beetles because their larvae tunnel perpendicular to the grain under the bark of dead trees. According to information on the card corresponding to the Hopkins number given on the label with the specimens, the pupae of the *P. ceonotalis* specimens lay longitudinally in the abdomen and thorax of unemerged adult *I. ruficornis*.

Plutothrix cisae Hedqvist

Figs. 39, 51

Plutothrix cisae Hedqvist, 1966:197–198 (Holotype, ♀; Hedqvist coll., Uppsala: not seen); 1968:40, 42. Graham, 1969:103, 104, 106, 111. Dzhankmen, 1978:122–123. Vago, 1989:1–4.

Diagnosis. 1. Body color blue–green. 2. Clypeus mostly smooth, not slanted relative to the upper face. 3. Anelli transverse (fig. 59). 4. Female antenna (fig. 39) with funicular segments uniform in color, club longer than F5–6, micropilosity lacking, club terminus pointed. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense, semierect setae. 6.

Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.48X width. 8. Scutellum (fig. 51) alveolate, moderately convex, without anterior median notch or groove; frenum alveolate (fig. 51). 9. Dorsellum nearly smooth, longer medially than laterally, not tilted posteriorly relative to adjacent structures (fig. 51). 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 coriaceous. 11. Propodeum nearly smooth. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa pale, mostly non-metallic. 14. Fore wing without macula, speculum open posteriorly. 15. Gaster length about 3.7X its width, about 1.2X length of head and mesosoma; T1 emarginate; hypopygium length 1/2 gaster length.

Plutothrix cisae has no character states unique among Nearctic *Plutothrix* except it is the only species to have the hypopygium sometimes extending more than 1/2 the gaster length. *Plutothrix cisae* and *P. ligyptera* are exceptionally similar species. These two species can be reliably distinguished only by those characters given in the key. *Plutothrix cisae* is the smallest of Nearctic *Plutothrix* species with a body length often less than 3.0 mm.

Redescription (based on North American material). Color: Head green, clypeus often more bluish; mesosoma, gaster bronzy green, pleural region and T1 often more bluish. Antenna with scape brownish yellow, pedicel weakly metallic green, flagellum brown. Legs with fore, hind coxae metallic; remainder of legs pale brownish yellow, fore and hind tibia sometimes with broad darker bands mesally. Fore wing veins pale yellow; membrane clear.

Sculpture: Clypeus smooth; head, mesosoma, scutellum, frenum alveolate; dorsellum coriaceous; lower 1/2 of upper epimeron finely alveolate, upper 1/2 coriaceous; propodeum with median panels weakly alveolate, nearly smooth; gaster with T1–2 smooth, remainder coriaceous dorsally.

Structure: Body length $2.6 \pm (\text{S.E.}) 0.07$ mm ($n=7$); range 1.6–3.2. Head ovate in anterior view, width $1.2 \pm 0.01X$ height, $1.9 \pm 0.01X$ length; clypeus in nearly same plane as rest of face; eye height $1.3 \pm 0.02X$ length, $3.2 \pm 0.02X$ malar distance, length $4.4 \pm 0.18X$ temple length; torulus located 1X own diameter above LOCL; ratio of MOD, OOL, POL, LOL as 3.0 ± 0.00 :- 5.3 ± 0.15 :- 7.0 ± 0.00 :- 3.4 ± 0.18 . Antenna (fig. 39) with combined length of pedicel and flagellum $1.1 \pm 0.02X$ head width; relative lengths of scape, pedicel, annelli, F1–6, club as 13.0 ± 0.4 :- 4.6 ± 0.14 :- 1.5 ± 0.11 :- 4.6 ± 0.21 :- 4.6 ± 0.14 :- 4.4 ± 0.13 :- 4.2 ± 0.14 :- 4.1 ± 0.13 :- 3.9 ± 0.13 :- 9.1 ± 0.17 ; relative widths of F1, F2, club as 2.9 ± 0.07 :- 3.4 ± 0.13 :- 3.7 ± 0.14 ; annelli transverse; MPP sensilla in 1 irregular row per segment; club pointed apically, lacking visible region of micropilosity. Mesosoma length $1.5 \pm 0.03X$ width; mesoscutum length $0.50 \pm 0.01X$ width; scutellum without anterior median groove (fig. 51); dorsellum longer mesally than laterally (fig. 51). Fore wing length $2.4 \pm 0.032X$ width; speculum broadly open posteriorly; relative lengths of submarginal, marginal, postmarginal, stigmal veins as 38 ± 1.4 :- 19 ± 0.6 :- 23 ± 0.9 :- 10 ± 0.3 ; costal cell with single complete row of setae, apical 2/5 setose; basal vein setose. Gaster length $3.7 \pm 0.12X$ width, $1.2 \pm 0.014X$ combined length of head and mesosoma; hind margin of T1 emarginate; hypopygium extending 1/2 or more gaster length.

Males similar except face sometimes green. Structure. Body length 2.0 ± 0.38 ($n=7$). Antenna with flagellum length $1.2 \pm 0.02X$ head width; relative lengths of scape, pedicel, annelli, F1–6, club as 10.0 ± 0.54 :- 3.9 ± 0.20 :- 1.5 ± 0.15 :- 4.2 ± 0.29 :- 4.3 ± 0.26 :- 4.2 ± 0.18 :- 4.2 ± 0.21 :- 3.8 ± 0.18 :- 3.4 ± 0.20 :- 8.7 ± 0.36 ; widths of F1, F6, club as 2.1 ± 0.14 :- 2.6 ± 0.18 :- 3.9 ± 0.09 ; MPP sensilla sparse; flagellum with moderately dense, semierect setae. Gaster length $2.8 \pm 0.11X$ width; $0.78 \pm 0.053X$ combined length of head and mesosoma.

Material Examined. The 26 female and 25 male *P. cisae* from North America seen were collected as follows (CNCI, NMNH, UCDC, UWEC): Canada. ONTARIO: Ottawa, emerged 3–16.VII.1954 (from *Platyteza*), 24♀, 25♂. United States. IOWA: Iowa City, 24.V.1928, 1♀. WISCONSIN: Oneida Co., 2–8.VIII.1977, 1♀. Those specimens from Ottawa are probably part of the same series Hedqvist examined in his 1968 paper.

Biology. *Plutothrix cisae* is unusual among the Trigonoderini because its known host is a dipteran — the long series from Ottawa, Canada were reared from *Platypeza* sp. (Platypezidae). The larvae of Platypezidae are associated with fungus. That a few species of Trigonoderini may have switched hosts from fungus-inhabiting beetles to fungus-inhabiting flies is probably not too surprising.

***Plutothrix glareosa* Heydon,
new species**

Figs. 52, 53

Diagnosis. 1. Body color usually dark bronzy green. 2. Clypeus mostly smooth, not slanted relative to upper face. 3. Anelli transverse. 4. Female antenna with funicular segments uniform in color, club the same length as F5–6, micropilosity lacking, club terminus pointed. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense and semierect setae. 6. Pronotum with anterior transverse carina (fig. 52). 7. Mesoscutum length about 0.46X width. 8. Scutellum (figs. 52, 53) colliculate between lateral setal rows, strongly convex, without anterior median notch or groove; frenum alveolate (fig. 53). 9. Dorsellum (fig. 53) nearly smooth, longer medially than laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron mostly smooth but with mesal longitudinal coriaceous band (fig. 52). 11. Propodeum nearly smooth (fig. 53). 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic. 14. Fore wing without macula, speculum narrowly open posteriorly. 15. Gaster length about 3.1X its width, about 1.1X length of head and mesosoma; T1 emarginate; hypopygium length just under 1/2 to 1/2 gaster length.

Unique character states in *P. glareosa* include the strongly arched and colliculate scutellum (figs. 52, 53) and the epimeron smooth except for a mesal coriaceous strip (fig. 52). *Plutothrix unguttella* has the scutellum nearly as strongly arched, but its scutellum is alveolately sculptured. *Plutothrix ascita* and *P. smithi* both have a small colliculate area on the scutellum, but it is restricted to the scutellar hind margin. The weakly sculptured frenum, the large smooth dorsellum that is much longer medially than laterally, and the smooth propodeum give a characteristic appearance to the dorso-posterior surface of the mesosoma in *P. glareosa* (fig. 53).

Description. Holotype, female. Color: Body bronzy green except scutellum reddish apically, T1 more bluish, T5–7 purplish. Antenna with scape, pedicel yellowish brown; flagellum dark brown. Legs with coxae bronzy green (metallic coloration weak on middle coxa), remainder of legs brownish yellow with tarsi paler. Fore wing with veins pale brown; membrane clear.

Sculpture: Clypeus smooth, wrinkled basally; mesoscutum alveolate; scutellum finely colliculate between lateral hair rows in apical 2/3 (fig. 53), frenum alveolate; upper epimeron mostly smooth, but with a median longitudinal coriaceous strip (fig. 52); dorsellum smooth (fig. 53); median panels of propodeum weakly alveolate, nearly smooth; gaster with T1–2 smooth; T3–4 coriaceous basally, smooth apically; T5–7 coriaceous.

Structure: Body length 3.0 mm. Head quadrate in anterior view, width 1.2X height (45.0:36.5), 2.2X length (45:20); clypeus in nearly same plane as rest of face; eye height 1.4X length (23:17), 2.9X malar distance (23:8), length 5.7X temple length (17:3); torulus 1X own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 4.0:6.5:7.5:3.0. Antenna with combined length of pedicel and flagellum 1.1X head width (50:45); relative lengths of scape, pedicel, anelli, F1–6, club as 18.0:6.0:1.0:7.0:6.0:5.5:5.0:5.0:4.5:9.5; relative widths of F1, F6, club as 3.5:4.0:4.0; anelli transverse; MPP sensilla in 2 rows on F1, in 1 row on F2–6; club pointed apically, with no visible micropilosity. Mesosoma length 1.5X width (54:35); pronotum with weak transverse anterior carina (fig. 52); mesoscutal length 0.46X width (16:35); scutellum strongly arched both in profile and side to side (fig. 52), lacking anterior median groove; dorsellum distinctly longer mesally than laterally (fig. 53). Fore wing length 2.3X width

(110:48); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 47:22:27:12; costal cell with 2 ventral setal rows, setose in apical 1/3; basal cell with single row of setae along anterior edge; basal vein and cubital vein with single row of setae; speculum open posteriorly. Gaster length 3.1X width (77:25); 1.1X combined length of head and mesosoma (77:71); T1 with hind margin distinctly emarginate; hypopygium extending 1/2 gaster length.

Allotype, male. Similar to holotype except as follows: Color. T1 bronzy green, T2–7 dark purple. Structure. Body length 2.0 mm. Antenna with combined length of pedicel and flagellum 1.4X head width (51:37); relative lengths of scape, pedicel, annelli, F1–6, club as 13.0:4.0:1.0:7.0:6.5:6.5:6.0:5.5:5.5:9.5; widths of F1, F6, club as 3:3:3; flagellum with fine semierect setae whose length is approximately 1/3X width of funicular segments; MPP sensilla sparse. Gaster length 2.3X width (41.5:18.0).

Variation. *Plutothrix glareosa* individuals vary greatly in size; some of the smaller males would be hard to determine to this species without associated females. The female body length varies from 2.1–4.0 mm; male body length from 1.6–3.1 mm. There is little variation in body color except for a tendency to be blue–green in Canada, and progressively more bronzy further south. The sculpturing of the dorsellum varies from virtually featureless to finely coriaceous, but the surface always has a very polished appearance. The median panels of the propodeum vary from smooth to weakly alveolate, but are almost always polished at least postero–medially.

Etymology. The species name, derived from the Latin *glareosus* meaning gravelly, refers to the extensive colliculate sculpturing of the scutellum.

Type Material. The holotype (CNCI) and five female and nine male paratypes emerged 23 or 24 June 1954 from *Gandoderma applanatum* collected at Bells Corners, Canada; the allotype (CNCI) emerged with the same data on 2 July 1954. Sixty–five female and 25 male paratypes were seen collected as follows (CNCI, INHS, NMNH, UCDC): Canada. ONTARIO: Ottawa, em. V.1971, 6♀, 17.VI.1971, 4♀, 18.VI.1971, 1♀ (all emerged from *Gandoderma applanatum*), 4.VIII.1954 (from “egg” of *Boletotherus cornutus*), 1♀. QUEBEC: Parc De La Gatineau, 20.V.1965, 2♂, 26.V.1965, 1♀, 9.VI.1965, 1♀, 28.VI.1965, 1♀ (all emerged from *Fomes fomentarius*). SASKACHEWAN: Candle Lake, 2.VIII.1966 (from *F. fomentarius* on white spruce), 1♀. United States. CALIFORNIA: Berkeley Hills (near Orinda, Contra Costa Co.), 8.X.1960 (from *Trametes versicolor* on *Umbellularia*), 1♀, 1♂. ILLINOIS: Mahomet, em. 25.III.1932, 2♀, 1♂; White Heath, 6.IV.1932 (ex *Priotoma intermedius*), 24♀, 14♂. NEW HAMPSHIRE: Conway, 19.XI.1964 (reared from fungi on white birch), 1♀, 1♂. PENNSYLVANIA: Pittsburg, 2.IX.1907, 1♀. VIRGINIA: near Annandale, 12–18.VI.1988, 1♂, 13.IX.1987, 1♀; Arlington, 28.III.1929 (ex fungus infested with *Dorcatoma*), 3♀, 1♂; 4 mi. s. Cuckoo, 19–29.VI.1988, 1♀. WISCONSIN: Crabtree Lake (near Boulder Junction), 1908 (ex *Gandoderma pseudoboletus* infested with *Dorcatoma dresdensis*), 15♀, 4♂.

Biology. *Plutothrix glareosa* is a parasitoid of anobiid and tenebrionid beetles associated with shelf fungi (Polyporaceae). *Plutothrix glareosa* was reared from *Priotoma intermedius* (LeConte)(Anobiidae) in Illinois, *Dorcatoma dresdensis* Herbst (Anobiidae) on *Gandoderma pseudoboletus* (Jacq.) ex Murrill [= *Dichomitus squalens* (P. Karst) D. A. Reid] (Polyporaceae) in Wisconsin; *Dorcatoma* sp. in Virginia, and from *Boletotherus cornutus* Panzer (Tenebrionidae) “eggs”. *Plutothrix glareosa* has been reared from a number of shelf fungi (Polyporaceae) including *Gandoderma applanatum* (Pers. ex Wallr.), *Fomes fomentarius* (Fr.) Kickx, *Trametes versicolor* (Fr.) Pil., and a fungus on white birch [*Piptoporus betulinus* (Fr.) Kar.].

***Plutothrix ligyptera* Heydon,
new species**

Figs. 40–41

Diagnosis. 1. Body color blue–green. 2. Clypeus mostly smooth, not slanted relative to upper face. 3. Anelli transverse (fig. 41). 4. Female antenna (fig. 41) with funicular segments uniform in color, club same length as F5–6, micropilosity lacking, club terminus pointed. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense and semierect setae. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.51X width. 8. Scutellum alveolate, moderately convex, without anterior median notch or groove; frenum alveolate. 9. Dorsellum nearly smooth, longer medially than laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 coriaceous. 11. Propodeum weakly alveolate. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa weakly to strongly metallic. 14. Fore wing without macula, speculum open posteriorly. 15. Gaster length about 2.3X its width (fig. 42), about 1.0X length of head and mesosoma; T1 weakly emarginate; hypopygium length 1/3–1/2 gaster length.

Plutothrix ligyptera has no unique character states; its morphology is probably close to the ground plan for the genus. *Plutothrix ligyptera* is very similar to *P. cisae*, from which it can be distinguished by the characters given in the key.

Description. Holotype, female. Color: Head, mesosoma, fore and hind coxa green except pleuron more blue-green, vertex and mesosoma with weak yellow reflections; gaster brown dorsally except T1 blue, laterally green with weak yellow reflections. Antenna with scape yellow; pedicel brown; flagellum dark brown. Legs with middle coxa weakly metallic green; middle and hind tarsi cream-colored; remainder of legs yellow. Fore wing veins pale yellow-brown; membrane clear.

Sculpture: Clypeus mostly smooth; head, mesosoma (including frenum) alveolate except gena and dorsellum coriaceous; propodeum with median panels weakly alveolate; gaster with T1 smooth, T2–7 coriaceous.

Structure: Body length 3.3 mm. Head quadrate in anterior view, width 1.3X height (48:38), 1.9X length (48:25); clypeus in nearly same plane as rest of face; eye height 1.4X length (24:17), 2.7X malar distance (24:9), length 2.8X temple length (17:6); torulus located over 1X own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 4:7:8:4. Antenna (fig. 41) with combined length of pedicel and flagellum 1.1X head width (52:48); relative lengths of scape, pedicel, annelli, F1–6, club as 18.0:6.0:2.0:7.0:6.0:5.0:4.5:5.0:9.5; relative widths of F1, F2, club as 3:4:5; annelli transverse; MPP sensilla in 2 rows on F1, in 1 row on F2–6; club pointed apically, lacking visible patch of micropilosity. Mesosoma length 1.4X width (60:43); collar with fine sharp anterior transverse carina; scutellum without anterior median groove; dorsellum longer mesally than laterally. Fore wing length 2.4X width (66:28); relative lengths of submarginal, marginal, postmarginal, stigmal vein lengths as 53:25:27:13; costal cell setose in anterior 1/2; basal cell with a few scattered setae; basal vein with line of short setae which curves basally down cubital vein; speculum open posteriorly. Gaster (fig. 54) length 2.3X width (77:33), 1.0X combined length of head and mesosoma (80:77); hind margin of T1 weakly emarginate; hypopygium length 0.40X gaster length (31:77).

Allotype, male. Similar to holotype except as follows: Color. Body more blue–green, gaster only weakly metallic. Structure. Body length 2.6 mm. Antenna with length of pedicel plus flagellum 1.3X head width (56:44); relative lengths of scape, pedicel, annelli, F1–6, club as 12.5:6.0:2.0:7.5:6.5:6.5:6.0:6.0:5.5:13.0; relative widths of F1, F6, club as 3.0:3.0:3.5; MPP sensilla sparse, in single row at apex of each segment; setae reclinate, short (length 1/2 width of funicular segments). Gaster ovate; length 2.2X width (52:44).

Variation. Female body length varies from 2.8–3.4 mm; male body length from 1.9–3.1. The female gaster length varies from 2.3–3.0 times its width, the gaster length varies from 0.9–1.0 times the combined length of the head and mesosoma.

Type Material. The holotype (NMNH) was collected on 16 April 1961, at Big Sur, California (USA) by J. F. Lawrence from *Trametes versicolor*. The allotype and one paratype male was collected with the same data except on 14 May 1960. Nine additional paratypes were collected as follows (NMNH, UCDC): CALIFORNIA. Berkeley, 29.V.1960 (on *Trametes versicolor* on *Alnus rhombifolia*), 1♀, 1♂; Big Sur, 16.IV.1961 (on *Trametes versicolor* on *Acer*), 1♀, 2♂, 14.V.1960 (ex *Trametes versicolor* on *Alnus rhombifolia*), 1♀; 2 mi n. Placerville, 18.V.1961, 2♂ (on *Trametes versicolor*); Uvas Canyon County Park, 12.5 km wsw. Morgan Hill, 1♀.

Etymology. The species name, derived from a combination of the Greek *ligys*, meaning clear, and *pteron*, meaning wing, refers to the clear wing in this species.

Biology. *Plutothrix ligyptera* has been reared from the shelf fungus *Trametes versicolor* (Fr.) Pil. on *Alnus rhombifolia* Nuttall (Betulaceae) and *Acer* sp. (Aceraceae).

Plutothrix pilosiclava Heydon, new species

Fig. 43

Diagnosis. 1. Body color dark green with bronzy reflections. 2. Clypeus mostly smooth but wrinkled laterally, slanted ventro-posteriorly relative to upper face. 3. Anelli transverse (fig. 43). 4. Female antenna (fig. 43) with funicular segments uniform in color, club as long as F4–6, micropilosity in large ventral patch; club terminus rounded. 5. Male antenna with MPP sensilla sparse, flagellum with moderately dense and semierect setae. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.46X width. 8. Scutellum alveolate, moderately convex, with slight anterior median notch in some specimens; frenum alveolate. 9. Dorsellum coriaceous, as long medially as laterally. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 nearly smooth. 11. Propodeum weakly alveolate. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic. 14. Female fore wing with brown macula extending posteriorly from stigma, speculum narrowly open posteriorly. 15. Gaster length about 2.7X its width, about 0.91X length of head and mesosoma; T1 emarginate; hypopygium length 1/3–1/2 gaster length.

Unique character states of *P. pilosiclava* include the long female club with a large ventral patch of micropilosity (fig. 43). Also, the one known male has the fore femur darkly colored; males of *P. unguttella* have the anterior face and males of other Nearctic *Plutothrix* species have the whole femur pale. Both *P. pilosiclava* and *P. smithi* have the apical edge of the clypeus deflected posteriorly so the clypeus is at a distinct angle from the region of the face between the clypeus and the torulus; other Nearctic *Plutothrix* species have the clypeus in nearly the same plane as the face.

Description. Holotype, female. Color: Body, coxae coppery green except T2–7 dark purple, pleuron dark green. Antenna with scape brownish yellow; pedicel brown; flagellum brownish black. Legs beyond coxae brownish yellow. Fore wing veins pale brown, parastigma slightly more reddish brown; membrane clear except for diffuse brown macula extending from stigma to center of wing.

Sculpture: Clypeus smooth but wrinkled in basal 1/3; gena coriaceous; remainder of head, mesoscutum, scutellum, frenum alveolate; upper epimeron finely alveolate ventrally; dorsellum faintly coriaceous; median panels of propodeum weakly alveolate; gaster with T1–5 smooth, T6–7 coriaceous.

Structure: Body length 2.9 mm. Head transversely ovate in anterior view, width 1.3X height (48:37), 2.2X length (48:22); clypeus slanted ventro-posteriorly relative to remainder of face; eye height 1.4X length (22:16), 2.4X malar distance (22:9), length 4.0X temple length (16:4); torulus located tangent to LOcL; ratio of MOD, OOL, POL, LOL as 3.5:9.0:8.5:5.0. Antenna (fig. 43) with combined length of pedicel and flagellum 0.96X head width (46:48); relative lengths of scape, pedicel, annelli, F1-6, club as 17.0:5.0:2.0:6.0:4.5:4.5:4.0:4.0:3.5:-13.0; relative widths of F1, F2, club as 4.0:5.0:5.5; annelli transverse; MPP sensilla in 2 rows on F1, in 1 row on F2-6; club (fig. 43) rounded apically, with ventral spindle-shaped patch of micropilosity extending basad to C1. Mesosoma length 1.4X width (54:38); collar with fine sharp anterior transverse carina; scutellum without anterior median furrow; dorsellum approximately the same length medially as laterally. Fore wing length 2.1X width (114:54); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 43:21:30:15; costal cell with ventral setal band; basal cell with anterior 1/2 setose; basal vein, cubital vein setose; speculum nearly closed posteriorly by single row of setae. Gaster length 2.7X width (67:25), 0.91X combined length of head plus mesosoma (67:74); hind margin of T1 weakly emarginate; hypopygium extending 0.34X gaster length (23:67).

Allotype, male. Similar to holotype except as follows: Color. Femora brown; T1 bluish. Structure. Body length 2.4 mm. Antenna with combined length of pedicel plus flagellum 1.5X head width (61.5:41.0); relative lengths of scape, pedicel, annelli, F1-6, club as 16.0:4.5:-1.5:9.0:8.0:8.0:8.0:7.5:6.0:10.0; widths of F1, F6, club as 3.0:3.5:3.5; MPP sensilla in two rows on each funicular segment, 3-5 visible per segment; setae scattered, semierect, length 1/2 funicular segment width. Gaster length 2.5X width (45:18).

Variation. Female body length varies from 2.3-3.4 mm. The body color varies from dark coppery green to dark green to dark blue.

Etymology. The species name, derived from a combination of the Latin *pilosus*, meaning hairy, and *clava* meaning club, refers to the large ventral patch of micropilosity in the female club. The name *pilosiclava* should be considered a noun in apposition.

Type Material. The holotype and allotype (both CNCI) were collected 5 June 1964 in Cooper's Rock State Forest, West Virginia (USA) by O. Peck. Fourteen paratypes (CNCI, NMNH, UWEC) were collected as follows: Canada. NEW BRUNSWICK: Aweme, 10.VI.1924, 1♀. ONTARIO: Alymer West, 13.VI.1973, 1♀.; New Liskeard, 25.VIII.1938, 1♀. QUEBEC: Alymer, Queen's Park, 29.VIII.1924, 1♀. YUKON TERRITORY: Rampart House, 19.VIII.1951, 1♀. United States. MARYLAND: Thurmont, 4.IX.1967 (dipteran in puffball), 2♀. MICHIGAN: Midland Co., 17.IX.1956, 1♀. MINNESOTA: Alex, VII.1939, 1♀. NEBRASKA: Halsey, 8.VIII.1958, 1♀. PENNSYLVANIA: Stony Creek Mills, 30.VIII.1951 (with emerging Anobiidae in dry puffball), 1♀. VIRGINIA: 8 km nw. Blacksburg, 20.V-9.VI.1987, 1♀; 4 mi s. Cuckoo, 19.IX-1.X.1987, 1♀. WISCONSIN: Nekoosa, 14-15.VIII.1948, 1♀.

Biology. *Plutothrix pilosiclava* is exceptional in *Plutothrix* because it has been reared from puffball fungi rather than shelf fungi or decaying wood. It has been reared in association with Anobiidae in Pennsylvania and an unidentified Diptera in Maryland.

Plutothrix recula Heydon, new species

Diagnosis. 1. Body color dark green. 2. Clypeus mostly smooth but wrinkled laterally, slanted ventro-posteriorly relative to upper face (as in fig. 55). 3. Annelli transverse. 4. Female antenna with funicular segments uniform in color, club length just longer than that of F5-6, micropilosity in small ovate patch, club terminus rounded. 5. Male antenna unknown. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 1/2 width. 8. Scutellum mostly coriaceous, flat, without anterior median notch or groove; frenum coriaceous. 9.

Dorsellum nearly smooth, longer medially than laterally, in same plane as scutellum and propodeum. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 nearly smooth. 11. Propodeum weakly alveolate but with rugae laterally. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic. 14. Female fore wing with faint brown area over center of wing disc, speculum closed posteriorly. 15. Gaster length about 2.5X its width, about 1.2X length of head and mesosoma; T1 emarginate; hypopygium length 1/4 gaster length.

Unique character states of *P. recula* include the flat scutellum; the posterior 3/4 of the scutellum, dorsellum and propodeum being all in one plane in lateral view; the dark brown wing veins; and the diffuse ovate macula on the wing disc. Other *Plutothrix* species have the scutellum arched to a greater or lesser extent, the scutellum at a distinct angle from the succeeding structures in lateral view, the wing veins paler, and either the fore wing clear or with a maculae the extending only posteriorly from the stigma. Among Nearctic *Plutothrix*, only *P. aerata* has the body color as dark.

Description. Holotype, female. Color: Head, mesosoma dark green; gaster with T1 greenish blue basally, dark coppery green apically, sternites and succeeding terga dark coppery green basally and dark purple apically. Antenna with scape brownish yellow; pedicel brown; flagellum black. Legs with coxae dark green; femora tibiae, apical 2 tarsi yellow-brown; remaining tarsi pale yellowish brown. Fore wing with veins dark brown, membrane with faint brown ovate macula extending over center part of wing.

Sculpture: Clypeus smooth mesally, wrinkled laterally and dorsally; head and mesoscutum alveolate except gena, dorsellum smooth; scutellum (including frenum) coriaceous between lateral setal rows; nucha smooth; median panels of propodeum weakly alveolate with some rugae laterally; callus imbricate; upper epimeron with lower half alveolate, upper half smooth; gaster with T1–2 smooth, succeeding terga coriaceous with smooth strip along posterior margin.

Structure: Body length 4.6 mm. Head quadrate in anterior view, width 1.3X height (63:50), 2.0X length (63:32); clypeus slanted ventro-posteriorly relative to rest of face; eye height 1.3X length (28:21), 2.0X malar distance (28:14), length 3.5X temple length (21:6); torulus on LOcL; ratio of MOD, OOL, POL, LOL as 4:13:12:4. Antenna with combined length of pedicel and flagellum 1.1X head width (70:63); relative lengths of scape, pedicel, annelli, F1–6, club as 26:8:3:10:8:8:7:7:6:14; relative widths of F1, F6, club as 5:5:5; annelli transverse; MPP sensilla in several rows on F1, in 2 rows on F2–6; club rounded apically, with fine ventral line of MPP sensilla on terminal segment. Mesosoma length 1.5X width (74:48); mesoscutal length 0.51X width (23:45); scutellum without anterior median furrow; dorsellum convex, about as long medially as laterally. Fore wing length 2.5X width (142:56); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 62:22:31:36; costal cell with anterior and apical half setose; basal cell setose; basal vein with double row of setae; speculum closed posteriorly. Gaster length 2.5X width (126:47), 1.2X length of mesosoma (126:108); hind margin of T1 deeply emarginate; hypopygium extending 1/4 gastral length.

Male. Unknown.

Etymology. *Plutothrix recula* is named from the Latin word *recula* meaning trifle.

Type Material. The holotype (UCDC) was collected by malaise trap at the Stebbins Cold Creek Reserve of the University of California (11 km west of Winters California, USA) exposed between 13–26 May 1991, by David Carmean.

Biology. The host(s) of *P. recula* are unknown.

***Plutothrix smithi* Heydon,
new species
Figs. 44, 56–58**

Diagnosis. 1. Body color green with bronzy reflections. 2. Clypeus mostly smooth but wrinkled laterally (fig. 55), slanted ventro-posteriorly relative to upper face. 3. Anelli transverse (figs. 44). 4. Female antenna with funicular segments uniform in color, club length 2/3rds that of F5–6 (fig. 44), micropilosity lacking, club terminus blunt and surrounded by ring of white setae (fig. 57). 5. Male antenna with MPP sensilla short and sparse, funicular setae erect and papillate. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.64X width. 8. Scutellum mostly alveolate, moderately convex, without anterior median notch or groove; frenum coriaceous. 9. Dorsellum coriaceous, as long medially as laterally, tilted posteriorly relative to adjacent structures. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 coriaceous or nearly smooth. 11. Propodeum weakly alveolate but with rugae. 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic. 14. Female fore wing with faint brown area below stigma, speculum narrowly open to closed posteriorly. 15. Gaster length about 7.0X its width, about 2.0X length of head and mesosoma; T1 emarginate; hypopygium length 1/4–1/3 gaster length.

Unique character states of *P. smithi* include the female club being very short, blunt, and with its terminal end ringed by white setae (figs. 44, 57) and the male funiculus having very short and sparse MPP sensilla and short, erect, papillate setae (fig. 58). The club of other *Plutothrix* species is nearly as long or longer than the two terminal funicular segments and the tip rounded or pointed, but never blunt and with such a ring of setae (figs. 36, 37, 38, 39, 41, 43, 46). Among Nearctic *Plutothrix*, only *P. ceonotalis* and *P. smithi* have the frenum distinctly less coarsely sculptured than the scutellum.

Description. Holotype, female. Color: Body (including coxae) green with bronzy reflections, reflections strong on dorsum of thorax, venter of gaster; T5–7 dark purple. Antenna with scape yellow–brown; pedicel, flagellum black. Remainder of legs yellow–brown. Fore wing with veins brown, membrane with pale brown ovate macula extending between 1/3–1/2 way to hind margin of wing.

Sculpture: Clypeus (fig. 55) smooth mesally, wrinkled laterally; remainder of head alveolate except gena coriaceous; mesoscutum alveolate, cells in posterior 1/2 of middle lobe 2X as large as those of remainder of mesoscutum; scutellum scabriculous medially, imbricate laterally; nucha, dorsellum coriaceous; median panels of propodeum rugose; callus imbricate; upper epimeron with lower half alveolate, upper half coriaceous; gaster coriaceous.

Structure: Body length 6.5 mm. Head (fig. 55) quadrate in anterior view, width 1.2X height (64:54), 1.8X length (64:35); clypeus slanted ventro-posteriorly relative to rest of face; eye height 1.4X length (32:23), 2.3X malar distance (32:14), length 2.6X temple length (23:9); torulus on LOcL; ratio of MOD, OOL, POL, LOL as 5:11:11:5. Antenna (fig. 44) with combined length of pedicel and flagellum 1.2X head width (77:64); relative lengths of scape, pedicel, annelli, F1–6, club as 24:7:3:12:11:10:9:9:6:10; relative widths of F1, F6, club as 5:6:7; annelli transverse; MPP sensilla in several rows on F1–5, in 2 rows on F6; club (figs. 44, 57) ovate, tip blunt, C3 with apical ring of long white setae. Mesosoma length 1.7X width (94:56); mesoscutal length 0.64X width (18:28); scutellum without anterior median furrow; dorsellum convex, about as long medially as laterally. Fore wing length 2.7X width (200:74); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 88:32:51:22; costal cell with anterior and apical half setose; basal cell setose except for posterior apical corner; basal vein with double row of setae; speculum closed posteriorly. Gaster length 7.0X width (188:27), 2.0X length of mesosoma (188:94); hind margin of T1 deeply emarginate; hypopygium extending 1/4 gastral length.

Allotype, male. Similar to holotype except as follows: Color. Bronzy reflections more weakly developed; scape and legs lighter yellow brown, gaster almost entirely darkened dorsally; wings clear. Sculpture. Similar to that of holotype except sculpture of scutellum similar to that of mesoscutum. Structure. Body length 3.5 mm. Antenna (fig. 58) with length of pedicel plus flagellum 1.3X head width (60.0:47.5); relative length of scape, pedicel, annelli, F1–6, club as 16.5:5.0:2.0:9.5:9.0:8.0:7.5:6.5:4.5:9.0; relative widths of F1, F6, club as 4:5:5; MPP sensilla in single irregular apical row with a few basally; setae dense, short, upstanding, on papillae.

Variation. Female body size varies from 4.0–7.5 mm; male body size varies from 2.8–3.8 mm. The amount of copper coloration on the body varies greatly from almost absent to nearly completely covering the green.

Eymology. *Plutothrix smithi* is named after Dr. D. R. Smith whose collecting efforts has greatly increased our knowledge of *Plutothrix* and other Hymenoptera of the mid-Atlantic region of the United States.

Type Material. The holotype (NMNH) was collected by malaise trap near Annandale, Virginia (USA) on 27 April 1981, by David Smith; the allotype (NMNH) was collected with the same data on 8 May 1981. Twenty-seven female and 13 male paratypes were collected as follows (AEIC, CNCI, INHS, NMNH, OSUC, UCDC): Canada. NEW BRUNSWICK: Queen's County, 21.VI.1961 (in beech logs with Siricidae), 1♀. NORTHWEST TERRITORIES: Yellowknife, 18.VI.1966, 1♀. ONTARIO: Carleton Place, 15.IV.1980, 1♀; Chaffey's Locks, 20.VI.1975, 1♀; Cumberland, 19.V.1975, 1♀; Point Pelee National Park, 19.V.1968, 1♂. QUEBEC: Baie Comeau, 14.VI.1954, 1♂; Kingsmere, 19.V.1958, 1♂; La Treppe, 11.V.1945, 1♂. United States. GEORGIA: Scull Shoals Forest, 11.VII.1972 (on *Pinus taeda*), 3♀. MARYLAND: College Park, em. 10.III.1981 (*Isorhipis* sp.?), 1♀, 17–19.II.1981, 3♂. MICHIGAN: Detroit, 30.V.1939, 1♀. NEW HAMPSHIRE: Durham, 11.VII.1965 (on apple bark), 1♀. NEW YORK: Scarsdale, 3.V.1942, 1♀. NORTH CAROLINA: Highlands, 26.VI.1977, 1♀. OHIO: 1♀; Tuscarawas Co., 17.V.1962, 1♀. VIRGINIA: near Annandale, 18.IV.1981, 1♀, 4.V.1981, 1♀, 15–21.V.1988, 1♀, 18–24.VI.1989, 1♀; 16–22.VII.1989, 1♀; 3–9.IX.1989, 1♀; 4 mi s. Cuckoo, 29.III–11.IV.1988, 3♀, 2♂, 12–25.IV.1988, 3♀, 1♂, 25.IV–13.V.1988, 3♂.

Biology. Like other *Plutothrix* species, *P. smithi* is associated with insects in wood. *Plutothrix smithi* has been collected in association with beech logs, apple bark, and *Pinus taeda* L. (Pinaceae). A series from College Park, Maryland was reared from eucnemid beetles, possibly of the genus *Isorhipis* Lacordaire (Eucnemidae).

***Plutothrix unguata* (Girault)**

Figs. 45, 54, 59

Trigonoderus unguata Girault, 1917:396–397. (Holotype, ♀; NMNH, Type No. 20900; examined.) Graves, 1960:64, 66, 74.

Plutothrix unguatus (Girault): Hedqvist, 1968:41, 42. Burks, 1979:777.

Diagnosis. 1. Body color varying from green with bronzy reflections to blue–green. 2. Clypeus mostly smooth, not slanted relative to upper face. 3. Anelli transverse. 4. Female antenna with funicular segments uniform in color, club length 4/5ths that of F5–6, micropilosity in small ovate patch, club terminus rounded. 5. Male antenna (fig. 59) with MPP sensilla numerous, funicular setae nearly absent. 6. Pronotum with anterior transverse carina. 7. Mesoscutum length about 0.50 or more times width. 8. Scutellum (fig. 54) alveolate, moderately convex, without anterior median notch or groove; frenum alveolate. 9. Dorsellum (fig. 54) coriaceous, as long medially as laterally, tilted posteriorly so posterior face nearly vertical. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 coriaceous (fig. 54). 11. Propodeum weakly alveolate to irregularly sculptured with rugae (fig. 54). 12. Fore femur uniformly colored, usually pale. 13. Middle coxa metallic but sometimes weakly so. 14. Female fore wing with reddish

brown area below stigma (as in fig. 48), speculum usually narrowly open posteriorly. 15, Gaster length about 3.2–6.5X its width, about 1.7–2.0X length of head and mesosoma; T1 emarginate (fig. 45); hypopygium length 1/3–1/2 gaster length.

Unique character states of *P. unguitta* include the male funiculus with numerous MPP sensilla and lacking any setae (fig. 59). Among Nearctic *Plutothrix* species, only *P. unguitta* and *P. smithi* have the dorsellum tilted posteriorly so that its posterior face is nearly vertical; other Nearctic *Plutothrix* species have the surface of the dorsellum more or less in the same plane as surrounding structures.

Redescription of holotype, female (information in brackets is taken from specimens other than the type because structures not visible in the type). Color: Body (including coxae) dark bronzy green. Antenna with scape yellow, pedicel reddish brown, flagellum black. Remainder of legs brownish yellow. Fore wing with veins reddish brown; broad, rounded reddish brown macula extending from stigma halfway to hind margin of wing (as in fig. 48).

Sculpture: Clypeus smooth; head alveolate except scrobes granulate; mesoscutum alveolate, side lobes more finely textured than middle lobe; scutellum, frenum alveolate (fig. 54); upper epimeron with ventral anterior half finely alveolate (fig. 54); dorsellum coriaceous; propodeum with median panels medially finely and weakly alveolate, laterally becoming more areolate and with distinct rugae (fig. 54); gaster with T1–6 coriaceous, T7 smooth.

Structure: Body length 6.7 mm. Head quadrate in anterior view, width 1.3X length (71:56), 2.0X length (71:35); clypeus in nearly same plane as rest of face; eye height 1.5X length (37:24), 2.5X malar distance (37:15); torulus 1/2 own diameter above LOCL; ratio of MOD, OOL, POL, LOL as 5.0:10.5:11.0:6.0. Antenna with combined length of pedicel and flagellum 1.2X head width (84:71); relative lengths of scape, pedicel, annelli, F1–6, club as 27:8:4:12:11:10:10:9:8:14; relative widths of F1, F6, club as 6:7:7; annelli transverse; MPP sensilla distributed in several irregular rows on F1–4, in 2 rows on F5–6; club rounded apically, C3 with ventral line of micropilosity. Mesosoma (fig. 54) length 1.6X width (94:60); collar with transverse anterior carina; dorsellum scalloped anteriorly, median length about the same as lateral length, tilted vertically relative to scutellum and propodeum. Fore wing length 2.6X width (180:70); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 80:29:42:18; [costal cell with anterior 1/2 and apical 1/3 setose; basal vein setose; basal cell with a few dorsal setae in anterior 1/2; speculum usually narrowly open posteriorly]. Gaster length 6.5X width (214:33); 1.7X combined length of head and mesosoma (214:129); hind margin of T1 deeply emarginate medially (fig. 45); [hypopygium extending ~2/5 gaster length].

Males. Similar to holotype except as follows: Color. Pattern similar to females but body blue with propodeum, coxae, pleural areas more purple, and with coppery green areas sometimes present on head and dorsum of mesosoma; wings hyaline. Sculpture. Similar to female but about half the specimens have no rugae in median panels of propodeum. Structure. Body length varies between 2.0–3.8 mm ($\bar{x}=2.4\pm(\text{S.E.})0.11$, $n=9$). Antenna with combined length of pedicel and flagellum $1.2\pm0.01\text{X}$ head width; relative lengths of scape, pedicel, annelli, F1–6, club as $15.0\pm0.8:4.8\pm0.22:1.5\pm0.12:7.3\pm0.52:6.6\pm0.51:6.3\pm0.51:6.0\pm0.40:5.8\pm0.32:5.2\pm0.23:-9.5\pm0.20$; relative widths of F1, F6, club as $3.7\pm0.14:3.9\pm0.18:4.1\pm0.11$; flagellum with only a few short setae; MPP sensilla densely and irregularly distributed over segments. Propodeum in half the males examined lack rugae in posterior lateral corners of median panels. Gaster ovate, length $2.5\pm0.10\text{X}$ width.

Variation. The body size of females varies from 3.4–6.6 mm; male body size from 2.0–3.8 mm. Large specimens tend to be green with bronzy reflections and have the female gaster relatively slender and long; small specimens tend to be more blue–green and with a shorter and wider gaster. Large females may have the gaster length 4 1/2 times its width and 1 1/2 times the combined length of the head and thorax, while small specimens have the gaster length only around 2 1/2 times its width and 1 1/4 times the combined length of the head and mesosoma. The ratio of

the mesoscutal width divided by its length varied between 0.51 and 0.59 for the specimens measured. (See also Variation section for *P. unguetella*.)

Material Examined. A total of 93 females and 49 males were examined from the following provinces and states (AEIC, CNCI, CUIC, INHS, NMNH, UCDC, UWIC): Canada. NEW BRUNSWICK: Ludlow. ONTARIO: Algonquin Park, Bells Corners, Hamilton, Merivale, St. Lawrence Island National Park. QUEBEC: Franklin, Gatineau Park, Knowlton, Old Chelsea. United States. ALABAMA: Coleta. GEORGIA: Atlanta, Rabun Bald [Rabun Co.]. ILLINOIS: Algonquin, Des Plaines, Havara, Urbana. KANSAS: Wellington. MARYLAND: Cabin John, College Park, Patuxent Research Station [nr.Laurel]. MICHIGAN: Ann Arbor, Grand Ledge, Livingston Co., Midland Co. MINNESOTA: Alexandria. MISSOURI: Williamsville, 10 mi s. Columbia. NEVADA: Ormsby. NEW HAMPSHIRE: Hampton. NEW JERSEY: Monmoth, Mooreston, Princeton. NEW YORK: Farmingdale, McLean Reservoir, New Hope. PENNSYLVANIA: Harrisburg. MARYLAND: Plummers Island. SOUTH CAROLINA: Greenville. VIRGINIA: near Annandale, Arlington Co., Blacksburg, 4 mi s. Cuckoo, Falls Church, Galax. WASHINGTON D.C. WEST VIRGINIA: w. Lost City. WISCONSIN: Fon duLac Co., Rock Co. Specimens were taken throughout the spring, summer and fall, but primarily in May and June.

Biology. The known hosts of *Plutothrix unguetta* are beetles living in shelf fungi. Graves (1960) records rearing this species from *Euparius marmoreus* (Oliver)(Anthribidae)(Illinois, Cook County) and from *Phellinus gilvus* (Fr.)Quél. (Polyporaceae) in association with the ciid *Octotemnus laevis* Casey (Illinois, Des Plaines). The specimens from this latter rearing were seen by the author and confirmed as specimens of *P. unguetta*. Specimens from Graves' rearing number 16 are actually *P. unguetella*. Specimens examined were reared from the following hosts: *Euparius marmoreus* (Michigan, Grand Lake), *Dorcatoma* sp. (Anobiidae)(Virginia, Arlington Co., 28 February 1929), and probably either *Thymalus marginicolis* Chevrolate (Trogossitidae) or *Diaperis maculata* Oliver (Tenebrionidae)(Ontario, Merivale, em. 15 July 1954). *Plutothrix unguetta* has been reared from a number of shelf fungi (Polyporaceae) including *Piptoporus betulinus* (Fr.) Kar. (numerous specimens from New Brunswick, Ludlow, various dates between 14 May and 5 June; Quebec, Gatineau Park, four dates between 11 May and 16 June), *Gandoderma applanatum* (Pers. ex Wall.)Pat. (Ontario, Bells Corners, 23 and 24 June 1954), *Fomes fomentarius* (Fr.)Kar. (Quebec, Gatineau Park, six dates between 31 May and 9 July), and *Phellinus gilvus* (Missouri, 10 mi s. Columbia, 26 August, 1964; New Jersey, Monmoth, 25 March 1919). Many specimens were collected in malaise traps.

Plutothrix unguetella Heydon, new species

Figs. 46–48, 60

Diagnosis. 1. Body color varying from green with bronzy reflections to blue-green. 2. Clypeus mostly smooth, not slanted relative to upper face. 3. Anelli transverse (fig. 46). 4. Female antenna (fig. 46) with funicular segments uniform in color, club length about as long as F5–6, micropilosity in small ovate patch, club terminus pointed or rounded. 5. Male antenna (fig. 60) with MPP sensilla sparse, flagellum with moderately dense and semierect setae. 6. Pronotum with transverse anterior carina. 7. Mesoscutum length about 0.50 or less times width. 8. Scutellum alveolate, strongly convex, without anterior median notch or groove; frenum alveolate. 9. Dorsellum coriaceous, as long medially as laterally, not tilted posteriorly relative to adjacent structures. 10. Upper epimeron with lower 1/2 alveolate, upper 1/2 coriaceous. 11. Propodeum weakly alveolate, sometimes with rugae. 12. Female fore femur dark on posterior face. 13. Middle coxa metallic but sometimes weakly so. 14. Female fore wing (fig. 48) with reddish brown area below stigma, speculum usually narrowly open posteriorly. 15. Gaster length about 2.1–2.8X its

width, about 1.1X length of head and mesosoma; T1 nearly straight across (fig. 47); hypopygium length $1/3$ – $1/2$ gaster length.

Unique character states of *P. unguttella* include the posterior face of the fore femur darker colored than the anterior face and the hind margin of the first gastral tergite nearly straight across (fig. 47); other Nearctic *Plutothrix* species have the fore femur uniformly colored (usually pale) and T1 distinctly emarginate.

Description. Holotype, female. Color: Head, mesosoma dark green; gaster dark blue green. Antenna with scape brownish yellow; pedicel brown; remainder black. Legs with fore, hind coxa dark green; middle coxa dark brown, weakly metallic green; femora pale reddish brown, fore and middle femora with posterior face dark brown; tibiae, tarsi pale brownish yellow. Fore wing veins brown; membrane clear except for ovate brown macula extending from stigma to center of wing (fig. 48).

Sculpture: Clypeus smooth; scutellum alveolate; frenum weakly alveolate; dorsellum, median panels of propodeum weakly alveolate; upper epimeron coriaceous; T1, T2 smooth dorsally, remainder of gaster coriaceous.

Structure: Body length 3.3 mm. Head quadrate in anterior view, width 1.3X height (46:36), 2.0X length (46:23); clypeus in nearly same plane as rest of face; eye height 1.4X length (23:17), 2.6X malar distance (23:9), length 4.2X temple length (17:4); torulus $1/2$ own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 4.0:7.0:8.0:4.5. Antenna (fig. 46) with combined length of pedicel plus flagellum 1.3X head width (58:46); relative lengths of scape, pedicel, annelli, F1–6, club as 19.0:6.0:2.0:8.0:8.0:7.0:6.5:6.5:6.0:11.5; widths of F1, F6, club as 3.0:4.0:5.0; annelli transverse; MPP sensilla in 2 rows on each funicular segment; club pointed apically, micropilosity in small ovate patch on ventral side of C3. Mesosoma length 1.5X width (53:36); collar with anterior edge carinate; mesoscutal length 0.43X width (16:36); scutellum without anterior furrow; dorsellum as long medially as laterally, tilted posteriorly only slightly relative to surrounding structures. Fore wing (fig. 48) length 2.3X width (108:46); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 45:21:27:12; costal cell with 2 complete ventral setal rows; basal cell with one row of setae parallel to submarginal vein; basal vein setose, setal row curving down cubital vein apically behind speculum, cubital vein setose beneath basal cell; speculum narrowly open posteriorly. Gaster length 2.7X width (89.0:32.5), 1.1X combined length of head and mesosoma (89:79); hind margin of T1 nearly straight (fig. 47); hypopygium extending 0.43X length of gaster (38:89).

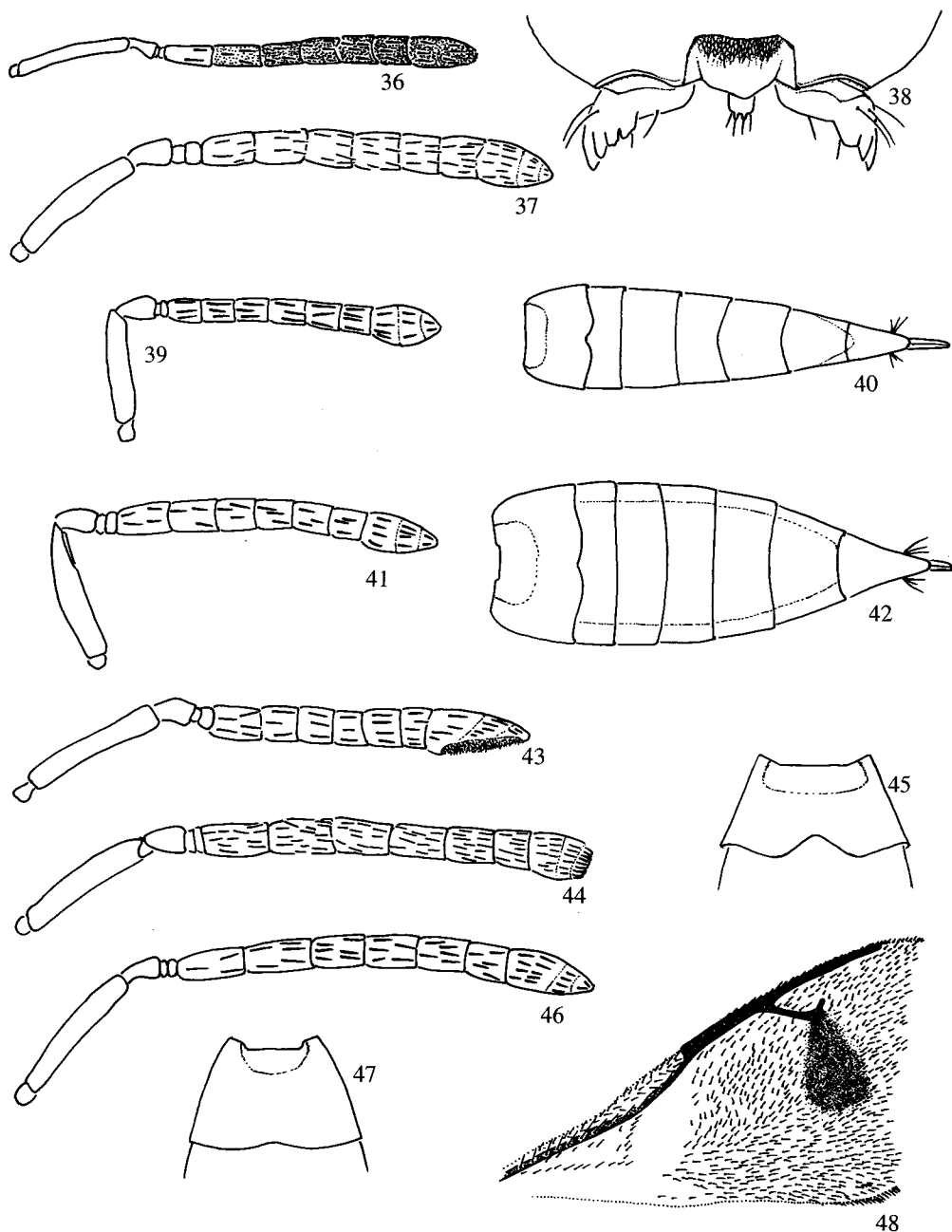
Allotype, male. Similar to holotype except as follows: Color. Antenna (fig. 60) with scape yellow, flagellum dark brown, posterior face of middle coxa same color as anterior face; fore wing lacking macula. Structure. Body length 2.8 mm. Antenna with length of pedicel plus flagellum 1.6X head width (69:44); relative lengths of scape, pedicel, annelli, F1–6, club as 16.0:4.0:2.0:9.5:9.5:9.0:9.5:8.5:7.5:12.0; widths of F1, F6, club as 4.0:4.0:4.0; MPP sensilla on F1–4 in three rows, F5–6 in 2 rows; funicular setae semierect, length $2/3$ funicular segment width. Gaster length 2.9X width (69:24)(specimen critical-point dried), 0.88X combined length of head and mesosoma (69:78).

Variation. Female body length varies from 2.5–5.0 mm; male body length from 1.8–2.8 mm. The characters given in the key to distinguish *P. unguttella* from *P. unguetta* are not absolute; exceptional specimens may exhibit a character state usually found only in the other species. For instance, one specimen from near Cuckoo, Virginia has the posterior face of the fore femur pale, but in all other characters agrees with other *P. unguttella*. Unusual specimens of *P. unguetta* have the emargination of the hind margin of T1 weakly developed as in *P. unguttella*. The ratio of the mesoscutal width divided by its length varied between 0.42 and 0.49 for the specimens measured.

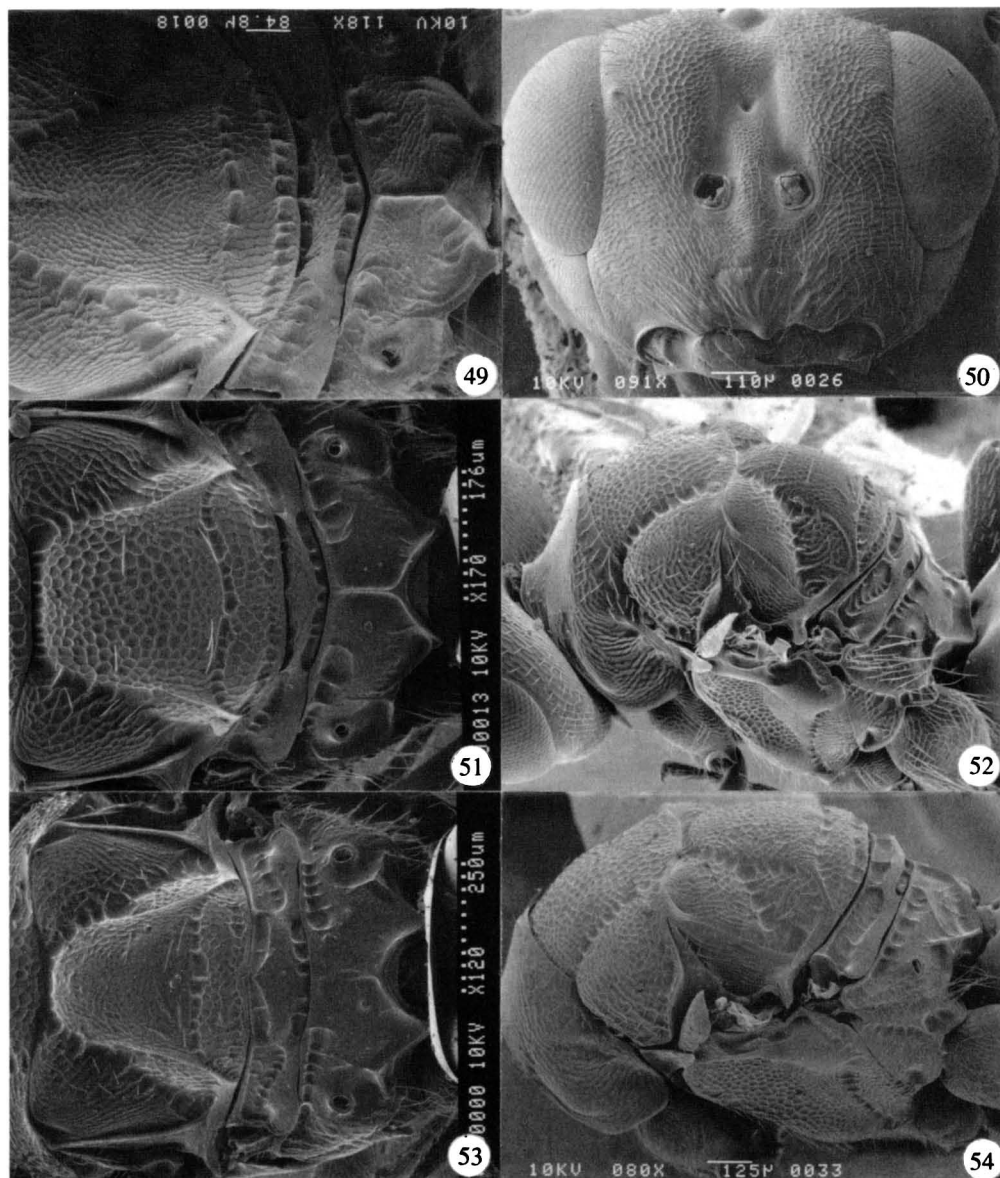
Etymology. The species name refers to the general similarity of *P. unguttella* with *P. unguetta*, but the body size of the former species is generally smaller than that of the latter.

Type Material. The holotype (NMNH), allotype (NMNH), and one male paratype were collected near Annandale, Virginia (USA), in a malaise trap exposed 1–12 July 1988 by D. R. Smith. An additional 33 paratypes were collected as follows (CNCI, NMNH, UCDC): Canada. ONTARIO: Oxford Mills, 24.VII.1979, 1♂. QUEBEC: Duchesnay, 5.VII.1953, 1♂. United States: CONNECTICUT: Chapling, 15.V.1939 (on timber infested with “*Habrobrymus*” [= *Hadrobregmus*] *carinatus*), 1♀. ILLINOIS: Evanston, 1954 (ex. polyporoid fungus), 1♀. MISSOURI: Williamsville, VI.1987, 1♀, VII.1987, 1♀. NEW YORK: New Hope, 30.VI.1958, 1♂. NORTH CAROLINA: Springdale, 31.V.1986, 1♀. VIRGINIA: near Annandale, 13.V.1987, 1♂, 22–28.V.1988, 1♀, 16.VI.1987, 1♀, 18–24.VI.1989, 2♂, 9–15.VII.1989, 1♀, 30.VII–5.VIII.198?, 1♀; 4 mi s. Cuckoo, 29.III–11.IV.1988, 1♂, 12–25.IV.1988, 1♂, 25.IV–13.V.1988, 2♂, 1–12.V.1988, 1♂, 27.V–7.VI.1988, 1♀, 1♂, 6–15.VI.1987, 1♂, 8–18.VI.1988, 1♀, 15.VII.1986, 1♀, 13–27.VII.1988, 4♂, 16–31.VII.1987, 1♂, 7.X–4.XI.1988, 1♀, 12.IX–6.X.1989, 1♀. SOUTH CAROLINA: Cleveland, 14.X.1975, 1♀.

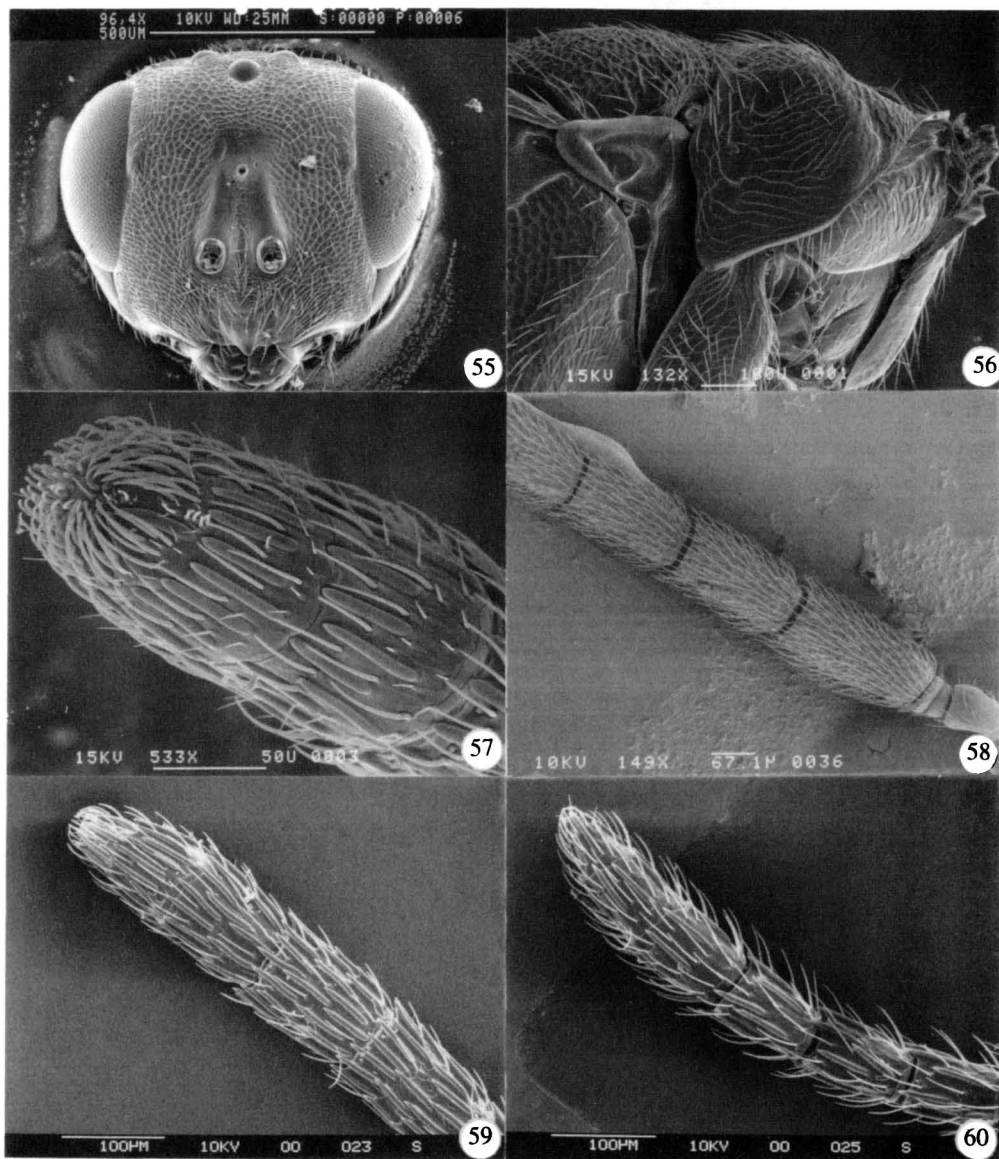
Biology. A specimen of *P. unguttella* from Chapling, Connecticut was reared from timber infested with the anobiid *Hadrobregmus carinatus* (Say) (Anobiidae). Graves (1960) reared *P. ungutta* from the polyphore *Phellinus gilvus* (Schw.) Pat. in association with the ciid *Ceracis* sp. (among other insects) at Evanston, Illinois (rearing # 16, Table 1).



Figures 36–48. *Plutothrix*, female. 36, *P. aerata*, antenna. 37–38, *P. ascita*. 37, Antenna. 38, Clypeus. 39–40, *P. cisae*. 39, Antenna. 40, Gaster. 41–42, *P. ligyptera*. 41, Antenna. 42, Gaster. 43, *P. pilosiclava*, antenna. 44, *P. smithi*, antenna. 45, *P. unguitta*, gastral T1, hind margin. 46–48, *P. unguittella*. 46, Antenna. 47, Gastral T1, hind margin. 48, Fore wing.



Figures 49–54. *Plutothrix*, female. 49–50, *P. ceonotalis*. 49, Scutellum. 50, Head, anterior view. 51, *P. cisae*, scutellum and propodeum. 52–53, *P. glareosa*. 52, Mesosoma, lateral view. 53, Scutellum and propodeum. 54, *P. ungutta*, mesosoma, lateral view.



Figures 55–60. *Plutothrix*. 55–58, *P. smithi*. 55. Female, head, anterior view. 56, Female, prepectus. 57, Female, club tip. 58, Male, antenna. 59, *P. ungutta*, male, antenna. 60, *P. unguttella*, male, antenna.

Trigonoderus Westwood

Trigonoderus Westwood, 1832:127 (Type species: *T. princeps* Westwood, autobasic.) Walker, 1836:15 *in part*. Thomson, 1878:4, 7–8 *in part*. Schmiedeknecht, 1909:156, 157, 166–167 *in part*. Novicky, 1955:26–34. Kerrich and Graham, 1957:254–293. Ferrière and Kerrich, 1958:26–27. Bouček, 1958:354, 364. Nikol'skaya, 1963:215 *in part*. Bouček and Hoffer, 1964:35. Hedqvist, 1968:36, 44–48. Graham, 1969:99–102. Dzhanokmen, 1978:117, 123. Bouček and Rasplus, 1991:45.

Pterolycus Ratzeburg, 1848:208 [Type species: *Pteromalus (Pterolycus) brandtii* Ratzeburg, designated by Gahan and Fagan, (1923:126).]

Diagnosis. *Trigonoderus* can be recognized by the following combination of characters: Female. Head (fig. 61) quadrate or ovate in anterior view; clypeus with anterior rounded denticle, anterior tentorial pits shallow; gena smooth or coriaceous; antennal scrobes developed, circular or slitlike scrobal pit present; vertex alveolate. Antenna with club either without micropilosity or with a line down its ventral side. Mandibles with three teeth on the left mandible and four on the right. Mesosoma with sides of pronotum parallel in dorsal view, collar with anterior transverse carina; prepectus with posterior corner bent and set off by a carina, setose except in *T. cyanescens*; propodeum with median carina. Fore wing without alar speculum.

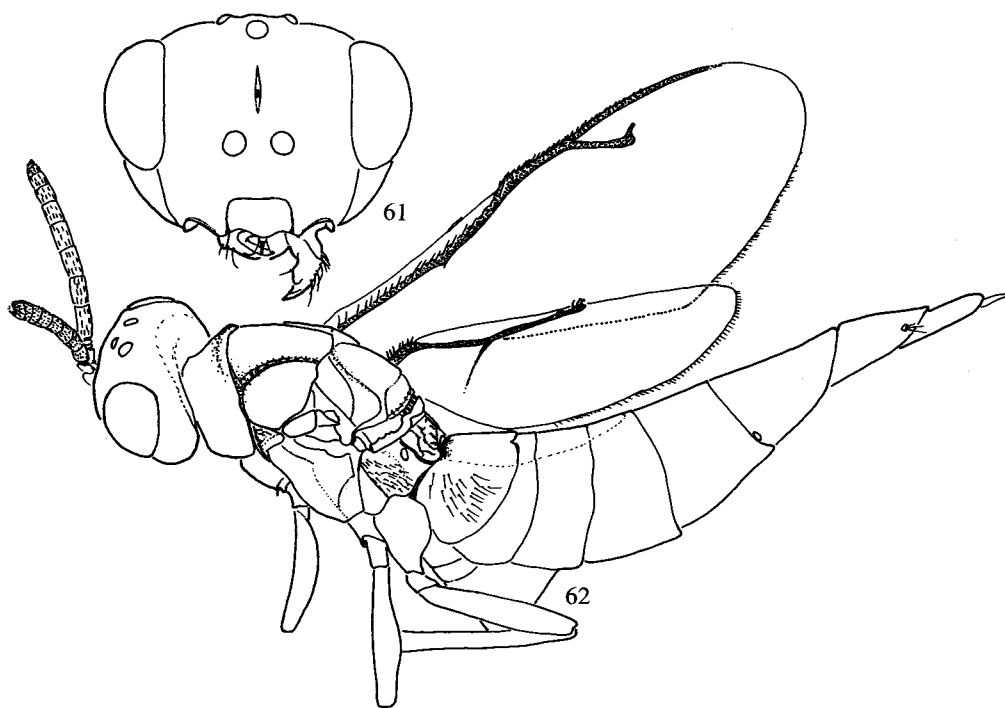
Male. Antennal flagellum with setae poorly developed, MPP sensilla dense; all flagellar segments usually independently articulated. Petiole nearly as long or as long as wide.

Discussion. Described species of *Trigonoderus* include two Neotropical species—*T. areolatus* Cameron, 1910 and *T. brasiliensis* Ashmead, 1904; an Oriental species—*T. malaisei* Hedqvist, 1968; and four Palearctic species—*T. cyanescens* (Förster), 1841; *T. filatus* Walker, 1836; *T. princeps* Westwood, 1832; and *T. pulcher* Walker, 1836.

Burks (1979) lists three described Nearctic *Trigonoderus* species; however, these species all belong in other genera. Based on examination of the types, *Trigonoderus aegeriae* Ashmead is herein referred to *Halticoptera* Spinola as *H. ageriae* (Ashmead), **n. comb.**, *Trigonoderus irvingi* Girault to *Platygermus* Thomson, and *Trigonoderus nonstylatus* Girault to *Seladerma* Walker as *S. nonstylata* (Girault), **n. comb.** *Trigonoderus varipes* Viereck, 1903 was described, but the type is now lost (Burks 1979). The species was referred to the '*Habrocytus*-group' by Hedqvist (1968).

Three specimens of *Trigonoderus* from the United States were examined that were collected as follows: ARIZONA: Ramsey Canyon (15 mi s. Sierra Vista), 17.XI.1967, 1♀ (CNCI). CALIFORNIA: Shepard Pass Trail, Inyo Co., 16.VII.1985, 1♀ (AEIC). WASHINGTON: Ashford, 10 July 1940, 1♂ (AEIC). No Nearctic species will be described because more than one Nearctic species appears to occur, but the few specimens available preclude accurate determination of the range of variability. The character state distributions for *Trigonoderus* used in the cladistic analysis presented earlier in this study is derived from examination of specimens of the Palearctic species *T. cyanescens*, *T. pulcher*, and *T. princeps* (NMNH). In addition, specimens of *Trigonoderus* species from Taiwan, Japan, Nepal, the Philippines, Mexico and El Salvador were also examined (AEIC, CNCI, NMNH).

Biology. The Palearctic species *Trigonoderus filatus* Walker (var. *binubilatus* Erdős) is known from the cerambycid *Pogonocherus hispidus* L. (Tudor 1971). Bouček and Rasplus (1991) also give Scolytidae as hosts.



Figures 61–62. 61, *Trigonoderus* sp., female, head, anterior view. 62, *Plutothrix smithi*, female, habitus.

Ogloblinisca Hedqvist

Ogloblinisca Hedqvist, 1968:50 (Type species: *Ogloblinisca maculata* Hedqvist, 1968; original designation.) Burks, 1979:777.

Diagnosis. *Ogloblinisca* is characterized by the following combination of characters: Female. Head shape quadrate, the anterior margin of the clypeus either sinuous and weakly concave mesally (fig. 63) or with traces of an anterior clypeal denticle (in *O. americana*) (fig. 64), anterior tentorial pits shallow; gena smooth or coriaceous; antennal scrobes shallow, circular scrobal pit present in *O. flavipes* but pit weakly developed in *O. maculata* and absent in *O. americana*; vertex alveolate. Antennal club with a line (figs. 68, 72, 73) or a small ovate patch of micropilosity on its ventral side. Mandibles with three teeth on the left mandible and four on the right. Mesosoma with sides of pronotum parallel in dorsal view (fig. 65), collar with anterior transverse carina in *O. flavipes* and *O. maculata* but lacking in *O. americana*; prepectus with posterior corner bent and set off by a carina, setose (fig. 70); propodeum with median carina (fig. 65). Fore wing without alar speculum (fig. 69).

Male. Antennal flagellum (figs. 66, 74) with setae poorly developed, MPP sensilla dense; all flagellar segments independently articulated in *O. americana* (figs. 66, 74). Petiole nearly as long or as long as wide.

Discussion. There are only three described species of *Ogloblinisca*—the Nearctic species *O. americana* Hedqvist and the Neotropical species *O. flavipes* Hedqvist and *O. maculata* Hedqvist—but several undescribed species are present in the Neotropics.

Biology. The hosts of *Ogloblinisca* remain unknown, but they are likely to be insects associated with dead and decaying wood or fungus.

Ogloblinisca americana Hedqvist

Figs. 64–74

Ogloblinisca americana Hedqvist, 1968:54 (Holotype, ♀; NMNH, Type No. 70379; examined.) Burks, 1979:777.

Diagnosis. Characters that will distinguish between *Ogloblinisca americana* and *O. maculata* and *O. flavipes* include the following: *O. americana* has the gaster nonmetallic ventrally, the gena smooth to the posterior setal line, the anterior margin of the clypeus straight or with a trace of an asymmetrical denticle (fig. 64), a line of micropilosity down the ventral side of the female club (figs. 68, 72), the pronotum lacking an anterior transverse carina, the fore wing lacking maculae (fig. 69), the dorsellum bare, and the metapleuron completely setose. *Ogloblinisca maculata* and *O. flavipes* have the gaster metallic ventrally, the gena totally coriaceous or at least with coriaceous sculpture beginning before the posterior setal line, the anterior clypeal margin sinuous and weakly concave mesally (fig. 63), a small ovate patch of micropilosity on the ventral side of the terminal segment of the female club, the pronotum with an anterior transverse carina, the fore wing with brown maculae extending posteriorly from the stigmal vein, the dorsellum setose, and the metapleuron setose at most in the ventral half.

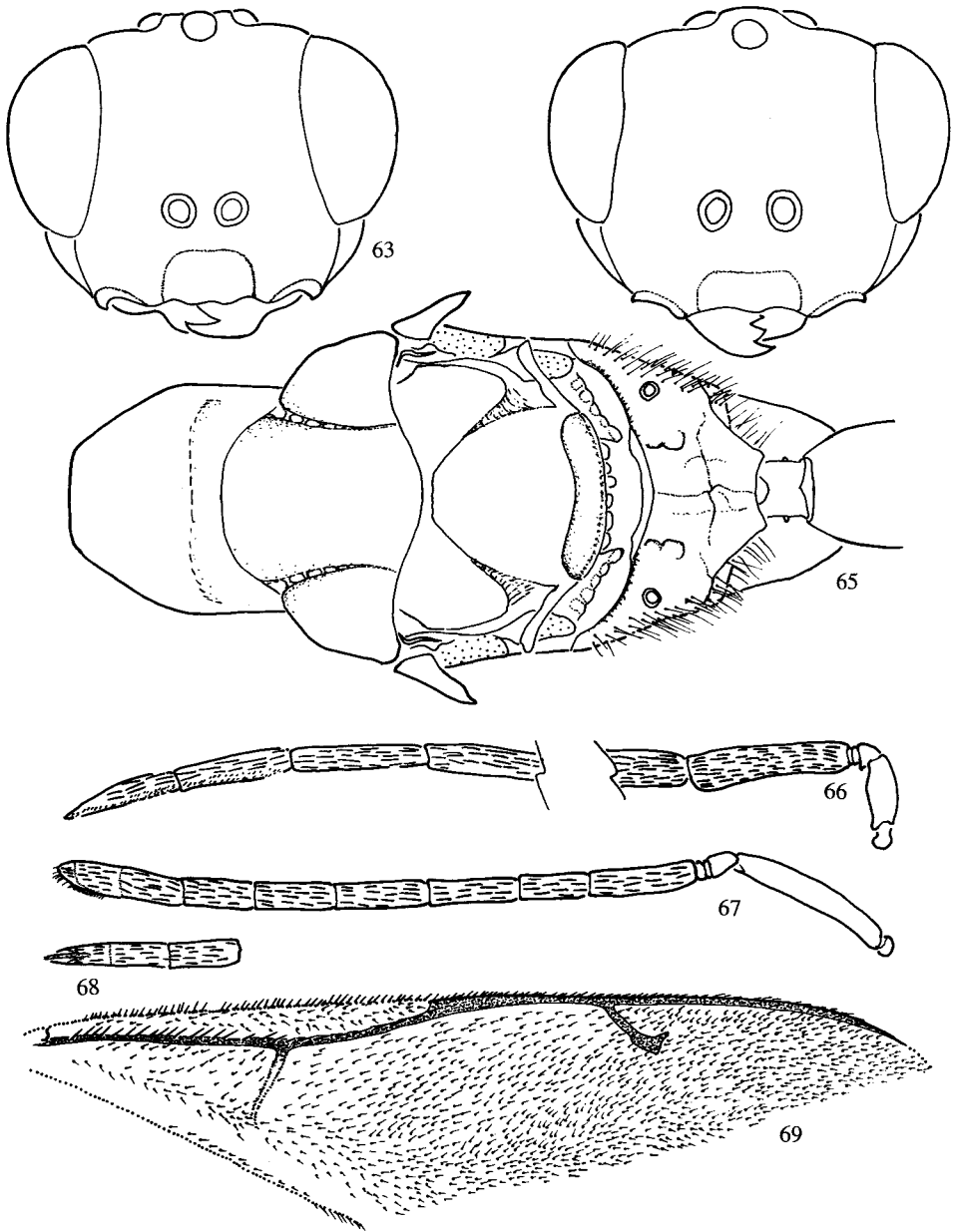
Redescription of holotype: Color. Head with face, frons dark green, vertex dark blue; mesosoma blue except mesoscutum, scutum, axilla green and reticulate area of mesopleuron dark purple; gaster non-metallic yellow-brown ventrally almost to end of hypopygium; remainder dark metallic purple with bluish and violaceous reflections. Antenna with basal 1/2 of scape yellow-brown; apical 1/2 of scape, pedicel weakly metallic blue; remainder brownish black. Legs with coxae dark blue; femora tibiae yellow-brown; tarsi brownish white. Wings clear; veins pale brown with parastigma darker; pale band of brown pigment extending down basal vein, curving apically down cubital vein.

Sculpture. Head alveolate in anterior aspect, occiput scalelike; gena smooth; pronotum, mesoscutum alveolate (side lobes finely so); scutellum alveolate; frenum, dorsellum coriaceous; propodeum alveolate, becoming nearly smooth posteriorly; upper epimeron smooth, lower epimeron coriaceous; petiole, gaster smooth.

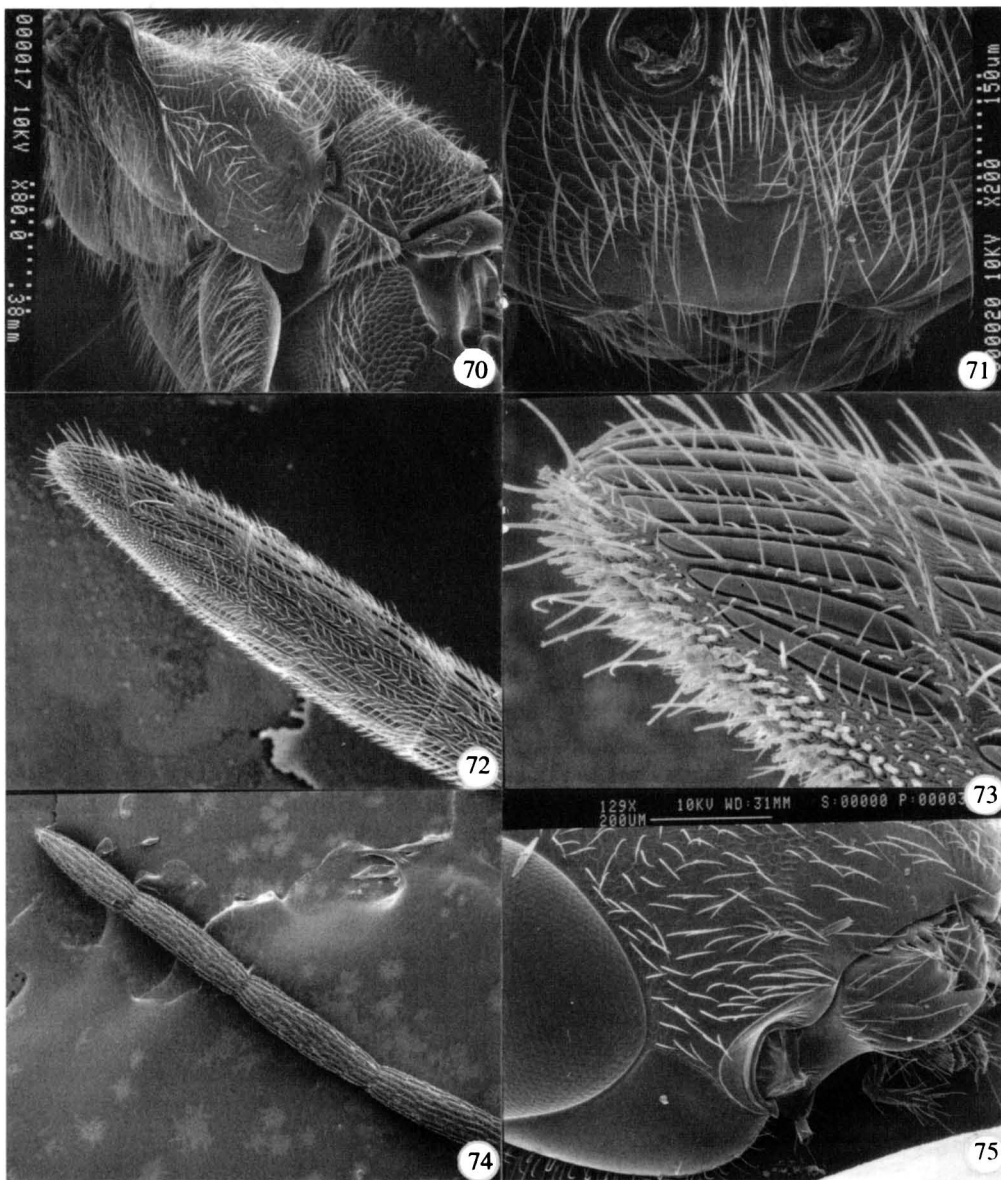
Structure. Body length 6.6 mm. Head quadrate in anterior view (fig. 64), width 1.3X height (66:52), 2.1 length (66:32); anterior mouth margin reflexed, laminate (as in fig. 75); eye height 1.5X length (35:23), 2.7X malar distance (35:13), length 3.3X temple length (23:7); torulus tangent to LOcL; ratio of MOD, OOL, POL, LOL as 5.0:9.0:10.0:4.5; occiput shallowly concave; scrobes absent; anterior margin of clypeus nearly straight. Antenna (fig. 67) with length of pedicel plus flagellum 1.9X head width (124:66); ratio of scape, pedicel, annelli, F1–6, club lengths as 30.0:6.0:2.0:19.0:17.0:16.0:15.5:14.5:12.5:21.0; ratio of widths of F1, F6, club as 4:4:5; MPP sensilla distributed in several irregular rows on each funicular segment (figs. 67, 72); club with sulcus between C2 and C3 oblique (fig. 72), line of micropilosity extending halfway down C2 (fig. 72); flagellum clothed in very short dark suberect setae. Mesosoma (fig. 65) length 1.8X width (95:54), collar with anterior edge rounded; pronotal length 0.52X width (21:40); dorsellum quadrate, width 4.8X length (19:4); propodeum with median carina in shallow median groove, basal fovea distinct with median edge carinate; plicae distinct only posteriorly, spiracle ovate and about one inside diameter from anterior margin of propodeum. Fore wing (fig. 69) length 2.7X width (188:70); ratio of submarginal, marginal, postmarginal, stigmal vein lengths as 82:35:63:13; stigmal vein straight, stigma ovate; basal cell setose; speculum absent. Gaster lanceolate, length 4.7X width (196:42); T1 with hind margin crenulate with slight median emargination. The type has the tip of the gaster shattered so the condition of the ovipositor sheaths is unknown.

Material Examined. The holotype (NMNH) is a female, and was collected from *Quercus marylandica*, at Durham, North Carolina (USA), on 22 September 1946, by Wm. Haliburton. An additional 33 female and 21 male specimens collected from the following localities were examined (AEIC, CNCI, INHS, NMNH, UCDC): Canada. ONTARIO: Gananoque, Rhondeau Park (near Erieau). Costa Rica. GUANACASTE: Santa Rosa Park. United States. ALABAMA: Coleta. FLORIDA: Juniper Springs (8 mi wnw. Astor Park). ILLINOIS: Oakwood, Jonesboro State Park [on *Carpinus caroliniana*]. INDIANA: Vincennes, Yates Or. (peach wood). MAINE: Dryden. MARYLAND: Bethesda, Patuxent Research Station (near Laurel), Takoma Park. MASSACHUSETTS: Nantucket. NEW YORK: Peckskill. NORTH CAROLINA: Murfreesboro, Crabtree Mounds (Yancey Co.). SOUTH CAROLINA: McClellansville, Cleveland, Wattacoo. TENNESSE: Reelfoot Lake (near Tiptonville). VIRGINIA: near Annandale, 4 mi s. Cuckoo, Montross, Westmorland State Park.

Biology. The host(s) of *O. americana* are as yet unknown, but this species has been collected in association with *Quercus marylandica* Muenchhausen (Fagaceae), *Carpinus caroliniana* Walter (Betulaceae), and peach wood.



Figures 63–69. *Ogloblinisca*. 63, *Ogloblinisca* sp., Head, anterior view. 64–69, *O. americana*. 64, Female, head, anterior view. 65, Female, mesosoma, dorsal view. 66, Male, antenna. 67, Female, antenna, lateral view. 68, Female, club, ventral view. 69, Female, fore wing.



Figures 70–75. 70–74, *Ogloblinisca americana*. 70, Female, mesosoma, anteriolateral view. 71, Female, clypeus. 72, Female, club. 73, Female, club, detail showing structure of sensilla making up micropilosity. 74, Male club. 75, *Miscogasteriella*, female, lateral mouth margin.

Miscogasteriella Girault

Miscogasteriella Girault, 1915:196–197 (Type species: *Miscogasteriella longiventris* Girault, 1915; original designation.) Bouček, 1988:232, 402 (synonymy).

Glyptosticha Masi, 1927:348–349 (Type species *Glyptosticha flavipes* Masi, 1927; original designation.) Kamijo, 1963:118–119. Hedqvist, 1968:36, 48–50.

Trigonoderoides Kamijo, 1960:121–122 (Type species: *Glyptosticha nigricans* Masi, 1927; original designation: examined.) Hedqvist, 1968:35, 39. Bouček, 1988:232, 402–403. **syn. nov.**

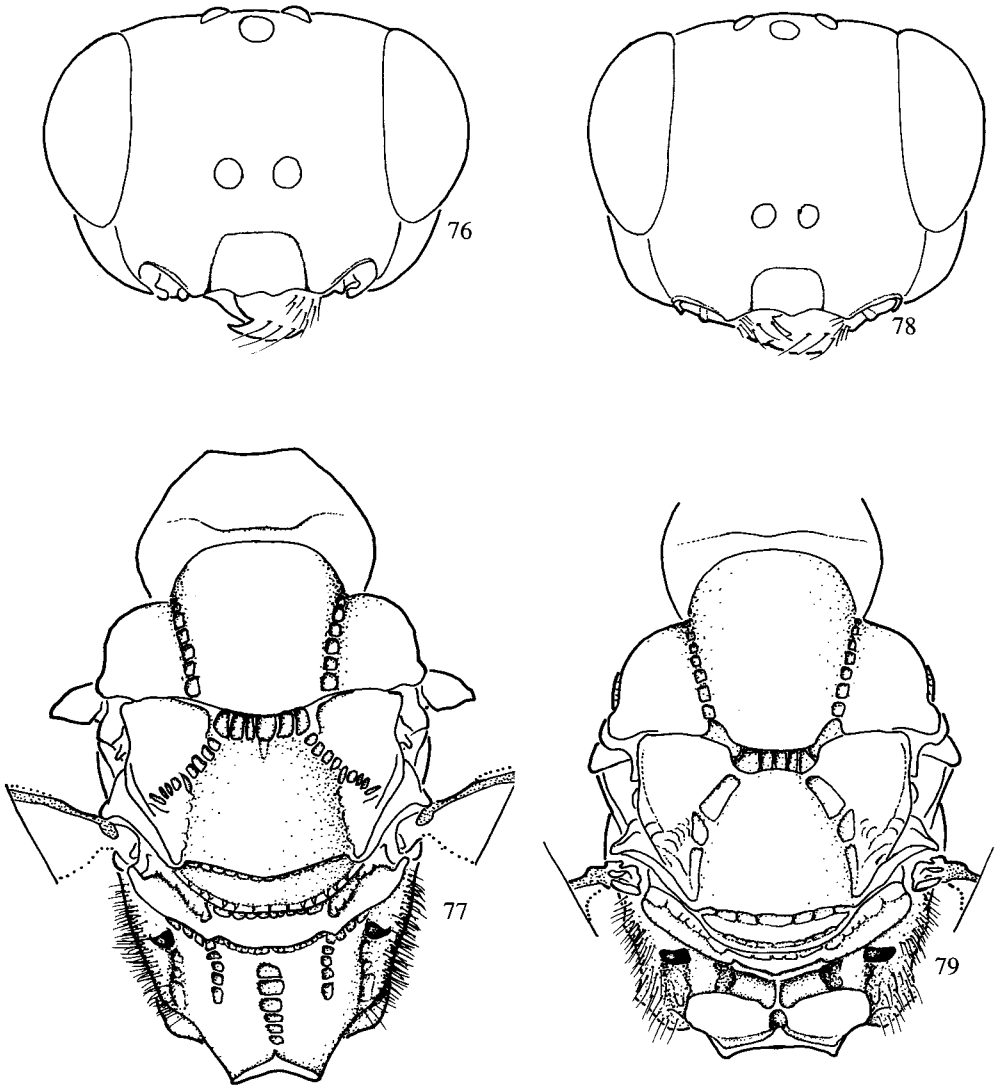
Diagnosis. *Miscogasteriella* can be recognized by the following combination of characters: Female. Head ovate in anterior view (figs. 76, 78); clypeus with anterior margin sinuous and weakly concave mesally (fig. 76) or with a rounded denticle in *M. nigricans* (fig. 78), anterior tentorial pits small and shallow; gena smooth; antennal scrobes shallow, scrobal pit absent; vertex smooth. Antenna with club with a line of MPP sensilla down its ventral side. Mandibles with either four teeth on both mandibles or with three teeth on the left and four on the right mandible. Mesosoma with sides of pronotum converging posteriorly in dorsal view (figs. 77, 79), collar with anterior transverse carina; prepectus with posterior corner bent and set off by a carina, setose; propodeum with median costate sulcus (figs. 77, 79). Fore wing without alar speculum present.

Male. Antennal flagellum with setae poorly developed, MPP sensilla dense; all flagellar segments independently articulated or with the terminal two segments forming a compact club. Petiole nearly as long or longer than wide.

A male from Wushe, Taiwan (AEIC) has the propodeal structure of *M. nigricans*, but the clypeal structure of species described into *Glyptosticha*.

Discussion. There are six described species of *Miscogasteriella*: *M. burmanica* (Hedqvist), 1968; *M. flavipes* (Masi), 1926; *M. longiventris* Girault, 1915; *M. nigricans* (Masi) 1926; *M. perakensis* (Hedqvist), 1968; and *M. sulcata* (Kamijo), 1963. The described species are from Japan, Taiwan, Burma, Perak, and Australia; but the genus is probably widespread throughout the western Pacific rim since I have seen material from undescribed species from Nepal and the Philippines, and Bouček (1988) records other material from Papua New Guinea.

Biology. The hosts of *Miscogasteriella* are unknown, but they are known from forests, and so are probably parasitoids of insects associated with dead or dying trees like other closely related genera.



Figures 76–79. 76–77, *Miscogasteriella sulcata*, female. 76, Head, anterior view. 77, Mesosoma, dorsal view. 78–79, *Miscogasteriella nigricans*, female. 78, Head, anterior view. 79, Mesosoma, dorsal view.

Eutelisca Hedqvist

Eutelisca Hedqvist, 1968:36, 39–40 (Type species: *Eutelisca chilensis* Hedqvist, 1968; original designation: examined.)

Diagnosis. *Eutelisca* is characterized by the following combination of characters: Female: Head (fig. 80) triangular in anterior view (vertex rather straight across, genae nearly straight); clypeus with single small asymmetrically-situated clypeal denticle, anterior tentorial pits not deep; gena coriaceous, vertex reticulate; mouth margin not reflexed; scrobes present, lacking pit. Antenna with micropilosity (when present) in a ventral patch on the terminal club segment. Mesosoma with pronotum with sides parallel (fig. 84), less than half as long as wide, collar with or without anterior transverse carina; prepectus bent (fig. 81), with at most a weak carina setting off the hind corner, without a shield-shaped area anterior to fore coxae; frenum developed (figs. 85, 86); propodeum weakly to strongly carinate medially (figs. 85, 86). Fore wing with speculum present (figs. 87, 88). Petiole transverse. Gaster with all terga with straight hind margins (figs. 82, 83). A female habitus of *E. luteocaudata* is shown in figure 89.

Male: Antenna with funicular segments with numerous irregularly arranged MPP sensilla; setae short, reclinate; club three segmented. Petiole not as long as wide.

Discussion. *Eutelisca* was formerly a monotypic genus with only one described species — *E. chilensis* Hedqvist, 1968. I describe two new species herein — *E. metalliscapa*, n. sp. and *E. luteocaudata*, n. sp. All known species are from Chile. The genera *Eutelisca* and *Susteraia* have a very similar gestalt. Particularly characteristic of these two genera is the small but sharp anterior clypeal denticle and the long mesoscutum with a short and abruptly declivous pronotum. Characters that will distinguish species of these two genera are as follows: 1. *Eutelisca* species have the body color coppery; *Susteraia* has the body green. 2. *Eutelisca* species have the scutellum uniformly sculptured; *Susteraia* has a median strip of fine sculpture on the scutellum. 3. *Eutelisca* species have the vertex nearly flat in anterior view; *Susteraia* has the vertex arched dorsally in anterior view. 4. *Eutelisca* species have a collar on the pronotum, though this collar is only weakly developed in *E. metalliscapa*; *Susteraia* has the pronotum declivous immediately from the anterior margin of the mesoscutum. 5. *Eutelisca* species have the dorsum of the mesosoma setose; *Susteraia* has the dorsum of the mesosoma asetose. 6. *Eutelisca* species have the plicae strongly developed; *Susteraia* has the plicae undeveloped. 7. *Eutelisca* species have the callus setose, its setae long, fine, and dark; *Susteraia* has the callus with a single row of around five pale bristlelike setae. 8. *Eutelisca* species occur in Chile; *Susteraia* species occur in Europe.

Biology. Nothing is known of the host(s) of *Eutelisca* species. The the holotype of *E. luteocaudata* was collected in a *Nothophagus* forest.

Key to Females of *Eutelisca* Hedqvist

1. Pronotal collar smoothly rounding into neck. Dorsellum (fig. 86) coarsely alveolate, with anterior and posterior edges parallel, median length less than 4/5 frenal length. Propodeum (fig. 86) lacking spiracular sulcus in anterior 1/2; nuchal region without raised transverse carina. Costal cell generally setose over mesal 1/3 (fig. 88) *metalliscapa*, n. sp.
- Pronotal collar with an anterior transverse carina (fig. 84). Dorsellum (fig. 85) weakly sculptured, longer medially than laterally, and the median length more than 4/5 the frenal length. Propodeum (fig. 85) with spiracular sulcus extending anteriorly beyond spiracle; nuchal region with transverse carina. Costal cell with only a short anterior setal band in mesal 1/3 (fig. 87) 2.

2. Gaster length ~7X its maximum width (fig. 82); T7 length ~6X its basal width, dark reddish purple. Basal cell with only a single setal row along anterior edge (fig. 87). Stigma about as long as wide (fig. 87)..... *chilensis* Hedqvist
- Gaster length ~3X its maximum width (fig. 83); T7 length 2–4X its basal width, with dorsal patch of yellow coloration. Basal cell generally setose over anterior 2/3 (as in fig. 88). Stigma width twice its length (as in fig. 88)..... *luteocaudata*, n. sp.

***Eutelisca chilensis* Hedqvist**

Figs. 80–82, 84–85, 87

Eutelisca chilensis Hedqvist, 1968:40, 41 (Holotype, ♀; in private collection of K.–J. Hedqvist: examined).

Diagnosis. The following diagnosis of *Eutelisca chilensis* covers only those characters that differ between the three *Eutelisca* species. Color: Body generally, T7, coxae dark reddish purple; the scape is pale in the basal 1/2, dark over the apical 1/2; femora concolorous with tibiae; body setae white. Structure: Clypeus semicircular (fig. 80); eye height 1.7X malar length (26:15), length 4.8X temple length (19:4); antenna with scape carinate on anteriomedian edge, club with large patch of micropilosity on ventral side of C3; pronotal collar with weak anterior transverse carina (fig. 84); prepectus lacking carina setting off posterior corner (fig. 81); dorsellum (fig. 85) weakly coriaceous, longer mesally than laterally, width 2.6X median length (17:6.5), median length 0.93X frenal length (6.5:7.0); propodeum (fig. 85) lacking distinct median carina, median panels nearly smooth and lacking rugae, nucha with transverse carina anterior to petiolar foramen, spiracular sulcus hirsute posteriorly and extending anteriorly beyond spiracle, depressed area around spiracle smooth and set off from remainder of spiracular sulcus by carinae; costal cell with short anterior setal band (fig. 87); basal cell bare except for single row of setae along anterior edge; stigma as long as wide (fig. 87); gaster length 6.7 X width (154:23) (fig. 82); T7 length 6.0X width (60:10) (fig. 82).

Discussion. Unique features of *Eutelisca chilensis* are the short temple (eye length 4.8X temple length; compared with 3.8–4.2X in *E. luteocaudata* and 3.1X in *E. metalliscapa*); the scape which is pale ventrally, and dark dorsally; the large ventral patch of micropilosity on the terminal club segment; the long dorsellum [dorsellum width 2.6X median length (fig. 85); compared with 3.0X in *E. luteocaudata* and 3.6X in *E. metalliscapa* (fig. 86)]; the weak transverse carina on the pronotal collar (fig. 84); the weak median carina on the propodeum (fig. 85); the weakly sculptured median panels of the propodeum which mostly lack rugae (fig. 85); the depressed area around the spiracle that is delimited laterally and posteriorly by carinae (fig. 85); the basal cell bare except for a single setal row along its anterior margin (fig. 87); the stigma as long as wide (fig. 87); a long gaster (fig. 82) [length 6.7X width; compared to 3.0–3.1X in *E. luteocaudata* (fig. 83) and 4.2X in *E. metalliscapa*]; and T7 elongate (fig. 82) [length 6.0X basal width; compared with 2.5–3.0X in *E. luteocaudata* (fig. 83) and 2.7X in *E. metalliscapa*].

Distribution. Only the holotype female from Puerto Fui, Valdivia, Chile is known.

Biology. The host(s) of *Eutelisca chilensis* are unknown.

***Eutelisca luteocaudata* Heydon new species**

Fig. 83

Holotype, female. Color: Head, mesosoma coppery green except gena, upper epimeron blue–green, callus purple; gaster with T1–6 coppery green but with purplish band along posterior margins; T7 with basal 1/2 yellow, apical 1/2 brown. Antenna with scape yellow–brown, darker at very tip; remainder green. Legs with basal 1/2 of middle coxa, basal 3/4 of hind coxa coppery

green; remainder of legs pale brownish yellow except apical tarsi slightly more brown. Fore wing membrane faintly yellowish; submarginal vein reddish brown; remainder of veins pale brownish yellow with stigma darker. Body setae white.

Sculpture: Clypeus finely cobbled, gena coriaceous, remainder of head alveolate; mesoscutum finely alveolate, cells of posterior half of middle lobe larger than those of remainder; scutellum alveolate, finely so mesally; frenum delicately alveolate; dorsellum coriaceous, smooth posteriorly; propodeum with median panels weakly alveolate, rugose posteriorly. Gaster with T1 smooth; T2–6 coriaceous basally, purplish hind marginal band smooth; T7 finely and weakly coriaceous.

Structure: Body length 4.0 mm. Head triangular in anterior view, width 1.3X height (49:37), 2.3X length (49:21); clypeus semicircular; eye height 1.3X length (21.5:17.0), 2.0X malar distance (21.5:11.0), length 3.8X temple length (17.0:4.5); torulus located just above and tangent to LOcL; ratio of MOD, OOL, POL, LOL as 4.5:6.0:10.5:4.0. Antenna with combined length of pedicel and flagellum 1.4X head width (70:49); scape with anteriomedian edge carinate; relative lengths of scape, pedicel, annelli, F1–6, club as 18.0:7.0:2.0:10.0:9.0:8.5:8.5:7.0:–6.5:11.0; width of F1, F6, club as 4.0:4.5:5.0; MPP sensilla scattered irregularly on T1–4, in 3 overlapping rows on T5–6; club nearly lacking micropilosity. Mesosoma length 1.9X width (75:40); pronotal collar with anterior edge strongly carinate; prepectus with irregular carina at point of weak bend setting off posterior triangular weakly-sculptured area; dorsellum longer mesally than laterally, width 3.0X median length (13.5:4.5), median length 0.9X frenal length (4.5:5.0); propodeum with median carina well developed, nucha with strong transverse carina anterior to petiolar foramen, spiracular sulcus setose in posterior half and extending anteriorly beyond spiracle, area around spiracle irregularly sculptured and only partially set off by carina and not sunken relative to remainder of spiracular sulcus. Fore wing length 2.5X width (165:65); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 61:44:42:20; stigma width 2X length; costal cell with short setal band down anterior edge, generally setose on basal 1/4 and apical 1/3; basal cell setose over anterior 2/3; basal vein with narrow band of setae; basal cell, speculum bordered posteriorly by narrow band of setae along cubital vein. Gaster (fig. 83) length 3.0X width (112:37), 1.2X combined length of head and mesosoma (112:94); T1 with sparse lateral patch of setae; T7 length 3.0X width (42:14); ovipositor sheath exerted 0.35X T7 length (14:40).

Allotype, male. Color: Similar to holotype except copper reflections weak; gaster brown and only weakly metallic; scape brown in apical 1/2; fore coxa metallic blue on basal 1/3; middle, hind coxa metallic blue–green; hind femur, tarsi brown; wing membrane clear, veins brown. **Structure:** Body length 2.6 mm. Antenna with combined lengths of pedicel and flagellum 1.6X head width (51:32); relative lengths of scape, pedicel, annelli, F1–6, club as 10.0:4.5:1.0:–6.5:6.5:6.0:6.0:5.5:5.5:11.0; widths of F1, F6, club as 3.0:3.5:4.0; MPP sensilla scattered and densely covering flagellar segments; setae subreclinate, short (length ~1/4 funicular segment length); club 3-segmented. Gaster length 4.2X width (63:15).

Variation. The body length of the paratype female is 3.8 mm. This female is very similar to the holotype. When two ratios are given for *E. luteocaudata* in the diagnosis sections, one of the given ratios is that in the holotype and the other is from the paratype female.

Diagnosis. Unique features for female *E. luteocaudata* are the generally blue–green body color; the scape almost entirely pale; T7 with a dorsal yellow spot; the eyes relatively large (eye height 2.0X malar distance; compared to 1.7X in *E. chilensis* and *E. metalliscapa*); moderately long temples (eye length 3.8–4.2X temple length; compared with 4.8X in *E. chilensis* and 3.1X in *E. metalliscapa*), the pronotal collar with a strong transverse carina; the prepectus with a weak carina delimiting a weakly sculptured triangle in its posterior corner; a moderately long dorsellum (dorsellum width 3.0X length; compared with 2.6X in *E. chilensis* and 3.6X in *E. metalliscapa*); the area around the spiracle irregularly sculptured, and not depressed relative to the spiracular

sulcus or set off by carinae; and a more robust gaster (fig. 83) [length 3.0–3.1X width; compared with 6.7X for *E. chilensis* and 4.2X for *E. metalliscapa* (fig. 82)].

Etymology. The species name is a combination of the Latin words *leuteo*–, meaning yellow, and *caudata*, meaning tailed, and refers to the yellow patch on T7.

Type Material. The holotype is a female collected on the Rio Mañuales, 20 km e. Puerto Aisén, Aisén, Chile, by Luis Peña, on 26–28 January 1961 (AEIC). The allotype was collected at Puerto Cisnes, Aisén, Chile, by Luis Peña, in February 1961 (AEIC). Three paratype females and one paratype male were collected from Chile as follows (NMNH, UCDC): VIII REGION: sw. Concepción (camino a Santa Juana), 13.XII.1991, 1♀. X REGION: 30 km w. La Unión Trancas (500m), 18.II.1988 (from *Nothophagus*), 1♀; Valdivia (150m), 26.II.1988 (flood forest), 1♂. XI REGION: 15 km s. Las Juntas and 30 km n. Puyuhuapi, Aisén, 30.XII.1984–29.I.1985 (*Nothophagus* forest), 1♀.

Biology. Nothing is known of the host(s) of *E. luteocaudata*, but the holotype was collected in a *Nothophagus* forest.

Eutelisca metalliscapa Heydon, new species

Figs. 86, 88

Holotype, female. Color: Head, dorsum of mesosoma coppery green except clypeus violet; pleural, ventral mesosomal regions dark green with bluish reflections; propodeum dark bluish copper; gaster dorsally with T1–6 copper colored (T6 with dull green reflections) and T7 dark purple with green reflections in basal half; ventrally dark green with bluish reflections. Antenna with scape, pedicel dark coppery green; flagellum black. Legs with coxae dark green; femora reddish brown with blue reflections; tibiae, tarsi yellow–brown except pretarsi, dorsum of fore tarsi brown. Wing membrane weakly brown, veins brown. Body setae dark.

Sculpture: Clypeus granulate; gena coriaceous; remainder of head finely alveolate; pronotum, mesoscutum alveolate, side lobes of mesoscutum finely so; axilla, scutellum, frenum, alveolate, scutellum with median strip of finely alveolate sculpture; dorsellum coarsely alveolate; median panels of propodeum alveolate with rugae in posterior 1/2; gaster with T1–2 smooth, T3 smooth but coriaceous basally, T4–7 coriaceous.

Structure: Body length 5.6 mm. Head pentagonal in anterior view, width 1.3 X height (55:42), 2.1X length (55:26); clypeus pentagonal; eye height 1.4X length (26.0:18.5), 1.7X malar distance (26:15), length 3.1X temple length (18.5:6.0); torulus on LOcL; ratio of MOD, OOL, POL, LOL as 4.5:6.0:11.0:5.0. Antenna with combined length of pedicel and flagellum 1.4X head width (79:55); scape with anteriomedian edge blunt; relative lengths of scape, pedicel, annelli, F1–6, club as 26.0:7.5:4.0:11.5:10.0:9.5:9.0:8.5:7.5:13.0; widths of F1, F6, club as 4.0:4.0:5.5; MPP sensilla in several rows on F1–4, 2 rows on F5–6; club with small patch of micropilosity on terminal segment. Mesosoma length 1.9X width (92:49); pronotal collar with anterior edge rounded; prepectus uniformly alveolate, smoothly rounded from ventral to pleural side of mesosoma, lacking any trace of carina setting off posterior corner; dorsellum (fig. 86) with median length equal to lateral length, width 3.6X length (18:5), length 0.62X frenal length (5:8); propodeum (fig. 86) with median carina well developed, petiolar foramen with smooth raised crescentic nuchal region anteriorly, spiracular sulcus bare and not extending more than halfway to anterior propodeal margin, area around spiracle alveolate and not set off by carina or sunken relative to callus. Fore wing (fig. 88) length 2.6X width (186:73); relative lengths of submarginal, marginal, postmarginal, stigmal veins as 76:43:51:19; stigma width 2X length; costal cell generally setose but bare posteroapically and postero–mesally; basal cell setose in anterior 2/3; basal vein with single row of setae; basal cell, speculum bordered posteriorly by band of setae along cubital vein. Gaster length 4.3X width (154:35.5), 1.3X combined length of head

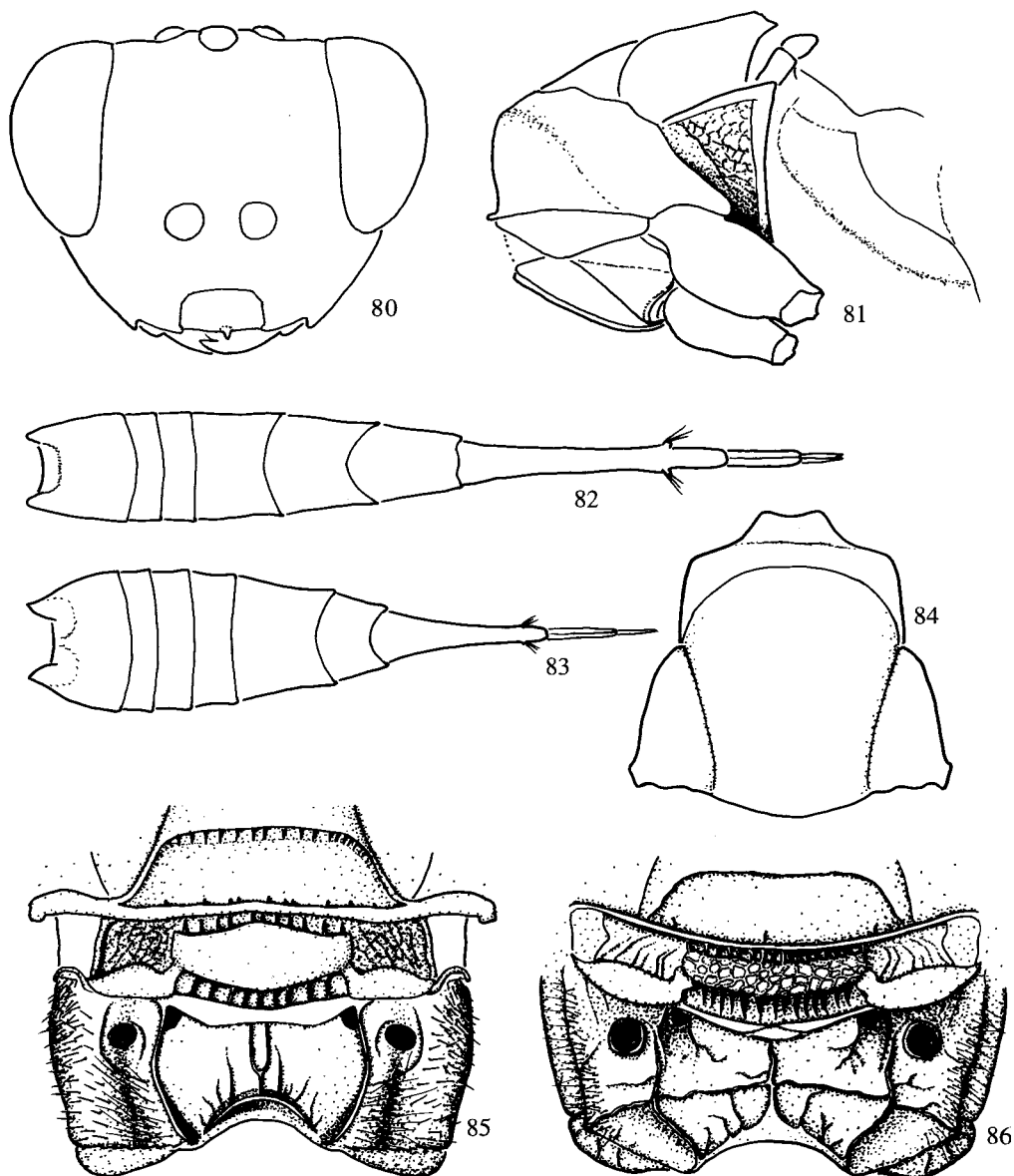
and mesosoma (154:123); T1 with only a few setae laterally; T7 length 2.7X width (40:15); ovipositor sheath exerted 0.60X T7 length (24:40).

Diagnosis. Unique features of female *Eutelisca metalliscapa* are the wholly dark metallic-colored scape; the femora distinctly darker than the tibiae; body setae dark; the long temples (eye length 3.1X temple length; compared with 4.8X in *E. chilensis* and 3.8–4.2X in *E. luteocaudata*); the scape with anteriomedian edge rounded; the rounded anterior margin of the pronotal collar; prepectus completely alveolate, and without any trace of a carina setting off the posterior corner; the dorsellum (fig. 86) which is as long medially as laterally, short (width 3.6X length; compared with 2.6X in *E. chilensis* (fig. 85) and 3.0X in *E. luteocaudata*: length 0.62X frenal length; compared with 0.93X in *E. chilensis* and 0.90X in *E. luteocaudata*); spiracular sulcus not extending to anterior 1/2 of propodeum, and bare posteriorly; area around spiracle alveolate, not depressed, and not set off by carinae; nucha without transverse carina anterior to petiolar foramen (fig. 86); the basal 2/3 of costal cell generally setose; and the moderately robust gaster (length 4.2X width; compared with 6.0X in *E. chilensis* and 3.0–3.1X in *E. luteocaudata*).

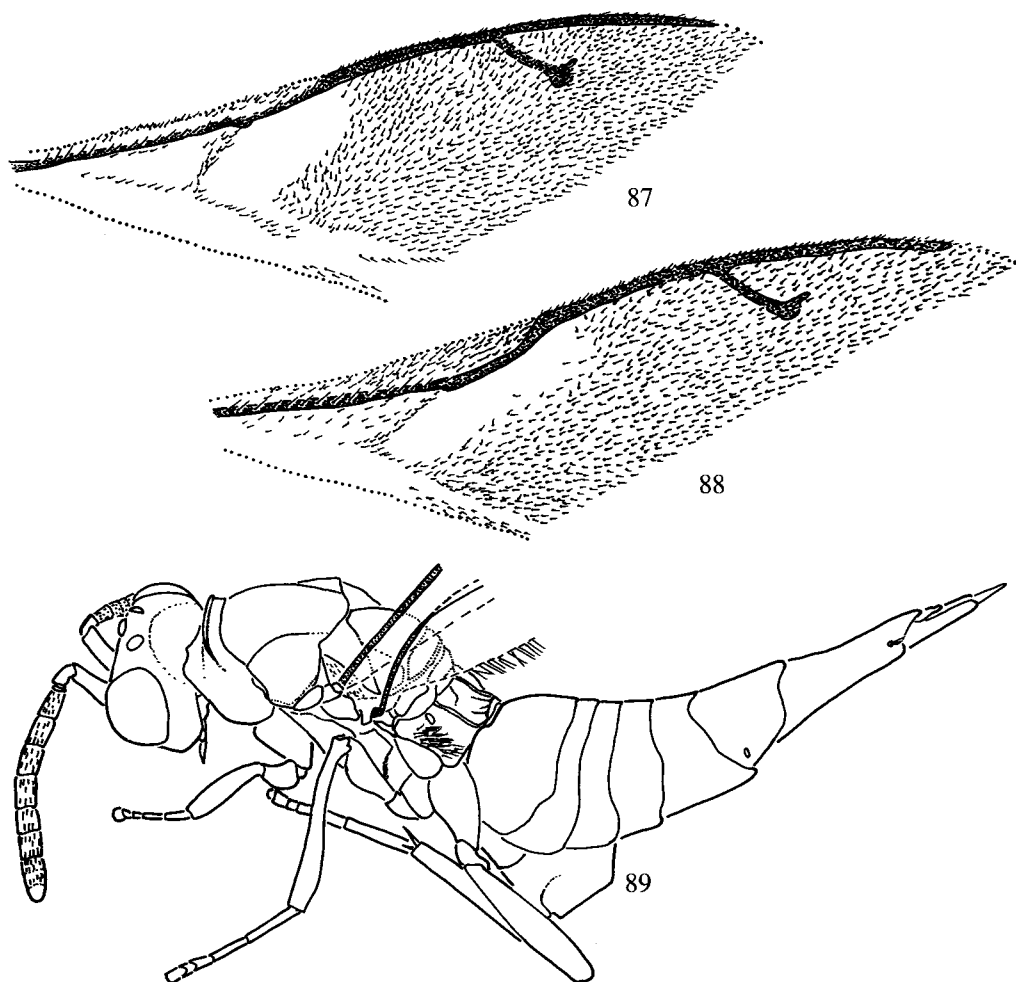
Etymology. The species name of *E. metalliscapa* comes from the Latin words *metallum*, meaning metal, and *scapus*, meaning staff, and refers to the wholly metallic colored scape in this species.

Type Material. The holotype is a female collected at Puente Trongol, Arauco, Chile, on 15–16 October 1969, by Flint & Barria (NMNH).

Biology. Nothing is known of the host(s) of *E. metalliscapa*.



Figures 80–86. *Eutelisca*. 80–82, *E. chilensis* Hedqvist, female. 80, Head, anterior view. 81, Mesosoma, anterioventral view. 82, Gaster, dorsal view. Figure 83, *E. luteocaudata*, female, gaster, dorsal view. 84–85, *E. chilensis*, female. 84, Pronotum and mesoscutum. 85, Dorsellum and propodeum. 86, *E. metalliscapa*, female, dorsellum and propodeum.



Figures 87–89. 87, *Eutelisca chilensis*, female, fore wing. 88, *Eutelisca metalliscapa*, female, fore wing. 89, *Eutelisca luteocaudata*, female, habitus.

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