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EULOPHIDAE OF COSTA RICA (HYMENOPTERA: CHALCIDOIDEA), 4

THE GENUS *CLOSTEROCERUS* WESTWOOD S.STR.

by

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ABSTRACT

The Neotropical species of *Closterocerus* Westwood are revised using morphological data. Sixty-six species are included, of which 60 are described as new, and 45 species are newly recorded from Costa Rica. Four of the previously described species, *C. coffeellae* Ihering, *C. flavicinctus* De Santis, *C. pulcher* (Howard), *C. purpureus* (Howard), were previously recorded from the Neotropical region, while the remaining two, *C. cincinnatus* Girault and *C. cinctipennis* Ashmead, were previously recorded from the Nearctic region but not from the Neotropics. Hosts are known for five of the species, which are all targeting leafmining insects (Coleoptera, Diptera, Lepidoptera). A key for the identification of the Neotropical species is included.

RESUMEN

Las especies neotropicales de *Closterocerus* Westwood se revisan utilizando datos morfológicos. Se incluyen sesenta y seis especies, de las cuales 60 se describen como nuevas, y 45 especies son recién registradas en Costa Rica. Cuatro de las especies descritas anteriormente, *C. coffeellae* Ihering, *C. flavicinctus* De Santis, *C. pulcher* (Howard), *C. purpureus* (Howard) se han registrado previamente en la región neotropical, mientras que los dos restantes, *C. cincinnatus* Girault y *C. cinctipennis* Ashmead, fueron registrados previamente en la región Neártica pero no en el Neotropic. Los huéspedes son conocidos por cinco de las especies, y todos se dirigen a insectos que minan hojas (Coleoptera, Diptera, Lepidoptera). Se incluye una clave para la identificación de las especies neotropicales.

SUMÁRIO

As espécies neotropicais de *Closterocerus* Westwood são revisadas usando dados morfológicos. Sessenta e seis espécies estão incluídas, das quais 60 são descritas como novas, e 45 espécies são recentemente registradas da Costa Rica. Quatro das espécies descritas anteriormente, *C. coffeellae* Ihering, *C. flavicinctus* De Santis, *C. pulcher* (Howard), *C. purpureus* (Howard) são previamente registradas da região neotropical, enquanto os dois restantes, *C. cincinnatus* Girault e *C. cinctipennis* Ashmead, foram previamente registrados da região nearctic, mas não do Neotropic. Os hospedeiros são conhecidos por cinco das espécies, e todos eles têm como alvo insetos de mineração de folhas (Coleoptera, Diptera, Lepidoptera). Uma chave para a identificação da espécie neotropical está incluída.

Key words
new species, Entedoninae, Entedonini, leaf miner parasitoids, morphological data

INTRODUCTION

This is the fourth major contribution to the knowledge of the Eulophidae in the Neotropical region with focus on the Costa Rican fauna. The previous three contributions are in Hansson (2002, 2004, 2009). Other, mainly smaller, contributions to this group in Costa Rica are in Hansson (2005, 2010a&b, 2011a&b, 2012, 2020a, b, c, 2021), Hansson & LaSalle (2003), and Hansson *et al.* (2015, 2021). The majority of these contributions include revisions of genera in the subfamily Entedoninae. *Closterocerus* Westwood, treated here, also belong in this subfamily. The knowledge of *Closterocerus* in Costa Rica and in the remaining parts of the Neotropical region is very poor.

Prior to this contribution no species were recorded from Costa Rica, and only four species from the remainder of the Neotropical region.

The concept of *Closterocerus* Westwood has varied over time depending on whether morphological or molecular data was available. After the original description in 1833 the concept stayed the same for a long time. This includes the interpretation by Bouček (1988), who also introduced *Chrysocharella* Girault as the first synonym. Hansson (1994) expanded the concept of *Closterocerus* by adding *Achrysocharis* Girault and related genera, and included ten new synonyms under *Closterocerus*. Hansson divided *Closterocerus* into two subgenera, *Closterocerus* s.str. and *Achrysocharis*. Gumovsky (2001) expanded the concept even further and added four additional synonyms under *Closterocerus*. Both Hansson's and Gumovsky's hypotheses of concept were based on morphological data.

Four analyses based on DNA data have added valuable information regarding the relationships of Entedoninae genera, including *Closterocerus*. All analyses have come to the same conclusion regarding *Closterocerus* s.str. It is a monophyletic group sister to all analyzed Entedoninae/Entedonini. They also found most genera synonymized under *Closterocerus* to be nested within the large Entedoninae clade, and different from *Closterocerus* s.str. Gauthier *et al*. (2000) included *C. trifasciatus* Westwood and *Closterocerus* sp. in an analysis of data from the 28S D2 rDNA gene. *Closterocerus* came out as sister group to all other Entedoninae taxa analyzed, although no species of the *Achrysocharis* group was included in this analysis. Gumovsky (2002) also used data from 28S D2 gene from the same *Closterocerus* species as Gauthier *et al*. (2000), but included *Asecodes* sp. and *Neochrysocharis formosa* Westwood, both regarded by Gumovsky (2001) as *Closterocerus*. *Asecodes* sp. and *N. formosa* were nested with other Entedoninae genera but were distinctly separated from each other, and the two *Closterocerus* species formed a sister group to all other Entedoninae. Burks *et al*. (2011) included *C. trifasciatus* and *C. tau* Girault in analyses of data from the 28S D2–D5 and CO1 genes. They also included *Closterocerus germanicus* (Erdös), which belongs to subgenus *Achrysocharis* according to the concept of Hansson (1994), and species of *Neochrysocharis* and *Asecodes*. Furthermore, specimens belonging to species in the subfamilies Entiinae and Opheliminae were included. In this analysis *Closterocerus* (*C. trifasciatus, C. tau*) came out as sister group to all Entedoninae, Entiinae and Opheliminae, and *C. germanicus, Asecodes* and *Neochrysocharis* were nested within the Entedoninae (in tribe Entedonini) but were separated from each other. Finally, Rasplus *et al*. (2020) used data from ultra-conserved elements (UCE's) and their flanking regions to resolve relationships among 63 Eulophidae genera, including *Achrysocharis* sp. and *Closterocerus* aff. *flavicinctus* De Santis. Also in this analysis *Closterocerus* was sister group to all other genera in the tribe Entedonini, while species of *Achrysocharis* were nested inside the Entedonini clade.

The exact number of described *Closterocerus* species is difficult to establish without examining some type specimens. Noyes (2019) lists 74 species under the genus, but this number also includes *Achrysocharis* etc. species. However, the author has been through the descriptions of the species listed by Noyes and only about 30 of them appear to belong to *Closterocerus* s.str. With the addition of the four species described by Li & Li (2021), the current number is about 34. This number includes species from all zoogeographical regions. The present contribution with 66 species from the Neotropical region, 60 of which are new, expands the size of *Closterocerus* considerably and also indicates that this region might be a hotspot for the genus – or that it is poorly known from other zoogeographical regions.

This study is based mainly on material from Costa Rica and Mexico, with relatively few specimens from other countries in the Neotropical region. The majority of the South American specimens represent different species from those found in Costa Rica and Mexico. Therefore it is very likely that the knowledge of species diversity of *Closterocerus* in this region is far from complete.

MORPHOLOGICAL TERMS AND ABBREVIATIONS

Morphological terms follow Gibson (1997) except for **mesoscutellum** that is used instead of "scutellum". Abbreviations: **F1–5** = flagellomeres 1–5; **Gt_{1-7}** = gastral tergites 1–7; **OOL** = shortest distance between posterior ocelli and eyes; **POL** = shortest distance between posterior ocelli; **T1–4** = tarsomeres 1–4. For illustrations of the morphological terms see Gibson (1997) and www.neotropicaleulophidae.com. Fore wing measurements are illustrated in Fig. 238.

Abbreviations of protected areas: **E.B.** Estación Biológica; **P.N.** Parque Nacional; **R.B.** Reserva Biológica; **R.P.** Reserva Privada.

The following abbreviations are used for museums from which material has been borrowed and in which types of the new species will be deposited:
CNC = Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada
MZLU = Entomological collections, Biological Museum, Lund University, Lund, Sweden
MZUCR = Museo de Zoología, Universidad de Costa Rica, San José, Costa Rica
NHMUK = Natural History Museum, London, United Kingdom
TAMU = Texas A&M University, College Station, U.S.A.
USNM = United States National Museum of Natural History, Washington, D.C., U.S.A.

MATERIALS AND METHODS

The material from Costa Rica, forming the bulk for this revision, has been obtained through extensive collecting projects. These include mainly Malaise trapping and sweeping, especially screen sweeping, starting in 1985 and continuing through different projects to this day. Noyes (2010) described Malaise trapping, screen sweeping and other collecting techniques that have been used to collect material in Costa Rica. The localities for collecting in Costa Rica have been chosen to cover as many habitats as possible (Map 1). Localities chosen for the early Malaise trapping programme were briefly described by Gauld (2000).

Imaging
The colour images of the specimens were made using Canon camera equipment, including an EOS 5D Mark IV body, a telezoom lens, 70–300mm (but using only 200mm), with a 10× and 5× Mitutoyo microscope lens attached, and with a macro twin lite MT-24 EX used for illumination. The camera was attached to a Cognisys stackshot macrorail system. The picture stacking was done with Helicon Focus version 6, and Adobe Photoshop was used for image processing. The SEM micrographs are from uncoated specimens and were done with a Hitachi SU 3500 microscope in low vacuum.

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Genus *CLOSTEROCERUS* Westwood

Closterocerus Westwood, 1833:419. Type species: *C. trifasciatus* Westwood, by monotypy.
Chrysocharella Girault, 1913:169. Type species *C. pulchra* Girault, by original designation. Synonymized by Bouček (1988:724).

Diagnosis. Antenna with pedicel ±flattened with a dorsal and a ventral longitudinal carina or edge (Fig. 6), scape and flagellum frequently, but not always, flattened (Figs 7, 9); antennal spicule long (Fig. 7); sensilla on flagellomeres slightly drawn out and asymmetric (Fig. 11); male scape with sense area restricted to apical part (Fig. 9); occiput usually with a median fold or groove (og), present at least close to occipital margin, sometimes reaching up on posterior vertex (Figs 8, 101); frons with subtorular sutures, these either white and easy to see (Fig. 87), or dark (Figs 19, 204); midlobe of mesoscutum with one to several pairs of setae (Figs 10, 13); fore wing usually with a stigmal hairline (sl) and with radial cell (rc) bare (Fig. 238), with infuscate patterns of varying shape; transepimeral sulcus (tps) strongly curved (Fig. 12).

Comments. The setae on the midlobe of the mesoscutum come in two shapes: either long and strong, and then with one or two pairs (Fig. 13), or short and weak, and then usually with at least three pairs (Fig. 10). The strong setae rarely break off, but if they do then the sockets are clearly visible. The weak setae frequently break off and since their sockets are small they are difficult to see with a stereomicroscope. Several of the species described below appear to be without setae on the midlobe of the mesoscutum, but it cannot be excluded that the setae have broken off (only SEM images can establish this). Due to these difficulties the number of weak setae is not used for identification purposes.

Biology - host associations. *Closterocerus*-species are koinobiont (i.e. a parasitoid whose host continues to feed and grow after parasitization) endoparasitoids in eggs or larvae of various phytophagous insects, mainly leafminers and gallmakers (see list in Hansson (1994)). All records from the Neotropical region (Table 1) are from leafminers, mainly in various Lepidoptera groups (Gelechiidae, Gracillariidae, Lyonetiidae, Tischeriidae), but also in Coleoptera (Buprestidae, Curculionidae) and Diptera (Agromyzidae).

Distribution. Species of *Closterocerus* s.str. have been found in all major geographic regions: Africa (Waterston 1925), Asia (e.g. Waterston 1915, Li & Li 2021), Australia (Bouček 1988), Europe (e.g. Westwood 1833), North America (e.g. Hansson 1994), South America (e.g. Ihering 1914, De Santis 1983).

KEY TO THE NEOTROPICAL SPECIES OF *CLOSTEROCERUS* S.STR.

1. Fore wing with apical one-third with median one-third infuscate and with an infuscate spot just below stigmal vein and one infuscate spot further down below level of stigmal vein (Figs 210), to predominantly infuscate with dorso-apical and ventro-apical one-third and basal one-third hyaline (Figs 3, 88, 89); midlobe of mesoscutum with one pair of strong setae attached in posterior one-half (Figs 88, 89); head triangular in lateral view (Fig. 89); frontofacial suture straight (Fig. 90)..... .....*C. deltoides* **sp.nov.** (♀, ♂) (p. 45)
- Fore wing with different pattern, setae on midlobe of mesoscutum, head shape and frontofacial suture variable 2

2 (1) Fore wing with three distinct spots and a long marginal fringe, length of longest seta in marginal fringe/fore wing width = 0.43 (Figs 5, 171, 206); scape flattened with ±parallel dorsal and ventral margins (Figs 172, 173, 228); mesoscutum and mesoscutellum smooth and shiny without sculpture (Fig. 171); midlobe of mesoscutum with two pairs of strong setae, anterior pair shorter than posterior pair (Fig. 78).... .....*C. trimaculatus* **sp.nov.** (♀, ♂) (p. 78)
- Fore wing pattern different, other characters variable 3

3 (2) Pronotal collar with a carina along anterior margin, at least medially (e.g. Fig. 10).....4
- Pronotal collar without a carina, but sometimes with a blunt edge along anterior margin (e.g. Fig. 20) 31

4 (3) Frontofacial suture straight (Fig. 236); midlobe of mesoscutum with one pair of strong setae (Figs 152, 153) .....*C. scitulus* **sp.nov.** (♀) (p. 71)
- Frontofacial suture V-shaped (as in Fig. 157); setation on midlobe of mesoscutum variable 5

5 (4) Fore wing with speculum absent, this part completely covered with setae (Fig. 154)..... .....*C. setosus* **sp.nov.** (♀) (p. 73)
- Fore wing with speculum present, sometimes quite small (as in Fig. 152).....6

6 (5) Pronotal collar long and smooth (Fig. 52); temples and occiput strongly hairy (Fig. 52) .....*C. barbatus* **sp.nov.** (♀) (p. 29)
- Pronotal collar short and with sculpture (as in Fig. 8).....7

7 (6) Fore wing speculum open below (as in Fig. 108).....8
- Fore wing speculum closed below (as in Fig. 16) 13

8 (7) Notauli as strong parallel grooves in posterior two-thirds (Fig. 14); mesoscutum and mesoscutellum smooth and shiny (Fig. 14).....*C. aglaia* **sp.nov.** (♀) (p. 14)
- Either notauli missing in posterior part, *or* ±curved and not parallel, *or* mesoscutum and mesoscutellum with reticulation.....9

9 (8) Propodeal callus with 8 setae..... *C. hirsutus* **sp.nov.** (♀) (p. 54)
- Propodeal callus with 2–4 setae.....10

10 (9) Hind tarsus with T4 white to infuscate (Figs 115, 142) 11
- Hind tarsus with T4 dark brown to black (Figs 42, 163) 12

11 (10) Mesoscutum with very weak reticulation (Fig. 141) .... *C. platycerus* **sp.nov.** (♀, ♂) (p. 68)
- Mesoscutum with strong reticulation (Fig. 112) ..... *C. iomus* **sp.nov.** (♀, ♂) (p. 56)

12 (10) Mesoscutum and mesoscutellum metallic blue with a wide black non-metallic median stripe (Fig. 40); hind tarsus with T1 white, T4 long, 2.6× as long as width at apex (Fig. 42) ..... *C. atrifasciatus* **sp.nov.** (♀) (p. 24)
- Mesoscutum and mesoscutellum metallic without median black non-metallic stripe (Fig. 156); hind tarsus with T1 dark brown, T4 2.0× as long as width at apex (Fig. 163) ..... *C. arenalensis* **sp.nov.** (♀) (p. 23)

13 (7) Midlobe of mesoscutum with two pairs of long and strong setae (as in Fig. 13) 14
- Midlobe of mesoscutum with shorter and weaker setae, numbers variable, *or* setae absent 18

14 (13) Fore wing with apical margin infuscate (e.g. Fig. 123) 15
- Fore wing with apical margin hyaline (Figs 60, 192) 17

15 (14) Fore wing predominantly hyaline with only a narrow infuscate band below stigmal vein and with apical margin infuscate (Fig. 16) ..... *C. alas* **sp.nov.** (♀, ♂) (p. 15)
- Fore wing predominantly infuscate (Figs 123, 200) 16

16 (15) Mesoscutellum golden-green (Fig. 200); midlobe of mesoscutum with two pairs of setae (Fig. 200); hind tarsus with T1&T4 dark brown, T2&T3 white (Fig. 201) .... *C. amethystinus* **sp.nov.** (♀) (p. 20)
- Mesoscutellum predominantly black (Fig. 123); midlobe of mesoscutum with three pairs of setae (Fig. 123); hind tarsus with T1 infuscate and T2–4 white (Fig. 122) .... *C. masneri* **sp.nov.** (♀) (p. 60)

17 (14) Frons with upper margin as a blunt edge (Fig. 194); mesoscutellum with raised reticulation (Fig. 192); stigmal vein 2.0× as long as wide (Fig. 192) .... *C. zurquiensis* **sp.nov.** (♀) (p. 85)
- Frons with upper margin indistinct; mesoscutellum with engraved reticulation (Fig. 59); stigmal vein 3.7× as long as wide (Fig. 59) ..... *C. caelatus* **sp.nov.** (♀) (p. 33)

18 (13) Hind tarsus with T4 yellowish-white to white (e.g. Fig. 165) 19
- Hind tarsus with T4 pale brown to black (e.g. Fig. 138) 23

19 (18) Vertex relatively long and flat, 0.9× as long as wide (Fig. 166) .... *C. tapantibius* **sp.nov.** (♀) (p. 76)
- Vertex relatively short, 0.6× as long as wide, and convex (Figs 75, 123) 20

20 (19) Fore wing with three infuscate bands, one along apical margin of wing, one below stigmal vein and one below middle of marginal vein (Fig. 238) ..... *C. trifasciatus* Westwood (♀, ♂) (a Holarctic species this far not found in the Neotropical region, type species for *Closterocerus*)

- Fore wing infuscate with basal and subapical hyaline bands (Fig.) 21

21 (20) Fore wing appearing ±triangular with apical margin more or less straight (Fig. 76) ....*C. complanatus* **sp.nov.** (♀) (p. 39)
- Fore wing not triangular in shape, with apical margin distinctly rounded (Figs 123, 143).....22

22 (21) Mesoscutellum convex with very strong reticulation (Fig. 123); midlobe of mesoscutum 1.70× as long as width at base (Fig. 123)..... *C. masneri* **sp.nov.** (♀) (p. 60)
- Mesoscutellum flatter with relatively weak reticulation (Figs 143, 144); midlobe of mesoscutum 1.06× as long as width at base (Fig. 143) ....*C. porphyriops* **sp.nov.** (♀) (p. 69)

23 (18) Hind tarsus with T1–3 white (e.g. Fig. 138).....24
- Hind tarsus with T1 infuscate to dark brown, contrasting against white T2–3 (e.g. Fig. 57).....26

24 (23) Fore wing with subapical hyaline band broken (Fig. 137); scape with one-third of its length reaching above level of vertex (Fig. 138)..... ..... *C. petiolatus* **sp.nov.** (♀, ♂) (p. 66)
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25 (24) Mesoscutum and mesoscutellum metallic bluish-purple (Fig. 187)..... .....*C. whartoni* **sp.nov.** (♀) (p. 83)
- Mesoscutum with midlobe golden-red, sidelobes metallic purple, mesoscutellum predominantly golden-red (Fig. 43) ..... *C. aureolus* **sp.nov.** (♀, ♂) (p. 25)

26 (23) Fore wing infuscate with a hyaline unbroken band close to apical margin of wing and a hyaline spot below base of marginal vein (e.g. Fig. 70).....27
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27 (26) Female gaster elongate, 1.9× as long as wide, with apex pointed (Fig. 83)..... .....*C. cuspidis* **sp.nov.** (♀) (p. 43)
- Female gaster ±circular, 1.1–1.2× as long as wide, with apex rounded (Figs 53, 70)..... 28

28 (27) Hind tibia stout, not more than 4.5× as long as wide, hind tarsus with T2–3 short so that T4 equals T1–3 in length (Fig. 57).....*C. brevipes* **sp.nov.** (♀, ♂) (p. 30)
- Hind tibia more slender, at least 5.5× as long as wide, hind tarsus with T2–3 longer and T4 0.6× as long as T1–3 (Fig. 74) .....*C. coffeellae* Ihering (♀, ♂) (p. 37)

29 (26) Hind tarsus with T1 infuscate; fore wing with area below marginal vein hyaline (Fig. 69)..... *C. clarus* **sp.nov.** (♀) (p. 36)
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33 (32) Antenna with F2–5 not flattened, F1 enlarged and slightly flattened (Fig. 105); legs white (Fig. 105); mesoscutum and mesoscutellum smooth and shiny with very weak traces of reticulation on lateral parts (Fig. 104).....*C. fulgens* **sp.nov.** (♀) (p. 52)
- Antenna distinctly flattened (e.g. Fig. 159); colour of legs variable but *usually* predominantly dark brown; mesoscutum and mesoscutellum *usually* with strong reticulation (weak in *C. verticillus*) 34

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- Fore wing speculum closed (as in Fig. 158); reticulation on mesoscutum and mesoscutellum variable but usually strong 35

35 (34) Stigmal vein elongate, 3.3× as long as maximum width (Figs 20, 158).....36
- Stigmal vein 2.0-2.5× as long as maximum width 37

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- Female scape widest at apex (Fig. 159).....*C. stigmalis* **sp.nov.** (♀) (p. 73)

37 (35) Mesoscutum and mesoscutellum with very weak reticulation (Fig. 185); flagellomeres with setae confined to a basal whorl (Figs 185, 186) .... *C. verticillus* **sp.nov.** (♀) (p. 82)
- At least mesoscutum with strong reticulation; flagellomeres with at least some setae attached apical to base (Figs 26, 190) 38

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39 (32) Antenna with F4-5 ±cylindrical, narrow and paler than F1–3 (Fig. 94)..... .....*C. eulampis* **sp.nov.** (♀, ♂) (p. 47)
- Antenna with F4-5 flattened and as dark as F1–3 (e.g. Fig. 19).....40

40 (39) Dark brown non-metallic species (Figs 147–151); flagellomeres with very long setae in both sexes, at least 2× as long as flagellomere they are attached to (Figs 148, 150)..... *C. pumilus* **sp.nov.** (♀, ♂) (p. 70)

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\- Mesoscutellum with weak reticulation (Figs 116, 130, 195); fore wing infuscation variable 42

42 (41) Mesoscutellum golden-red with very weak reticulation (Fig. 195); gaster elongate (Fig. 195), 3.1× as long as wide.....*C. byrrus* **sp.nov.** (♀) (p. 32)

\- Mesoscutellum golden-green (Fig. 130) or metallic purple (Fig. 116) with weak reticulation; gaster 1.5–2.2× as long as wide 43

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\- Fore wing with median part and apical margin infuscate (Fig. 131); female scape 3× as long as wide (Fig. 131).....*C. noyesi* **sp.nov.** (♀, ♂) (p. 64)

44 (31) Fore wing predominantly infuscate with a hyaline band close to apical margin (e.g. Fig. 76).....45

\- Fore wing more extensively hyaline, *or* predominantly infuscate but without subapical hyaline band 48

45 (44) Hind tarsus with T4 white (Fig. 76); fore wing ±triangular in shape (Fig. 76); mesoscutum and mesoscutellum with strong reticulation (Fig. 75)..... .....*C. complanatus* **sp.nov.** (♀) (p. 39)

\- Hind tarsus with T4 pale brown to dark brown (e.g. Fig. 107); fore wing more rounded in shape (e.g. Fig. 106); reticulation on mesoscutum and mesoscutellum variable. 46

46 (45) Mesoscutum and mesoscutellum dark brown to black with metallic tinges (Figs 22, 23) .....*C. amaurus* **sp.nov.** (♀) (p. 19)

\- Mesoscutum and mesoscutellum distinctly metallic (purple and blue) (Figs 106, 187) 47

47 (46) Fore wing with area below marginal vein bare and with speculum relatively large (Fig. 106)..... *C. hansoni* **sp.nov.** (♀) (p. 53)

\- Fore wing with area below marginal vein hairy and with speculum small (Fig. 188)..... .....*C. whartoni* **sp.nov.** (♀) (p. 83)

48 (44) Antenna with F1–4 dark brown and F5 white to pale brown, F5 narrow (Figs 133, 198) 49

\- Antennal flagellum with different combination of pale and dark flagellomeres, *or* completely dark, *or* completely pale; F5 flattened or narrow 51

49 (48) Female flagellomeres with few, long and relatively erect setae attached at base (Fig. 133)..... *C. oligothrix* **sp.nov.** (♀) (p. 65)
- Female flagellomeres with more, and/or shorter less erect setae (Figs 37, 198) 50

50 (49) Legs predominantly white, hind coxa brown at base (Fig. 198)..... ..... *C. albicrus* **sp.nov.** (♀) (p. 16)
- Legs predominantly dark brown (Fig. 37) .....*C. apiculus* **sp.nov.** (♀, ♂) (p. 22)

51 (48) Antennal flagellum distinctly flattened with scape *usually* triangular and widest at apex (as in Figs 6, 7) 52
- Antennal flagellomeres subcylindrical, *or* cylindrical and then narrow throughout, scape variable but *usually* not widest at apex 57

52 (51) Hind tarsus with T4 dark brown (Figs 124, 176).....53
- Hind tarsus with T4 white to infuscate 54

53 (52) Midlobe of mesoscutum and median mesoscutellum black with golden-purple tinges (Fig. 125); fore wing with rounded apex (Fig. 124)..... ..... *C. melanogrammus* **sp.nov.** (♀) (p. 61)
- Mesoscutum and mesoscutellum metallic bluish-purple (Fig. 175); fore wing shape ±triangular (Fig. 175) ..... *C. triquetrus* **sp.nov.** (♀, ♂) (p. 79)

54 (52) Fore wing with an infuscate spot below marginal vein (Figs 61, 67).....55
- Fore wing without infuscate spot below marginal vein (Figs 25, 128) 56

55 (54) Antenna with F5 flattened and wide (Figs 62, 64); mesoscutum and mesoscutellum with very weak reticulation (Figs 61, 63)..... *C. cincinnatus* Girault (♀, ♂) (p. 34)
- Antenna with F5 cylindrical and narrow (Fig. 67); mesoscutum and mesoscutellum with stronger reticulation than in alternate (Fig. 67)..... ..... *C. cinctipennis* Ashmead (♀) (p. 35)

56 (54) Midlobe of mesoscutum and mesoscutellum concolourous (Fig. 128); mesoscutellum with strong reticulation (Fig. 128); apical margin of fore wing hyaline (Figs 128, 129)..... *C. mirandus* **sp.nov.** (♀, ♂) (p. 62)
- Midlobe of mesoscutum and mesoscutellum contrasting in colour (Figs 25, 27); mesoscutellum with weak reticulation (Figs 25, 27); apical margin of fore wing infuscate (Fig. 25)..... *C. altamiraensis* **sp.nov.** (♀, ♂) (p. 18)

57 (51) Dark brown non-metallic species (Figs 147–151); flagellomeres with very long setae in both sexes at least 2× as long as flagellomere they are attached to (Figs 148, 150) ..... *C. pumilus* **sp.nov.** (♀, ♂) (p. 70)
- Predominantly metallic species; flagellomeres with shorter setae, at most 1.5× as long as flagellomere they are attached to.....58

58 (57) Fore wing speculum open below and towards base of wing (Figs 2, 111, 184) 59
- Fore wing speculum closed (e.g. Fig. 49).....61

59 (58) Fore wing narrow with long marginal fringe, length of longest seta in marginal fringe/fore wing width = 0.6; antenna and legs predominantly to completely yellowish-white (Figs 2, 30); male gaster dark with a pale spot in anterior part (Fig. 32) ..... *C. angustipennis* **sp.nov.** (♀, ♂) (p. 21)

\- Fore wing wider with shorter marginal fringe, length of longest seta in marginal fringe/fore wing width = 0.1–0.2; antenna and legs predominantly dark (Figs 111, 182, 183); male gaster completely dark 60

60 (59) Vertex with very weak reticulation, partly smooth (Fig. 184) ..... *C. variotinctus* **sp.nov.** (♀, ♂) (p. 81)

\- Vertex with strong reticulation (Fig. 110) ..... *C. huggerti* **sp.nov.** (♀) (p. 55)

61 (58) Setae on vertex long and strong (Figs 136, 232), ca 3× as long as maximum width of lateral ocelli; mesoscutum and mesoscutellum with very weak and superficial reticulation, shiny (Fig. 127) ..... *C. nitidulus* **sp.nov.** (♀, ♂) (p. 63)

\- Setae on vertex short, at most 2× as long as maximum width of lateral ocelli; reticulation on thoracic dorsum variable, but at least mesoscutum usually with relatively strong reticulation 62

62 (61) Notauli as deep and distinct grooves almost throughout (Fig. 160); mesoscutum and mesoscutellum with very strong reticulation (Fig. 160) ..... *C. sulcatus* **sp.nov.** (♀) (p. 75)

\- Notauli as shallow grooves; reticulation on mesoscutum and mesoscutellum variable 63

63 (62) Antenna with F2–5 (occasionally F1–5) white to yellow (Figs 51, 78, 179), orange-brown or pale brown (Fig. 103) 64

\- Antenna with F1–3 dark brown, F4–5 variable in colour 69

64 (63) Females (gaster semicircular to ovate with ovipositor visible in ventral view) 65

\- Males (gaster narrow at base and becoming progressively wider towards apex, without ovipositor) 67

65 (64) Coxae white (Fig. 78) ..... *C. concinnus* **sp.nov.** (♀) (p. 40)

\- Coxae dark brown (Figs 50, 179) 66

66 (65) Mesoscutellum with strong and dense reticulation (Fig. 178) ..... *C. tumidus* **sp.nov.** (♀) (p. 80)

\- Mesoscutellum with weak reticulation (Fig. 49) ..... *C. azofeifai* **sp.nov.** (♀) (p. 27)

67 (64) Scape strongly inflated (Fig. 181), ca 2× as long as wide ..... *C. tumidus* **sp.nov.** (♂) (p. 80)

\- Scape long and narrow, 3.7–3.8× as long as wide (Figs 51, 103) 68

68 (67) Midlobe of mesoscutum metallic blue or golden-green and mesoscutellum golden-red or golden (as in Fig. 49) ..... *C. azofeifai* **sp.nov.** (♂) (p. 27)

\- Midlobe of mesoscutum and mesoscutellum concolourous (Fig. 102) ..... *C. flavicinctus* De Santis (♂) (p. 49)

69 (63) Fore wing narrow, 2.3× as long as wide with a long marginal fringe, longest seta in fringe 0.5× as long as maximum width of fore wing (Fig. 81); legs white except dark brown hind coxa; antennal flagellum dark brown (Figs 81, 82)..... ..... *C. crinitus* **sp.nov.** (♀) (p. 42)

\- Not with this combination of characters: fore wing usually less narrow with shorter marginal fringe; legs usually darker; antennal flagellum variable but frequently with at least one flagellomere pale 70

70 (69) Antenna with F4 paler than remaining flagellomeres (Fig. 100)..... ..... *C. flavicinctus* De Santis (♀) (p. 49)

\- Antenna completely dark, or with F4–5 paler than F1–3 71

71 (69) Flagellomeres 4–5 paler than F1–3 (Figs 50, 96, 118, 146) 72

\- Antennal flagellum uniformly dark brown (Figs 67, 80, 87)..... 75

72 (71) Mesoscutellum with strong reticulation (Figs 117, 145) 73

\- Mesoscutellum with weak reticulation (Figs 49, 95)..... 74

73 (72) Antennal scape distinctly two-coloured: dark brown with dorsal margin white, border between the two areas distinct (Figs 118, 120), ca 4× as long as wide in female – widest at apex; mesoscutum metallic blue to purple (Figs 117, 119)..... ..... *C. lineatus* **sp.nov.** (♀, ♂) (p. 58)

\- Antennal scape completely dark brown, and ca 3× as long as wide in female – widest in the middle (Fig. 146); mesoscutum with sidelobes metallic bluish-purple and midlobe golden-green (Fig. 145)..... *C. pulcher* (Howard) (♀) (p. 70)

74 (72) Midlobe of mesoscutum and mesoscutellum with same colour (frequently golden-red), different from sidelobes of mesoscutum (usually metallic purple to blue) (Fig. 95); pair of setae on mesoscutellum weak and short (Fig. 95) .... *C. flammeus* **sp.nov.** (♀, ♂) (p. 48)

\- Mesoscutum and mesoscutellum with different colours (Fig. 49); pair of setae on mesoscutellum relatively strong and long (Fig. 49) .... *C. azofeifai* **sp.nov.** (♀, ♂) (p. 27)

75 (71) Female antennal flagellum thick and subcylindrical (i.e. not flattened) (Figs 79, 80)..... ..... *C. crassicornis* **sp.nov.** (♀) (p. 41)

\- Female antennal flagellum with F1–3 strongly flattened, F4–5 narrow (Figs 67, 68), or ±subcylindrical throughout (Fig. 87)..... 76

76 (75) Female antennal flagellum with F1–3 flattened and wider than F4–5, F4–5 narrow and cylindrical (Figs 67, 68) ..... *C. cinctipennis* Ashmead (♀) (p. 35)

\- Female flagellomeres ±subcylindrical throughout (Fig. 87)..... ..... *C. cymatilis* **sp.nov.** (♀, ♂) (p. 44)

SPECIES TREATMENTS

Closterocerus aglaia sp.nov.
(Figs 14, 15)

Diagnosis. Antenna (Fig. 15) with scape and pedicel distinctly flattened, F1–3 weakly flattened, F4–5 not flattened, antenna dark brown with F5 white; occipital margin with a rounded edge; pronotal collar with a carina along anterior margin (Fig. 14); mesoscutum (Fig. 14) smooth and shiny, with weak traces of reticulation on sidelobes and on anterior part of midlobe, notauli distinct throughout, as deep parallel grooves in posterior two-thirds, midlobe with one pair of long and strong setae; mesoscutellum smooth and shiny (Fig. 14); propodeum with two complete and parallel median carinae (Fig. 14); fore wing hyaline with median one-third infuscate, speculum open below and towards base of wing (Figs 14, 15); length of body female 1.7–1.8mm.

Female holotype: length of body 1.7mm.

Antenna dark brown with F5 white. Frons golden-green. Vertex metallic purple in front of anterior ocellus, metallic blue in posterior part. Mesoscutum with midlobe golden-purple with anterior one-third metallic purple, sidelobes metallic purple; mesoscutellum golden-purple, with lateral and posterior margins metallic bluish-purple; dorsellum golden-green; propodeum black with metallic tinges. Coxae and femora dark brown, hind femur with apex white; fore and mid tibiae white, hind tibia white with basal one-half dark brown; tarsi white. Fore wing hyaline with median one-third infuscate, hind wing hyaline. Petiole black with metallic tinges. Gaster with Gt_1 dark brown with metallic purple tinges, remaining tergites dark brown.

Antenna with scape and pedicel distinctly flattened, F1–3 weakly flattened, F4–5 not flattened. Frons with strong reticulation. Vertex with very weak reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin with an edge.

Pronotal collar with a carina along anterior margin. Mesoscutum smooth and shiny, with weak traces of reticulation on sidelobes and on anterior part of midlobe; notauli distinct throughout, as deep parallel grooves in posterior two-thirds; midlobe with one pair of long and strong setae. Mesoscutellum convex, smooth and shiny. Dorsellum convex, smooth and shiny. Propodeum smooth and shiny, with two complete and parallel median carinae; callus with two setae. Fore wing speculum open below and towards base of wing; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; Gt_{1-2} smooth, Gt_{3-7} with weak reticulation.

Relative measurements: head length dorsal 20; head length frontal 25; head width 40; POL 6.5; OOL 4; lateral ocellus maximum width 3; eye length 21; malar space 5; mouth width 9.5; mesosoma length 50; mesosoma width 34; mesoscutellum length 20; mesoscutellum width 20.5; fore wing length 80; fore wing width 49; marginal vein length 40; postmarginal vein length 3; stigmal vein length 7; fore wing marginal fringe length 6; gaster length 56; gaster width 43.

Variation in paratype material. Length of body: 1.8mm. The paratype is similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Ecuador.

Material examined.

Type material. Holotype ♀ "ECUADOR: Napo, 5km N of El Chaco, 2000m, 11.ii.1983, Masner & Sharkey" (CNC). Paratype 1♀ with same label data as holotype (CNC).

Etymology. From the Greek *aglaia* = splendour, beauty.

Comments. The holotype lacks F3–5 in the left antenna, and the paratype lacks F1–5 in the right antenna.

Closterocerus alas sp.nov.

(Figs 13, 16–19)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 19); frontofacial suture weakly V-shaped, almost straight (Fig. 19); pronotal collar with an indistinct carina along anterior margin (Fig. 16); midlobe of mesoscutum with two pairs of strong setae (Fig. 13); fore wing hyaline with an infuscate band below marginal vein and one along apical margin (Figs 16, 18); length of body female 1.5mm, male 1.2mm.

Female holotype: length of body 1.5mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-green. Mesoscutum and mesoscutellum metallic bluish-purple. Dorsellum and propodeum metallic purple. Coxae dark brown; fore femur whitish, mid femur infuscate, hind femur dark brown; fore and mid tibiae whitish, hind tibia dark brown; fore and mid tarsi whitish, hind tarsus infuscate. Fore wing hyaline with an infuscate band below marginal vein and one along apical margin, hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic purple and golden tinges.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture weakly V-shaped, almost straight. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with an indistinct carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-third; midlobe with two pairs of long setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing with speculum closed; without a stigmal hairline but with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate-elongate; tergites smooth.

Relative measurements: head length dorsal 17.5; head length frontal 22; head width 34.5; POL 7.5; OOL 2.5; lateral ocellus maximum width 2.5; eye length 16.5; malar space 6; mouth width 10.5; mesosoma length 47; mesosoma width 29.5; mesoscutellum length 16; mesoscutellum width 17; fore wing length 75; fore wing width 46; marginal vein length 41; postmarginal vein length 5; stigmal vein length 6; fore wing marginal fringe length 4; gaster length 50; gaster width 27.

Variation in paratype material. Length of body: 1.5–2.0mm. Vertex metallic bluish-green or bluish-purple. Mid femur infuscate to pale brown.

Male (Figs 17, 18). Length of body: 1.2mm. Vertex and mesoscutum golden-green (Fig. 17); mesoscutellum golden with lateral and posterior margins golden-green (Fig. 17). Otherwise similar to female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, 6km ENE Vara Blanca, 10˚11'N, 84˚07'W, 2000m, 21.iv.2002, 20/M/12/092, INBio, OET, ALAS" (NHMUK). Paratypes (1♀ 1♂): from same locality as holotype but collected iv.2002 (♂, NHMUK), iii.2002 (♀, MZLU).

Etymology. Named after the project to collect insects and other arthropods at, and in the vicinity of, the field station La Selva (ALAS = Arthropods of La Selva); noun in apposition.

***Closterocerus albicrus* sp.nov.**
(Figs 197, 198)

Diagnosis. Antenna dark brown with F5 pale brown, scape widest at apex, F1–3 flattened, F4 moderately flattened, F5 not flattened and long and narrow (Figs 197, 198); pronotal collar without a carina along anterior margin (Fig. 197); midlobe of mesoscutum with one pair of ±strong setae (Fig. 197); fore wing weakly infuscate (Fig. 198); legs predominantly white with hind coxa dark brown at base (Fig. 198); length of body female 0.9–1.1mm.

Female holotype: length of body 0.9mm.

Antenna dark brown with F5 pale brown. Frons below frontofacial suture golden-green, above suture metallic purple. Vertex metallic bluish-green. Mesoscutum golden-green; mesoscutellum golden-green with median part golden-red; dorsellum and propodeum golden-green. Legs white with fore tarsus infuscate and hind coxa dark brown in basal one-half. Fore wing weakly infuscate; hind wing hyaline. Petiole dark brown with metallic tinges. Gaster metallic bluish-green with median part golden-red.

Antenna predominantly flattened, except F5 which is narrow, scape widest just below apex. Frons with strong reticulation. Vertex with very weak reticulation, partly smooth. Frontofacial suture ±straight. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with weak reticulation on midlobe, strong reticulation on sidelobes; notauli distinct in anterior one-third; midlobe with one pair of ±strong setae. Mesoscutellum with very weak reticulation. Dorsellum convex and smooth. Propodeum smooth and shiny; propodeal callus with two setae. Fore wing speculum closed, with a stigmal hairline and with radial cell bare.

Petiole transverse and smooth. Gaster ovate; Gt_{1-3} smooth medially and with strong reticulation laterally, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 11; head length frontal 15; head width 23; POL 4.5; OOL 2.5; lateral ocellus maximum width 2; eye length 12; malar space 2.5; mouth width 5.5; mesosoma length 27; mesosoma width 18; mesoscutellum length 10; mesoscutellum width 10.5; fore wing length 48.5; fore wing width 23; marginal vein length 22.5; postmarginal vein length 2.5; stigmal vein length 4; fore wing marginal fringe length 7; gaster length 33; gaster width 17.

Variation in paratype material. Length of body: 1.1mm. The paratype is similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, Estación Altamira, Send. Los Gigantes, 1450m, 9º02'N, 83º00'W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos" (MZLU). Paratype 1♀ with same label data as holotype (MZLU).

Etymology. From the Latin *albus* = white and *crus* = leg.

***Closterocerus alpestris* sp.nov.**

(Figs 20, 21, 205)

Diagnosis. Antenna flattened, scape widest just below apex (Fig. 21); pronotal collar without a carina along anterior margin (Fig. 20); midlobe of mesoscutum with one pair of strong setae (Figs 20, 21); fore wing hyaline with an infuscate band below stigmal vein, reaching to hind margin (but there almost hyaline), stigmal vein elongate (Figs 20, 21, 205); length of body female 1.8mm.

Female holotype: length of body 1.8mm.

Antenna dark brown. Frons golden. Vertex metallic bluish-green. Mesoscutum and mesoscutellum metallic bluish-green. Dorsellum metallic bluish-purple. Propodeum metallic purple. Coxae, femora and tibiae dark brown; fore tarsus dark brown, mid and hind tarsi with T1–3 pale brown, T4 dark brown. Fore wing hyaline with an infuscate band below stigmal vein, reaching to hind margin (but there almost hyaline), hind wing hyaline. Petiole dark brown. Gaster metallic bluish-green.

Head (collapsed and frons difficult to see): Antenna flattened, scape widest just below apex. Frons and vertex with rather strong reticulation; frontofacial suture difficult to see but possibly straight. Subtorular sutures present but difficult to see because they are dark. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli indistinct; midlobe with one pair of strong setae. Dorsellum weakly convex, with weak reticulation. Propodeum without median carina, with weak reticulation; callus with two setae. Fore wing with speculum closed; without stigmal hairline but with radial cell bare; stigmal vein elongate.

Petiole very short, just a narrow band. Gaster elongate.

Relative measurements: head length dorsal 13.5; head length frontal 19; head width 33; POL 7; OOL 4; lateral ocellus maximum width 2.5; eye length 13.5; malar space 5; mouth width 10; mesosoma length 39; mesosoma width 29; mesoscutellum length 18; mesoscutellum width 17.5; fore wing length 71; fore wing width 46; marginal vein length 40; postmarginal vein length 2.5; stigmal vein length 9.5; fore wing marginal fringe length 3.5; gaster length 52; gaster width 26.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, Volcan Irazú, 3100m, 11.i.1991, J.S. Noyes" (NHMUK).

Etymology. From the Latin *alpestris* = of high mountains, referring to high altitude of type locality.

Closterocerus altamiraensis sp.nov.
(Figs 25–29)

Diagnosis. Antenna flattened with long and erect setae, scape widest at apex (Fig. 26); frons with upper border distinct; vertex ±flat (Fig. 29); pronotal collar without a carina along anterior margin (Figs 25, 27); mesoscutum and mesoscutellum with different colours (Figs 25, 27); midlobe of mesoscutum with one pair of setae, attached in posterior part (Figs 25, 27); notauli strongly curved (Figs 25, 27); fore wing hyaline with areas along apical margin, below stigmal vein and below base of marginal vein infuscate (Figs 25–28); hind tarsus white (Figs 26, 28); length of body female 0.9–1.1mm, male 0.8–1.0mm.

Female holotype: length of body 1.0mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple in anterior one-half and metallic bluish-purple in posterior one-half. Mesoscutum with sidelobes metallic purple and midlobe metallic bluish-purple. Mesoscutellum black with golden tinges and with lateral and posterior margins metallic bluish-purple. Dorsellum metallic purple. Propodeum dark brown with metallic tinges. Legs with coxae, femora and hind tibia dark brown, fore and mid tibiae white; tarsi white. Fore wing hyaline with areas along apical margin, below stigmal vein and below base of marginal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster with Gt_{1-2} metallic purple, Gt_6 metallic blue, remaining tergites dark brown with metallic purple tinges.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped; frons with upper border distinct. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli strongly curved and ±complete; midlobe with one pair of weak setae in posterior part. Mesoscutellum with weak reticulation. Dorsellum convex and ±smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a transverse strip. Gaster ovate; Gt_{1-2} smooth, remaining tergite with weak reticulation.

Relative measurements: head length dorsal 15; head length frontal 16; head width 29; POL 4.5; OOL 2.5; lateral ocellus maximum width 2.5; eye length 15.5; malar space 4; mouth width 7; mesosoma length 33; mesosoma width 25; mesoscutellum length 13; mesoscutellum width 15; fore wing length 58; fore wing width 35.5; marginal vein length 28; postmarginal vein length 1.5; stigmal vein length 6; fore wing marginal fringe length 5.5; gaster length 32; gaster width 23.

Variation in paratype material. Length of body: 0.9–1.1mm. Mesoscutum with midlobe metallic bluish-purple to purple.

Male (Figs 27, 28). Length of body: 0.8–1.0mm. Vertex with anterior one-half metallic bluish-purple, posterior one-half metallic bluish-green. Midlobe of mesoscutum golden-green. Mesoscutellum golden-red. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Puntarenas, Estación Altamira, Send. Los Gigantes, 1450m, 9º02’N, 83º00’W, 7.ii-5.iii.2002, YPT, C. Hansson & Parataxonomos” (MZLU). Paratypes (18♀ 12♂, CNC,

MZLU, MZUCR, NHMUK): 13♀ 9♂ with same collecting data as holotype; 1♀ "COSTA RICA: Puntarenas, Monteverde, St Luis Valley, 17.viii.1986, L. Masner, CR-03"; 1♀ "COSTA RICA: Puntarenas, P.N. Carara, Sendero Universal, 0-100m, LN195703/470200, 12.ix.2004, J.A. Azofeifa"; 2♀ "COSTA RICA: Cartago, Humo, El Copal, 9°47'N, 83°45'W, 1050-1250m, 29.ii-6.iii.2008, C. Hansson"; 2♂ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 23.ii.2006, J.S. Noyes"; 1♀ from same locality as previous but collected 22-24. ii.2012; 1♂ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 20-22.ii.2006, J.S. Noyes".

Etymology. Named after type locality and the Latin suffix -*ensis* = place, locality.

Closterocerus amaurus sp.nov.
(Figs 22–24)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 23); ocelli very small, ratio POL/posterior ocellus width 4.7 (Fig. 24); pronotal collar without a carina along anterior margin (Figs 22, 23); midlobe of mesoscutum without setae; fore wing infuscate with a hyaline band close to apical margin and with area just below marginal vein hyaline (Fig. 23); length of body female 1.2mm. A dark species (dark brown to black) with weak metallic tinges on thoracic dorsum.

Female holotype: length of body 1.2mm.

Antenna dark brown to black. Head black. Mesoscutum, mesoscutellum, dorsellum and propodeum black with metallic purple tinges. Coxae, femora and tibiae black; fore tarsus dark brown; mid and hind tarsi with T1–3 white, T4 black. Fore wing infuscate with a hyaline band close to apical margin and with area just below marginal vein hyaline; hind wing hyaline. Petiole not visible in type specimen. Gaster dark brown.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation; ocelli small. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli indistinct; midlobe without setae. Mesoscutellum ±flat, with strong reticulation. Dorsellum convex with weak reticulation. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare; with hyaline part below marginal vein bare.

Petiole hidden on type specimen. Gaster ovate-elongate; tergites with weak reticulation.

Relative measurements: head length dorsal 14; head length frontal 19; head width 29; POL 7; OOL 2.5; lateral ocellus maximum width 1.5; eye length 11.5; malar space 7; mouth width 6; mesosoma length 33; mesosoma width 25; mesoscutellum length 12.5; mesoscutellum width 14.5; fore wing length 57; fore wing width 32; marginal vein length 31; postmarginal vein length 1.5; stigmal vein length 5; fore wing marginal fringe length 7; gaster length 42; gaster width 26.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, Cerro de la Muerte, Villa Mills, 3000m, 9°34´N 83°44´W, i-v.1991, P. Hanson" (NHMUK).

Etymology. From the Greek *amauros* = dark, referring to the dark appearance of this species.

Closterocerus amethystinus sp.nov.
(Figs 200, 201)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Fig. 201); pronotal collar with a carina along anterior margin (Fig. 200); midlobe of mesoscutum with two pairs of strong setae (Fig. 201); petiole as long as wide; fore wing infuscate with base and a band close to apical margin ±hyaline (Figs 200, 201); hind tarsus with T1&4 dark brown, T2&3 white (Fig. 201); length of body female 1.4mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Frons dark brown with golden-purple tinges. Vertex metallic purple with parts inside ocellar triangle golden-green. Mesoscutum with midlobe golden-green and sidelobes metallic purple. Mesoscutellum golden-green with lateral and posterior margins metallic purple. Dorsellum black with metallic purple tinges. Propodeum black. Coxae, femora, and tibiae dark brown with metallic purple tinges; fore and mid tarsi with T1–3 white and T4 infuscate, hind tarsus with T1&4 dark brown, T2&3 white. Fore wing infuscate with base and a band close to apical margin ±hyaline, hind wing hyaline. Petiole black. Gaster dark brown with metallic purple tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation in anterior one-half, weak reticulation in posterior one-half. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli narrow and complete; midlobe of mesoscutum with two pairs of strong setae. Mesoscutellum with distinctly weaker reticulation than mesoscutum. Dorsellum convex and smooth. Propodeum smooth on median part, with weak reticulation on lateral parts, with an irregular median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole as long as wide. Gaster ovate; tergites mainly smooth, partly with very weak reticulation.

Relative measurements: head length dorsal 17; head length frontal 20; head width 35; POL 6; OOL 4; lateral ocellus maximum width 2.5; eye height 17; malar space 5; mouth width 9; mesosoma length 43; mesosoma width 26; mesoscutellum length 16.5; mesoscutellum width 14.5; fore wing length 68; fore wing width 42; marginal vein length 33; postmarginal vein length 2; stigmal vein length 5.5; fore wing marginal fringe length 4; gaster length 41; gaster width 27.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: San José, Zurqui de Moravia, 1600m, 10˚3’N, 84˚0’W, v.1991, P. Hanson” (NHMUK).

Etymology. From the Latin *amethystinus* = colour like amethyst, referring to the purple colour on vertex.

***Closterocerus angustipennis* sp.nov.**
(Figs 2, 30–33)

Diagnosis. Antennal flagellum yellowish-white, not flattened, scape narrow (Figs 30–33); pronotal collar without a carina along anterior margin (Figs 30–33); mesoscutum and mesoscutellum with strikingly different colours (Figs 30, 32); midlobe of mesoscutum without setae (Figs 30, 32); fore wing hyaline with area below stigmal vein weakly infuscate, narrow with a long marginal fringe, length of longest seta in marginal fringe/fore wing width = 0.6, and with speculum open below and towards base of wing (Figs 2, 30–32); legs white, hind coxa infuscate at base (Figs 31, 33); male gaster dark brown with a white spot in anterior part (Fig. 32); length of body female 0.6–0.9mm, male 0.5–0.8mm.

Female holotype: length of body 0.9mm.

Antenna with pedicel and flagellum yellowish-white, scape pale brown. Frons with lower one-half dark brown, upper one-half metallic pale blue. Vertex metallic purple in anterior one-half, metallic blue in posterior one-half. Mesoscutum, dorsellum and propodeum metallic bluish-purple; mesoscutellum golden-red. Legs white, hind coxa infuscate at base. Fore wing hyaline with area below stigmal vein weakly infuscate, hind wing hyaline. Petiole black with metallic tinges. Gaster metallic bluish-purple with a large dark brown non-metallic median spot.

Antenna not flattened, scape narrow with dorsal and ventral margins ±parallel-sided. Frons with strong reticulation. Vertex with strong reticulation; with a short groove medio-posteriorly. Fronto-facial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct almost throughout, missing close to mesoscutellum; midlobe without setae. Mesoscutellum flattened, with strong reticulation. Dorsellum convex with strong sculpture. Propodeum smooth and shiny; callus with two setae. Fore wing narrow with a long marginal fringe; speculum open below and towards base of wing; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; all tergites with strong reticulation.

Relative measurements: head length dorsal 11; head length frontal 14.5; head width 21; POL 4.5; OOL 1,7; lateral ocellus maximum width 1.5; eye length 12; malar space 3; mouth width 6.5; mesosoma length 24; mesosoma width 16; mesoscutellum length 9; mesoscutellum width 10; fore wing length 37; fore wing width 14.5; marginal vein length 18; postmarginal vein length 1,7; stigmal vein length 3.5; fore wing marginal fringe length 9; gaster length 26; gaster width 17.

Variation in paratype material. Length of body: 0.6–0.9mm. Antennal flagellum yellowish-white, yellowish-white with F5 infuscate, to completely infuscate. Mesoscutellum golden-red or golden.

Male (Figs 32, 33). Length of body: 0.5–0.8mm. Antenna white to pale orange. Gaster dark brown with a white spot in anterior part. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica, Ecuador.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Limón, R.B. Barbilla, 550m, 9˚59'N, 83˚27'W, 18.ii.2006, J.S. Noyes" (NHMUK). Paratypes (53♀, 108♂, CNC, MZLU, MZUCR, NHMUK): 2♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 14-18.i.1991, J.S. Noyes"; 2♀ from same locality as previous but collected 20-22.ii.2006; 1♂ "COSTA RICA: Limón, Pococi, P.N.Braulio Carrillo, Estación Quebrada Gonzalez, 10º09'N, 83º57'W, 400-500m, 24.ix.2002, Hanson & Godoy"; 3♀, 1♂ "COSTA RICA: Alajuela, R.F. Rincon, Estación Caribe, 10º53'N, 83º18'W, 19-20.ii.2003, J.S. Noyes"; 1♀, 9♂ "COSTA RICA: Alajuela, P.N. Are-

nal, Send. Pilón, 10º27'N, 84º43'W, 26.ii.2003, J.S. Noyes"; 1♀ 2♂ "COSTA RICA: Alajuela, P.N. Arenal, Send. Ceibo, 10º27'N, 84º41'W, 22-23.ii.2016, J.S. Noyes, NHM (Ent) 2016-79"; 15♀, 26♂ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 27-28.ii.2003, J.S. Noyes"; following from same locality as previous but collected 30.iii.2001 (1♀), 30-31.iii.2002 (2♀, 1♂), 23-24.ii.2005 (6♀, 20♂), 28-29.ii.2008 (3♂), 22-24.ii.2012 (1♂); 1♀ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 9º52′N 85º03′W, 305m, 11-21.ii.2005, C. Hansson"; following from same locality as previous but collected 14-15.ii.2005 (10♀, 25♂), 17-18.ii.2011 (4♀, 10♂), 23-24.ii.2013 (2♀), 19-20.ii.2016 (1♀, 1♂), 11-12.ii.2018 (1♀); 1♀, 7♂ "COSTA RICA: Puntarenas, P.N. Piedras Blancas, Estación El Bonito, 100m, 8˚43'N, 83˚13'W, 13-14.ii.2012, J.S. Noyes, NHM(Ent) 2012-91". 1♀ "ECUADOR: Napo, 10km NE Tena, 400m, 19-20.ii.1983, L. Masner"; 1♂ "ECUADOR: Pichin, Tinalandia, 850m, 2.ii.1983, Masner & Sharkey".

Etymology. From the Latin *angustus* = narrow and *penna* = wing, referring to the narrow fore wing.

Closterocerus apiculus sp.nov.
(Figs 36–39)

Diagnosis. Antenna dark brown to black with F5 white, scape widest at apex, F1–3 flattened, F4 moderately flattened, F5 not flattened and long and narrow (Fig. 37); pronotal collar without a carina along anterior margin (Figs 36, 38); midlobe of mesoscutum with two pairs of ±strong setae (Fig. 36); fore wing hyaline with apical margin and parts below stigmal vein weakly infuscate (Figs 36, 37); hind tarsus white to yellowish (Figs 37, 39); length of body female 0.8–1.2mm, male 0.7–0.9mm.

Female holotype: length of body 0.9mm.

Antenna dark brown with F5 white. Frons with lower one-half dark brown, upper one-half metallic pale blue. Vertex metallic bluish-purple. Mesoscutum metallic bluish-purple; mesoscutellum golden-green with lateral and posterior margins metallic purple; dorsellum and propodeum metallic purple. Legs with coxae dark brown; fore femur infuscate, mid and hind femora dark brown; fore and mid tibiae white, hind tibia dark brown; tarsi white to yellowish. Fore wing hyaline with apical margin and parts below stigmal vein weakly infuscate; hind wing hyaline. Petiole dark brown with metallic purple tinges. Gaster metallic bluish-purple with a large dark brown spot medially.Antenna predominantly flattened, except F5 that is narrow, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior two-thirds; midlobe with two pairs of ±strong setae. Mesoscutellum with strong reticulation. Dorsellum convex and predominantly smooth. Propodeum smooth and shiny; propodeal callus with two setae. Fore wing speculum closed, with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; Gt_{1-3} smooth medially and with strong reticulation laterally, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 12.5; head length frontal 17; head width 26.5; POL 4; OOL 2; lateral ocellus maximum width 2; eye length 14; malar space 2.5; mouth width 7.5; mesosoma length 28; mesosoma width 27; mesoscutellum length 11; mesoscutellum width 12.5; fore wing length 44; fore wing width 26; marginal vein length 21.5; postmarginal vein length 1.5; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 31; gaster width 22.

Variation in paratype material. Length of body: 0.8–1.2mm. Vertex completely metallic purple or metallic purple in anterior one-half and metallic blue in posterior one-half. Mesoscutum metallic bluish-purple, or midlobe golden-green and sidelobes metallic purple. Mesoscutellum golden with lateral and posterior margins metallic blue, or golden-green with lateral and posterior margins metallic purple.

Male (Figs 38, 39). Length of body: 0.7–0.9mm. Scape not expanded at apex, dorsal and ventral margins ±parallel. Mesoscutum with midlobe golden-green or metallic bluish-green, sidelobes metallic bluish-purple. Mesoscutellum golden. Hind femur and hind tibia dark brown with apical one-third white. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica, Mexico, Venezuela.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º46'N, 82º57'W, 1300m, 15-16.ii.2006, J.S. Noyes" (NHMUK). Paratypes (97♀ 27♂, CNC, MZLU, MZUCR, NHMUK, TAMU): 1♀ with same label data as holotype; 1♀ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 9º52′N 85º03′W, 305m, 11-21.ii.2005, C. Hansson"; following from same locality as previous but collected 14-15.ii.2005 (9♀), 17-18.ii.2011 (8♀ 3♂), 23-24.ii.2013 (3♀), 19-20.ii.2016 (13♀ 4♂), 11-12.ii.2018 (11♀ 6♂); 8♀ 3♂ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 8º29'N, 83º35'W, 5m, 19-20.ii.2004, J.S. Noyes"; 14♀ 7♂ "COSTA RICA: Puntarenas, P.N. Piedras Blancas, 100m, 8˚43'N, 83˚13'W, 13-14.ii.2012, J.S. Noyes, NHM (Ent) 2012-91"; 3♀ "COSTA RICA: Alajuela, P.N. Arenal, Send. Ceibo, 10º27'N, 84º41'W, 22-23.ii.2016, J.S. Noyes, NHM (Ent) 2016-79"; 2♀ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 27-28.ii.2003, J.S. Noyes"; 4♀ from same locality as previous but collected 22-24.ii.2012; 2♀ 1♂ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 20-22.ii.2006, J.S. Noyes"; 12♀ 3♂ "COSTA RICA: Turrialba, CATIE, Reventazon, 4.ix.1986, L. Masner"; 1♀ "COSTA RICA: Manuel Antonio N.P. 23-28.viii.1986, L. Masner". 1♀ "MEXICO, Chiapas, 6mi N Berriozabal, 4000′ [1219m], 8-9.viii.1990, J.B. Woolley, 90/056". 4♀ "VENEZUELA: Araqua, Rancho Grande, 3650' [1113m], 28.v.1990, J.B. Woolley, 90/003".

Etymology. From the Latin apiculus = apex, apical, referring to the white apical flagellomere.

Closterocerus arenalensis sp.nov.

(Figs 156, 157, 163)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Figs 157, 163); upper border of frons distinct (Fig. 157); pronotal collar with a carina along anterior margin (Fig. 156); midlobe of mesoscutum without setae (Fig. 156); petiole as long as wide with strong sculpture on dorsal surface; hind tarsus with T1 and T4 dark brown, T2–3 white (Fig. 163); fore wing infuscate with basal one-third and a subapical band hyaline, speculum open below (Figs 156, 163); length of body female 1.1–1.6mm. Similar to *C. hirsutus* but with only two setae on propodeal callus, mesoscutellum with weaker reticulation, and hind tarsus shorter, 0.63× as long as hind tibia.

Female holotype: length of body 1.4mm.

Antenna dark brown to black. Frons below frontofacial suture golden-green, above suture black with metallic tinges. Vertex metallic purple. Mesoscutum with midlobe golden with anterolateral parts metallic bluish-purple, sidelobes metallic bluish-purple. Mesoscutellum golden with lateral and posterior margins metallic bluish-purple. Dorsellum metallic bluish-purple. Propodeum black. Coxae, femora, mid and hind tibiae black with metallic tinges; fore tibia and tarsus infuscate, mid tarsus with T1–3 white and T4 infuscate, hind tarsus with T1 and T4 black, T2–3 white. Fore wing infuscate with basal one-third and a band close to apical margin hyaline, hind wing hyaline. Petiole black. Gaster with Gt_1 metallic bluish-purple, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; upper border of frons distinct. Subtorular sutures present but difficult to see because they are short and dark. Vertex with strong reticulation. Occipital margin with a carina behind ocellar triangle, rounded laterally.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct throughout; midlobe without setae. Mesoscutellum convex, with weak reticulation. Dorsellum convex and smooth. Propodeum with weak reticulation, partly smooth, with a median carina; callus with two setae. Fore wing speculum open below, with hyaline part below marginal vein bare; with a stigmal hairline and with radial cell bare.

Petiole as long as wide, dorsal surface with strong sculpture. Gaster short-ovate, almost circular; Gt_{1-2} smooth, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 19; head length frontal 21.5; head width 38; POL 6.5; OOL 4; lateral ocellus maximum width 3; eye length 19.5; malar space 5; mouth width 10.5; mesosoma length 46; mesosoma width 33; mesoscutellum length 18.5; mesoscutellum width 19; fore wing length 70; fore wing width 41; marginal vein length 40; postmarginal vein length 2.5; stigmal vein length 5.5; fore wing marginal fringe length 5; gaster length 44; gaster width 33.5.

Variation in paratype material. Length of body: 1.1–1.6mm. Vertex metallic purple, or metallic purple with posterior one-half metallic blue. Midlobe of mesoscutum golden-red or golden with anterolateral parts metallic bluish-purple. Mesoscutellum golden-red or golden with lateral and posterior margins metallic bluish-purple. Gt_1 metallic bluish-green or bluish-purple.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Alajuela, P.N. Arenal, 10˚28'N, 84˚45'W, 617m, 21-28.ii.2005, C. Hansson" (MZLU). Paratypes (6♀, MZLU, MZUCR, NHMUK): 5♀ with same label data as holotype; 1♀ "COSTA RICA: Alajuela, P.N. Arenal, La Peninsula, 10˚27'N, 84˚45'W, 600m, 25.ii.2003, J.S. Noyes".

Etymology. From the type locality and the Latin suffix *-ensis* = place, locality.

Closterocerus atrifasciatus sp.nov.

(Figs 40–42)

Diagnosis. Antenna flattened, scape widest at apex (Figs 41, 42); frons with upper border distinct (Fig. 41); pronotal collar with a carina along anterior margin (Fig. 40); midlobe of mesoscutum with 3–4 pairs of short setae (Fig. 40); mesoscutum and mesoscutellum with a black longitudinal band (Fig. 40); propodeum with a strong and complete median carina (Fig. 40); fore wing infuscate with area below marginal vein and a band close to apical margin hyaline, speculum open below (Fig. 40); hind tarsus with T1–3 white, T4 black and long, 2.6× as long as width at apex (Fig. 42); petiole as long as wide with strong sculpture on dorsal surface; length of body female 1.9–2.1mm.

Female holotype: length of body 2.1mm.

Antenna dark brown to black. Frons black with metallic tinges. Vertex with anterior one-half metallic bluish-purple, posterior one-half metallic blue. Mesoscutum with median part of midlobe black, sidelobes and lateral parts of midlobe metallic blue. Mesoscutellum with median part black, lateral parts metallic blue. Dorsellum metallic blue. Propodeum black. Coxae, femora, mid and hind tibiae black with metallic tinges; fore tibia and tarsus yellowish-brown; mid and hind tarsi with T1–3 white, T4 black. Fore wing infuscate with area below marginal vein and a band close to apical margin hyaline, hind wing hyaline. Petiole black. Gaster with Gt_{1-2} with median one-third black and lateral parts metallic blue; Gt_6 metallic blue, remaining tergites black.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; upper border of frons distinct. Subtorular sutures present but difficult to see because they are short and dark. Vertex with strong reticulation. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior four-fifths; midlobe with three pairs of short setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex and smooth. Propodeum with weak reticulation, partly smooth, with a strong median carina; callus with two setae. Fore wing speculum open below; hyaline part below marginal vein bare; with a stigmal hairline and with radial cell bare.

Petiole as long as wide, with strong sculpture on dorsal surface. Gaster ovate; Gt_{1-2} with metallic blue lateral parts smooth, median black part with strong reticulation, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 23; head length frontal 27; head width 43.5; POL 7; OOL 5.5; lateral ocellus maximum width 3; eye length 21; malar space 10; mouth width 11.5; mesosoma length 68; mesosoma width 41; mesoscutellum length 25; mesoscutellum width 25; fore wing length 100; fore wing width 53; marginal vein length 60; postmarginal vein length 3; stigmal vein length 7; fore wing marginal fringe length 7; gaster length 75; gaster width 45.

Variation in paratype material. Length of body: 1.9–2.1mm. Vertex with anterior one-half metallic bluish-purple or bluish-green, posterior one-half metallic blue or golden-green. Mesoscutum and mesoscutellum, apart from black median part, metallic blue or golden-green; dorsellum metallic blue or golden-green; midlobe of mesoscutum with 3–4 pairs of setae.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica, Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO, Oaxaca, 6mi NE Mitla, 20.vii.1985, J.B. Woolley, 85/077" (TAMU). Paratype: 1♀ "COSTA RICA: San José, San Pedro de Montes de Oca, 1200m, 19.ii.2001, J.S. Noyes" (NHMUK).

Etymology. From the Latin *atra* = black and *fascia* = band, referring to the black band on thoracic dorsum.

Closterocerus aureolus sp.nov.

(Figs 43–45)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 43); pronotal collar with a weak carina along anterior margin (Fig. 43); midlobe of mesoscutum with two pairs of setae (Fig. 43); fore wing strongly infuscate with a hyaline band close to apical margin and with area below basal two-thirds of marginal vein hyaline (Figs 44, 45); hind tarsus with T1–3 white, T4 pale brown (Fig. 44); petiole as long as wide with strong sculpture dorsally; length of body female 1.1mm, male 1.2–1.4mm.

Female holotype: length of body 1.1mm.

Antenna dark brown. Frons dark brown with metallic tinges. Vertex metallic purple. Mesoscutum with midlobe golden and sidelobes metallic purple. Mesoscutellum golden with lateral and posterior margin metallic bluish-purple. Dorsellum with metallic blue tinges. Propodeum with golden and golden-green tinges. Coxae and femora dark brown; fore tibia whitish, mid and hind tibiae dark brown; tarsi with T1–3 white, T4 pale brown. Fore wing strongly infuscate with a hyaline band

close to apical margin and with area below basal two-thirds of marginal vein hyaline; hind wing hyaline. Petiole dark brown. Gaster with Gt_1 golden medially and metallic purple laterally, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation in anterior one-half, smooth in posterior one-half. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a weak carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with two pairs of setae. Dorsellum flat with weak sculpture. Propodeum with strong sculpture in posterior two-thirds and smooth in anterior one-third; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole as long as wide with strong sculpture dorsally. Gaster short ovate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 13; head length frontal 18; head width 30; POL 6; OOL 3.5; lateral ocellus maximum width 2; eye length 13.5; malar space 6.5; mouth width 7.5; mesosoma length 37; mesosoma width 25; mesoscutellum length 15; mesoscutellum width 14; fore wing length 55; fore wing width 34; marginal vein length 29; postmarginal vein length 1.5; stigmal vein length 4.5; fore wing marginal fringe length 8.5; gaster length 37; gaster width 25.

Male (Fig. 45). Length of body 1.2–1.4mm. Fore tibia with basal one-half dark brown and apical one-half white, to predominantly dark brown. Propodeum dark brown non-metallic. Otherwise similar to female.

Hosts. Unknown.

Distribution. Ecuador, Peru.

Material examined.

Type material. Holotype ♀ "ECUADOR: Pichin, 10km N. Guayllabamba, 26.ii.1983, Masner & Sharkey" (CNC). Paratypes 3♂ "PERU: Ollantaytambo, 19.xii.1983, L. Huggert" (MZLU).

Etymology. From the Latin *aureolus* = golden, glittering, referring to the colour of thoracic dorsum.

Closterocerus aureopurpureus sp.nov.

(Figs 46–48)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 48); pronotal collar with a carina along anterior margin (Fig. 46); midlobe of mesoscutum with three pairs of setae (Fig. 46); midlobe of mesoscutum and mesoscutellum with median part dark (golden-purple), contrasting against lateral parts (Fig. 46); fore wing hyaline with three infuscate parts: along apical margin, below stigmal vein, and below marginal vein (Figs 46–48); hind tarsus with T1 and T4 dark brown, T2–3 white (Fig. 48); length of body female 1.3–1.8mm, male 1.1mm.

Female holotype: length of body 1.8mm.

Antenna dark brown to black. Head with frons golden-green; vertex metallic purple. Mesoscutum with midlobe with median part golden-purple, lateral parts and sidelobes metallic bluish-purple. Mesoscutellum with median part golden-purple and lateral parts metallic bluish-purple. Dorsellum metallic purple. Propodeum with median part golden and lateral parts black. Coxae and femora black with metallic tinges; fore tibia pale brown with base dark brown, mid and hind tibiae black with

metallic tinges, fore tarsus brown, mid and hind tarsi with T1 and T4 black, T2–3 white. Fore wing hyaline with three infuscate parts: along apical margin, below stigmal vein, and below marginal vein, hind wing hyaline. Petiole hidden in type specimen (dark brown in paratype). Gaster with Gt_1 and Gt_6 metallic purple, remaining tergites golden.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior ¾; midlobe with three pairs of setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex and smooth. Propodeum with weak reticulation, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole hidden in type specimen (very short, just a narrow band in paratype). Gaster ovate; tergites mainly smooth, partly with weak reticulation.

Relative measurements: head length dorsal 20; head length frontal 27; head width 43; POL 8; OOL 4; lateral ocellus maximum width 3; eye length 21; malar space 6; mouth width 11; mesosoma length 57; mesosoma width 39; mesoscutellum length 22.5; mesoscutellum width 21.5; fore wing length 88; fore wing width 56; marginal vein length 51; postmarginal vein length 2.5; stigmal vein length 8.5; fore wing marginal fringe length 5; gaster length 64; gaster width 36.

Variation in paratype material. Length of body: 1.3mm. Paratype similar to holotype.

Male (Fig. 47). Length of body: 1.1mm. Vertex metallic bluish-purple in anterior one-half, golden in posterior one-half. Mesoscutum with midlobe golden-red, sidelobes metallic bluish-purple. Mesoscutellum golden-red with sides golden-green. Dorsellum metallic purple. Propodeum golden-green medially, metallic purple on lateral parts. Sculpture as in female.

Hosts. Unknown.

Distribution. Costa Rica, Mexico.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, Buenos Aires, Estación Altamira, Sendero Cerro Biolley, 1766m, 13.ii-15.iii.2001, D. Rubí, MT, LS 572200/332400, #62094" (NHMUK). Paratypes: 1♀ 1♂ "MEXICO, Michoacan, 2mi. S Carapan, 6.vii.1986, J.B. Woolley, 85/031" (TAMU).

Etymology. From the Latin *aurum* = gold, and *purpureus* = purple, referring to the colour of dorsum.

Closterocerus azofeifai sp.nov.

(Figs 49–51)

Diagnosis. Antenna not flattened, but pedicel with sharp dorsal and ventral edges (Fig. 50); female flagellum with F1–3 dark brown, F4–5 infuscate (Fig. 50), male flagellum whitish to infuscate (Fig. 51); ocelli very small, ratio POL/posterior ocellus width 1.8 (Fig. 49); pronotal collar without a carina along anterior margin (Fig. 49); midlobe of mesoscutum without setae (Fig. 49); mesoscutum and mesoscutellum with different colours (Fig. 49); mesoscutellum with weak reticulation (Fig. 49); fore wing hyaline with area below stigmal vein infuscate (Figs 49, 51); hind tarsus white (Figs 50, 51); length of body female 0.8–1.1mm, male 0.7–0.9mm.

Female holotype: length of body 1.0mm.

Antenna with scape, pedicel and F1–3 dark brown, F4–5 infuscate. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum metallic blue. Mesoscutellum golden-green. Dorsellum and

propodeum metallic blue with purple tinges. Legs with coxae, femora and hind tibia dark brown, fore and mid tibiae and tarsi white. Fore wing hyaline with area below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1,6}$ metallic blue, remaining tergites dark brown.

Antenna not flattened, scape narrow. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with sidelobes and anterior one-half of midlobe with relatively strong reticulation, posterior one-half of midlobe with weak reticulation; notauli distinct in anterior one-half; midlobe without setae. Mesoscutellum convex, with weak reticulation. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a transverse strip. Gaster ovate; Gt_1 smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 14; head length frontal 22; head width 27; POL 5; OOL 2.5; lateral ocellus maximum width 3; eye length 16.5; malar space 3; mouth width 9; mesosoma length 33; mesosoma width 23; mesoscutellum length 13; mesoscutellum width 13; fore wing length 56; fore wing width 30; marginal vein length 29; postmarginal vein length 2; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 37; gaster width 25.

Variation in paratype material. Length of body: 0.8–1.1mm. Flagellum with F1–3 dark brown and F4–5 infuscate, or F1–5 or F2–5 whitish to infuscate. Fore tibia white to infuscate, mid tibia completely white or white with base brown.

Male (Fig. 51). Length of body: 0.7–0.9mm. Entire antennal flagellum whitish to infuscate. Midlobe of mesoscutum golden-green and mesoscutellum golden-red or golden. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40’N, 83˚02’W, 24-25.ii.2004, J.S. Noyes” (NHMUK). Paratypes (34♀, 28♂, CNC, MZLU, MZUCR, NHMUK): 3♀ with same label data as holotype; following from same locality as holotype but collected 20-22.ii.2006 (6♀, 7♂), 22-23.ii.2010 (1♂); 1♀ “COSTA RICA: Alajuela, Estación Pilón, 10º43’N, 85º59’W, 12-18.ii.2004, C. Hansson & J.A. Azofeifa”; 1♀ “COSTA RICA: Limón, R.B. Barbilla, 550m, 9˚59’N, 83˚27’W, 18.ii.2006, J.S. Noyes”; 2♀ “COSTA RICA: Cartago, Humo, El Copal, 9°47’N, 83°45’W, 1050-1250m, 29.ii-6.iii.2008, C. Hansson”; 1♀ “COSTA RICA: Guanacaste, Bagaces, P.N. Palo Verde, 400m E Puente La Espuela (Quebrado Mula), LN258980_396500, 10m, 10.x-9.xi.2000, I Jiménez”; 5♀ “COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26’N, 84º01’W, ix.1992, P.Hanson”; following from same locality as previous but collected ii.1991 (1♀), 30.iii.2001 (2♀), 23-24.ii.2005 (1♂), 23.ii.2006 (1♀, 3♂); 3♀, 9♂ “COSTA RICA: Puntarenas, R.P. Karen Mogensen, 305m, 9˚52’N, 85˚03’W, 14-15.ii.2005, J.S. Noyes”; following from same locality as previous but collected 11-21.ii.2005 (1♀, 2♂), 17-18.ii.2011 (1♀, 2♂); 1♀ “COSTA RICA: Puntarenas, Estación Altamira, Send. a Casa Coca, 1450-1700m, 9º02’N, 83º00’W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos”; 1♀ “COSTA RICA: Puntarenas, P.N. Piedras Blancas, 100m, 8˚43’N, 83˚13’W, 13-14.ii.2012, J.S. Noyes, NHM (Ent) 2012-91”; 1♀ “COSTA RICA: Puntarenas, A.C.O, Golfito, R.F. Golfo Dulce, Est Agujas, 250-350m, 2-22.x.1999, J. Azofeifa, swept, LS 276750_526550, #53491”; 2♀, 1♂ “COSTA RICA: Puntarenas, P.N. Carara, Sendero Universal, 0-10m, 12.ix.2004, J. Azofeifa, LN195703/470200, #791811”; 1♀ from same locality as previous but collected 20.vii.2004; 1♂ “COSTA RICA: Puntarenas, RVS Rio Piro, Golfito, Estación Tuva, LS262284_535746, 18.ix.2004, M. Moraga”; 1♀ “COSTA RICA: Puntarenas, Pamita Palmar, ii-xii.1988, P. Hanson”.

Etymology. Named after Antonio (Tonio) Azofeifa, a parataxonomist of the former organisation INBio, and collector of specimens included in this paper.

Closterocerus barbatus sp.nov.
(Figs 52, 58)

Diagnosis. Scape and pedicel flattened, flagellum less flattened, scape subtriangular and widest just below apex, apical three flagellomeres ±fused to form a clava (Fig. 58); occiput strongly hairy (Fig. 52); pronotal collar long and smooth, with a strong carina along anterior margin (Fig. 52); midlobe of mesoscutum with one pair of setae (Fig. 52); mesoscutum and mesoscutellum with strong engraved reticulation (Fig. 52); petiole 0.5× as long as wide with strong sculpture on dorsal surface; fore wing hyaline with median one-third infuscate (Fig. 52), speculum large and open below and towards base of wing; gaster with tuft of white hairs anterolaterally (Fig. 52); length of body female 1.9mm.

Female holotype: length of body 1.9mm.

Colour: Scape and pedicel dark brown to black, flagellum pale brown. Frons below frontofacial suture golden-green, above suture golden, close to vertex metallic purple. Vertex golden. Mesoscutum, mesoscutellum, dorsellum and propodeum black. Coxae black; femora, mid and hind tibiae dark brown, fore tibia brown with apex yellowish-brown; fore tarsus dark brown; mid and hind tarsi with T1–3 white, T4 black. Fore wing hyaline with median one-third infuscate, hind wing hyaline. Petiole black. Gaster dark brown.

Head: Scape and pedicel flattened, flagellum less flattened, scape ±triangular and widest just below apex. Frons below frontofacial suture with weak reticulation; above suture and vertex smooth. Frontofacial suture V-shaped. Subtorular sutures missing. Occipital margin rounded. Occiput strongly hairy.

Pronotal collar long and smooth, with a strong carina along anterior margin. Mesoscutum with strong and engraved reticulation; notauli distinct in anterior one-half; midlobe with one pair of setae, attached in posterior part. Mesoscutellum convex, with strong and engraved reticulation. Dorsellum convex and predominantly smooth. Propodeum with a ±complete median carina; medially smooth and laterally with rather strong reticulation; callus with two setae. Fore wing with speculum large, open below and towards base of wing; with a stigmal hairline and with radial cell bare.

Petiole 0.5× as long as wide, with strong sculpture on dorsal surface. Gaster oval-shaped and non-collapsed; with a tuft of white hair anterolaterally; tergites with strong reticulation.

Relative measurements: head length dorsal 17; head length frontal 27.5; head width 42; POL 9; OOL 4; lateral ocellus maximum width 3; eye length 18.5; malar space 9; mouth width 12; mesosoma length 65; mesosoma width 43; mesoscutellum length 26; mesoscutellum width 28; fore wing length 111; fore wing width 59; marginal vein length 60; postmarginal vein length 1.5; stigmal vein length 6.5; fore wing marginal fringe length 7.5; gaster length 64; gaster width 53.

Male. Unknown.

Hosts. Unknown.

Distribution. Ecuador.

Material examined.

Type material. Holotype ♀ “ECUADOR: Napo, Papallacta, 3700m, 25.ii.1983, L. Huggert” (MZLU)

Etymology. From the Latin *barbatus* = bearded, referring to the hairy temples and occiput.

Closterocerus brevipes sp.nov.
(Figs 53–57)

Diagnosis. Antenna flattened, scape widest at apex in female (Fig. 54), slightly below apex in male (Fig. 56); flagellum dark brown (Figs 54, 56); pronotal collar with a sharp carina along anterior margin (Figs 53, 55); midlobe of mesoscutum with three pairs of short setae; fore wing infuscate with an unbroken subapical hyaline band and with a bare area below marginal vein hyaline (Fig. 54); legs predominantly dark brown, mid and hind tarsi with T1&4 dark brown, T2&3 white (Figs 54, 56); hind leg with tibia stout, 4.5× as long as wide, and tarsus with T1–3 very short so that T4 is as long as T1–3 combined (Fig. 57); length of body female 1.2–1.9mm, male 0.9–1.5mm. Similar to *C. coffeellae* but with hind tibia and tarsus shorter, and male with reticulation on mesoscutum and mesoscutellum weaker.

Female holotype: length of body 1.6mm.

Antenna dark brown. Frons and vertex black with metallic tinges. Mesoscutum golden-purple. Mesoscutellum golden-purple with lateral and posterior margins metallic purple. Dorsellum and propodeum golden-purple. Coxae, femora, mid and hind tibiae dark brown; fore tibia whitish with base dark brown; fore tarsus infuscate, mid and hind tarsi with T1&4 dark brown, T2&3 white. Fore wing infuscate with an unbroken subhyaline band and with a bare area below marginal vein hyaline, hind wing hyaline. Petiole black. Gaster golden-purple with sides of Gt_{1-2} with metallic purple tinges.

Antenna flattened. Frons with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Vertex with strong reticulation in anterior one-half, with very weak reticulation in posterior one-half. Occipital margin rounded.

Pronotal collar with carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct and complete; midlobe of mesoscutum with three pairs of very short setae. Mesoscutellum with strong reticulation, lateral and posterior margins with weak reticulation. Dorsellum convex and smooth. Propodeum with some irregular sculpture on median part, otherwise smooth; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; $Gt_{1,2,6,7}$ smooth and shiny, Gt_{3-5} with weak reticulation.

Relative measurements: head length dorsal 19.5; head length frontal 26; head width 41.5; POL 7; OOL 4.5; lateral ocellus maximum width 3; eye length 21; malar space 5; mouth width 11; mesosoma length 48; mesosoma width 36; mesoscutellum length 20; mesoscutellum width 22; fore wing length 65; fore wing width 40; marginal vein length 37; postmarginal vein length 4; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 51; gaster width 41.

Variation in paratype material. Length of body: 1.2–1.9mm. Vertex with strong reticulation in anterior one-half and very weak reticulation in posterior one-half, or completely with strong reticulation. Notauli metallic or white. Mesoscutum golden-purple or metallic purple. Mesoscutellum golden-purple with lateral and posterior margins metallic purple, or metallic purple.

Male (Figs 55, 56). Length of body: 0.9–1.5mm. Scape less wide at apex. Vertex black with golden-green tinges, with very weak reticulation. Midlobe of mesoscutum golden-purple, with weak reticulation, sidelobes metallic bluish-purple with strong reticulation. Mesoscutellum golden-purple with lateral margins golden-green, with weak reticulation. Dorsellum metallic purple. Propodeum golden-purple. Otherwise as in female.

Hosts. Reared from leafminers on *Cecropia insignis* & *C. obtusifolia* (Cecropiaceae): unidentified species of *Pachyscelus* (Coleoptera: Buprestidae) and *Tischeria* (Lepidoptera: Tischeriidae); *Phyllocnistis* sp. (Lepidoptera: Gracillariidae) on *Trichilia havanensis* (Meliaceae); *Tachygonus* sp. (Coleoptera: Curculionidae) on *Lonchocarpus costaricensis* (Leguminosae).

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, E.B. La Selva, 50-150m, 10º26'N, 84º01'W, xi.1999, #99.831, L.M. LaPierre", "Ex Pachyscelus sp. on Cecropia insignis" (NHMUK). Paratypes (12♀ 12♂, CNC, MZLU, MZUCR, NHMUK): 2♀ with same label data as holotype; 2♀ 3♂ "COSTA RICA: Heredia, E.B. La Selva, 50-150m, 10º26'N, 84º01'W, xi.1999, #99.842, L.M. LaPierre", "Ex Tischeria sp. on Cecropia insignis"; 2♀ from same locality and host as previous but collected ii.2000; 1♀ 2♂ "COSTA RICA: Alajuela, vicinity of Boca Tapada de San Carlos, 250m, 10º40'N, 84º12'W, 21-22.iii.1999, L.M. La Pierre, #99.249, ex Tischeria sp. on Cecropia insignis"; 1♂ "COSTA RICA: Alajuela, Cabro Muco, 10º43'N, 85º09'W, 1100m, 13.ii.2004, C. Hansson & J.A. Azofeifa"; 1♀ "COSTA RICA: Cartago, Turrialba, CATIE, 600m, 09º54'N, 83º38'W, 3.ii.1998, L.M. La Pierre, #CR98.33, ex Buprestidae leafminer on Cecropia insignis"; 1♀ "COSTA RICA: Cartago, San Ramon 3 Rios, 1500m, 2.vi.90, P. Hanson"; 1♀ "COSTA RICA: Heredia, 6km ENE Vara Blanca, 10˚11'N, 84˚07'W, 2000m, ii.2002, 20/TN/ALL, INBio, OET, ALAS"; 1♂ "COSTA RICA: Puntarenas, upper San Luis Valley, 100m, 10º15'N, 84º45'W, 23.ix.1999, #99.468, L.M. LaPierre, ex Pachyscelus sp. on Cecropia obtusifolia"; 1♂ "COSTA RICA: Puntarenas, E.B. San Miguel, 0-50m, 09º34'N, 85º08'W, 2.xii.1998, #98.226, L.M. LaPierre, ex Tachygonus sp. on Lonchocarpus costaricensis"; 1♀ Puntarenas, San Luis de Monteverde & vicinity, 50-150m, 10º17'N, 84º49'W, viii.1997, L.M. LaPierre", "Coleoptera leafminer on Cecropia obtusifolia"; 1♀ "COSTA RICA: San José, San Pedro, UCR Campus, 1100m, 4.v.2000, K. Nishida, ex *Phyllocnistis* sp. on *Trichilia havanensis*".

Etymology. From the Latin *brevis* = short and *pes* = foot, referring to the short hind tarsus.

Closterocerus brillante sp.nov.

(Figs 34, 35)

Diagnosis. Antenna with scape, pedicel and F1–3 dark brown, F4–5 whitish, scape flattened and widest at apex, flagellum not flattened, F5 long and narrow (Fig. 35); pronotal collar without a carina along anterior margin (Fig. 34); midlobe of mesoscutum with one pair of strong white setae (Figs 34, 35); vertex, mesoscutum and mesoscutellum with very weak reticulation, shiny (Fig. 34); fore wing hyaline with area below stigmal vein infuscate, speculum open below and towards base of wing (Fig. 35); length of body female 0.9mm.

Female holotype: length of body 0.9mm.

Antenna with scape, pedicel and F1–3 dark brown, F4–5 whitish. Frons below frontofacial suture metallic blue, above suture metallic purple. Vertex golden-green. Mesoscutum with midlobe golden-green with anterior one-third golden-red, sidelobes metallic bluish-purple. Mesoscutellum golden-red with lateral and posterior margins golden-green. Setae on mesoscutum and mesoscutellum white. Dorsellum and propodeum metallic purple. Legs with coxae dark brown; fore and mid femora infuscate, hind femur dark brown; fore and mid tibiae white, hind tibia dark brown with apical one-third white; tarsi white. Fore wing hyaline with area below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1,6}$ metallic bluish-purple, remaining tergites golden-purple.

Antenna with scape flattened and widest at apex, pedicel and flagellum not flattened, F5 long and narrow. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with very weak reticulation, shiny. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with very weak reticulation, shiny; notauli distinct in anterior one-third; midlobe with one pair of strong setae. Mesoscutellum with weak reticulation. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum open below and towards base of wing; with a stigmal hairline, radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; tergites smooth.

Relative measurements: head length dorsal 12; head length frontal 16; head width 24; POL 4.5; OOL 2; lateral ocellus maximum width 2; eye length 13.5; malar space 3.5; mouth width 7; mesosoma length 30; mesosoma width 23; mesoscutellum length 12; mesoscutellum width 14; fore wing length 52; fore wing width 29; marginal vein length 25; postmarginal vein length 2; stigmal vein length 5.5; fore wing marginal fringe length 7.5; gaster length 30; gaster width 21.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, Estación Altamira, Send. Los Gigantes, 1450m, 9º02'N, 83º00'W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos" (MZLU)

Etymology. From the Spanish brillante = shining, referring to the appearance of vertex, mesoscutum and mesoscutellum.

Closterocerus byrrus sp.nov.

(Figs 195, 196)

Diagnosis. Antenna flattened, scape widest in apical part (Fig. 196); pronotal collar without a carina along anterior margin (Fig. 195); midlobe of mesoscutum with strong reticulation in anterior one-half and weak reticulation in posterior one-half, and with two pairs of long and strong setae (Fig. 195); mesoscutellum golden-red with very weak reticulation, almost smooth (Fig.195); fore wing hyaline with a narrow infuscate band below stigmal vein, reaching to hind margin, and with apical margin weakly infuscate (Figs 195, 196); coxae pale brown, fore and mid femora white, hind femur dark brown (Fig. 196); petiole about as long as wide and smooth; gaster elongate (Fig. 195), 3.1× as long as wide; length of body female 1.4mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-green in anterior one-half, golden-green in posterior one-half. Mesoscutum with midlobe metallic bluish-green, sidelobes metallic bluish-purple; mesoscutellum golden-red; dorsellum golden-green. Propodeum dark brown with metallic tinges. Legs with coxae pale brown; fore and mid femora white, hind femur dark brown; tibiae white; tarsi infuscate. Fore wing hyaline with a narrow infuscate band below stigmal vein, reaching to hind margin, and with apical margin weakly infuscate, hind wing hyaline. Petiole dark brown. Gastral tergite 1 metallic bluish-green, remaining tergites dark brown with metallic purple and green tinges.

Antenna flattened, scape widest in apical part. Frons with weak reticulation below frontofacial suture, with strong reticulation above suture. Vertex with strong reticulation in anterior one-half, with weak reticulation in posterior one-half. Frontofacial suture V-shaped. Subtorular sutures dark and difficult to see. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with midlobe with strong reticulation in anterior one-half and weak reticulation in posterior one-half, sidelobes with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with two pairs of long

and strong setae. Mesoscutellum with very weak reticulation, almost smooth. Dorsellum convex and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing with speculum closed; with an indistinct stigmal hairline and with radial cell bare.

Petiole about as long as wide and smooth. Gaster elongate; tergites smooth and shiny.

Relative measurements: head length dorsal 13; head length frontal 18.5; head width 29; POL 6; OOL 2.5; lateral ocellus maximum width 2; eye length 14; malar space 5.5; mouth width 6.5; mesosoma length 36; mesosoma width 24; mesoscutellum length 14; mesoscutellum width 14; fore wing length 69; fore wing width 43; marginal vein length 32; postmarginal vein length 6; stigmal vein length 5.5; fore wing marginal fringe length 4; gaster length 61; gaster width 20.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Limón, Valle de Silencio, 2460m, 20.ix-5.x.2003, D. Rubí et al., LS340258/577465" (NHMUK).

Etymology. From the Latin *byrrus* = red, flame-coloured, referring to the colour of mesoscutellum.

***Closterocerus caelatus* sp.nov.**
(Figs 59, 60)

Diagnosis. Antenna flattened, scape widest slightly below apex (Fig. 60); pronotal collar with a carina along anterior margin (Fig. 59); midlobe of mesoscutum with two pairs of strong setae (Fig. 59); mesoscutellum with engraved reticulation (Fig. 59); dorsellum concave; fore wing hyaline with a large infuscate spot below stigmal vein (Figs 59, 60); stigmal vein elongate, 3.7× as long as wide and postmarginal vein 1.2× as long as stigmal vein (Fig. 59); hind tarsus white (Fig. 60); petiole as long as wide with sculpture on dorsal surface; length of body female 1.8mm.

Female holotype: length of body 1.8mm.

Antenna dark brown. Head with frons golden-green; vertex metallic bluish-purple. Mesoscutum and propodeum metallic bluish-green. Mesoscutellum and dorsellum golden-green. Coxae and femora dark brown with metallic tinges; tibiae and tarsi white. Fore wing hyaline with a large infuscate spot below stigmal vein, hind wing hyaline. Petiole black with metallic tinges. Gaster with Gt_{1-2} metallic bluish-green, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest slightly below apex. Frons and vertex with strong reticulation, vertex smooth lateral of ocellar triangle. Frontofacial suture V-shaped. Subtorular sutures absent. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with two pairs of strong setae. Mesoscutellum flat, with strong engraved reticulation. Dorsellum concave and smooth. Propodeum smooth without median carina; callus with two setae. Fore wing speculum closed; without a stigmal hairline and with radial cell hairy.

Petiole as long as wide with strong sculpture on dorsal part. Gaster ovate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 20; head length frontal 26; head width 41; POL 7;

OOL 4; lateral ocellus maximum width 3.5; eye length 21.5; malar space 6; mouth width 10; mesosoma length 60; mesosoma width 39; mesoscutellum length 23; mesoscutellum width 23; fore wing length 90; fore wing width 55; marginal vein length 48; postmarginal vein length 12; stigmal vein length 10; fore wing marginal fringe length 4; gaster length 61; gaster width 39.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, Buenos Aires, Cerro Frantzius, 2134m, 12.iii-12.iv.2001, D. Rubí, MT, LS 574800_334750, #62125" (NHMUK).

Etymology. From the Latin *caelatus* = engraved, referring to the engraved sculpture on mesoscutellum.

Comments. This species has some odd features for a *Closterocerus*: a long postmarginal vein, radial cell hairy, but since it has a flattened antenna and infuscate pattern in fore wing it is provisionally placed here.

Closterocerus cincinnatus Girault
(Figs 61–64)

Closterocerus utahensis cincinnatus Girault, 1916:47. Holotype male, type locality: U.S.A., Ohio, Cincinnati, in USNM, examined.
Closterocerus cincinnatus Girault; Hansson (1994:4).

Diagnosis. Antenna flattened, scape widest at apex (Fig. 62); pronotum very short, pronotal collar without a carina along anterior margin (Fig. 61); mesoscutum and mesoscutellum with very weak reticulation (Figs 61, 63); fore wing with three infuscate bands (Figs 61–63): one along apical margin, one below stigmal vein, one below marginal vein; legs with coxae, femora, mid and hind tibiae dark brown, fore tibia with basal one-half dark brown and apical one-half infuscate; fore tarsus infuscate, mid and hind tarsi white; body compact with a large head (Fig. 61); length of body female 0.7–1.0mm, male 0.7mm.

Description (Mexican specimens, non-types). Length of body: 0.7–1.0mm.

Antenna dark brown. Frons dark brown with metallic green tinges. Vertex metallic purple. Mesoscutum, mesoscutellum, dorsellum and propodeum dark brown, anterior part of midlobe of mesoscutum and lateral parts of mesoscutellum metallic purple; mesoscutum and mesoscutellum golden-purple in some specimens. Legs with coxae, femora, mid and hind tibiae dark brown, fore tibia with basal one-half dark brown and apical one-half infuscate; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with three infuscate bands: one along apical margin, one below stigmal vein and one below median part of marginal vein, hind wing hyaline. Petiole dark brown. Gaster dark brown, tergites with metallic purple tinges.

Antenna flattened, scape widest in apical part. Frons with strong reticulation. Vertex with very strong mall-meshed reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Mesosoma: Pronotum very short, pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with very weak reticulation; mesoscutum with notauli distinct in anterior one-third, midlobe with two pairs of rather thick setae. Dorsellum convex with very weak reticulation. Propodeum smooth and shiny; callus with two setae. Fore wing with speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; Gt_{1-2} smooth, remaining tergites with very weak reticulation.

Relative measurements: head length dorsal 12.5; head length frontal 17; head width 28; POL 6; OOL 3; lateral ocellus maximum width 1.5; eye length 14.5; malar space 2; mouth width 7; mesosoma length 25.5; mesosoma width 25; mesoscutellum length 14; mesoscutellum width 15.5; fore wing length 41; fore wing width 26; marginal vein length 23; postmarginal vein length 1.5; stigmal vein length 4; fore wing marginal fringe length 4.5; gaster length 30; gaster width 27.

Male (Figs 63, 64). Length of body 0.7mm. Vertex, anterior part of mesoscutum and sides of mesoscutellum metallic green. Otherwise similar to female.

Hosts. Reared from cynipid galls (Hymenoptera: Cynipidae) on *Quercus* sp. (Fagaceae) (Hansson 1994).

Distribution. Canada (Hansson 1994), USA (Girault 1916). **New records**: Guatemala, Mexico.

Material examined.

Type material. Holotype ♂ of *Closterocerus utahensis cincinnatus* (USNM No. 19606). Non-type material (CNC, MZLU, TAMU). GUATEMALA: 1♀, Departamento Zacapa, 5km NW San Lorenzo, 12.vii.1986 (L. LeSage). MEXICO: 10♀, Michoacan, 10mi S Uruapan, 6.vii.1985 (J.B. Woolley); 1♀, Guerrero, 5.6mi NW El Ocotito, 3100' [945m], 7.vii.1987 (J.B. Woolley); 1♂, Guerrero, 2mi E Ocotito, 11.vii.1985 (J.B. Woolley); 1♀, Guerrero, 17mi E Tixtla, 11.vii.1985 (Woolley & Zolnerowich); 1♀, Oaxaca, 3mi SE Matatlan, Microondas Rd, 6650', 17.vii.1987 (Woolley & Zolnerowich); 1♀, Oaxaca, 3.2mi SW La Cumbre, 8.vii.1985 (J.B. Woolley); 1♀, Oaxaca, 8mi NE El Punto, 18.vii.1985 (Woolley & Zolnerowich).

Closterocerus cinctipennis Ashmead
(Figs 65–68, 207)

Closterocerus cinctipennis Ashmead, 1888:4. Neotype female CNC, examined. Designated by Hansson (1994:4),

Chrysonotomyia baliosa Yoshimoto, 1980:1042. Holotype female CNC, examined. Synonymy with *C. cinctipennis* by Hansson (1994:4).

Chrysonotomyia cunicularia Yoshimoto, 1980:1044. Holotype male in USNM, examined. Synonymy with *C. cinctipennis* by Hansson (1994:4).

Diagnosis. Antenna with F1–3 flattened and F4–5 less flattened, scape widest just below apex (Fig. 68); ocelli very small, ratio POL/posterior ocellus width 3.7 (Fig. 67); pronotal collar without a carina along anterior margin (Figs 65, 67); midlobe of mesoscutum with two pairs of setae (Fig. 67); fore wing hyaline with three infuscate parts: along apical margin, below stigmal and marginal veins (Figs 66, 67); hind tarsus predominantly white (T4 sometimes infuscate) (Figs 66, 68); length of body female 0.8–1.0mm.

Description (Mexican specimens). Length of body: 0.8–1.0 mm.

Antenna dark brown. Frons golden-green below frontofacial suture and golden-purple above suture. Vertex metallic blue with purple tinges. Mesoscutum with midlobe metallic blue, sidelobes

metallic purple. Mesoscutellum, dorsellum and propodeum metallic purple. Legs with coxae, femora and hind tibia dark brown, fore and mid tibiae dark brown in basal one-half and white in apical one-half; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with three infuscate parts: along apical margin, below stigmal vein and below marginal vein; hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic purple tinges.

Antenna predominantly flattened, F4–5 less so. Frons below frontofacial suture with weak reticulation, above suture with strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct ±throughout; midlobe with two pairs of short setae. Mesoscutellum with weak reticulation. Dorsellum convex with weak sculpture. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a transverse strip. Gaster ovate; tergites with weak reticulation.

Relative measurements: head length dorsal 12; head length frontal 14; head width 23; POL 5.5; OOL 2; lateral ocellus maximum width 1.5; eye length 11; malar space 4; mouth width 6; mesosoma length 24; mesosoma width 19.5; mesoscutellum length 11; mesoscutellum width 12; fore wing length 37; fore wing width 22; marginal vein length 19; postmarginal vein length 1.5; stigmal vein length 3; fore wing marginal fringe length 6; gaster length 27; gaster width 21.

Variation in paratype material. Body length 0.8–1.0mm.

Hosts. See lists in Peck (1963) and Hansson (1994).

Distribution. Canada & USA (Hansson 1994). **New record:** Mexico.

Material examined.

Type material. Types of *C. cinctipennis* (CNC No. 22130), *C. baliosa* (CNC No. 16058), *C. cunicularia* (USNM No. 76599). Non-type material (MZLU, TAMU). MEXICO: 1♀, Guerrero, 6.2mi SW Xochipala, 13.vii.1985 (J.B. Woolley); 1♀, Guerrero, 18.2mi S Iguala, 3000' [914m], 5.vii.1987 (J.B. Woolley); 1♀, Oaxaca, 6.8mi N Candelaria Loxicha, 3250' [991m], 12.vii.1987 (Woolley & Zolnerowich); 1♀, Oaxaca, 1.1mi W El Tule, 5400' [1646m], 17.vii.1987 (J.B. Woolley); 1♀, Puebla, 5mi SE Izucar de Matamoros, 20.vii.1984 (J.B. Woolley).

Closterocerus clarus sp.nov.

(Fig. 69)

Diagnosis. Antenna flattened, scape widest at apex; pronotal collar with a carina along anterior margin (Fig. 69); midlobe of mesoscutum with one pair of setae, attached in posterior part (Fig. 69); fore wing hyaline with areas below stigmal vein and along apical margin infuscate (Fig. 69); hind tarsus with T1 infuscate, T2–3 white, and T4 dark brown; length of body female 1.3mm.

Female holotype: length of body 1.3mm.

Antenna dark brown. Head with frons golden-green; vertex metallic purple. Mesoscutum golden with parts close to notauli metallic bluish-purple. Mesoscutellum with median part golden and lateral parts metallic bluish-purple. Dorsellum golden-green. Propodeum black. Coxae, femora, mid and hind tibiae dark brown, fore tibia pale brown in basal one-half and whitish in apical one-half; fore tarsus infuscate, mid tarsus with T1–3 white and T4 black, hind tarsus with T1 infuscate, T2–3 white and T4 black. Fore wing hyaline with area below stigmal vein and along apical margin infuscate, hind wing hyaline. Petiole black. Gaster dark brown with metallic blue, purple and green tinges.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation on midlobe, sidelobes with weak reticulation and shiny; notauli distinct throughout; midlobe with one pair of setae, attached in posterior part. Mesoscutellum convex, with strong reticulation, except sides and posterior part that have weak reticulation. Dorsellum convex and smooth. Propodeum with strong reticulation and with two irregular median carinae; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole transverse with strong sculpture on dorsal surface. Gaster ±circular with apex rounded; tergites smooth.

Relative measurements: head length dorsal 19; head length frontal 23; head width 38; POL 6; OOL 4; lateral ocellus maximum width 3; eye length 21; malar space 3; mouth width 9.5; mesosoma length 43; mesosoma width 32; mesoscutellum length 17.5; mesoscutellum width 20; fore wing length 58; fore wing width 38; marginal vein length 32; postmarginal vein length 1.5; stigmal vein length 6; fore wing marginal fringe length 3; gaster length 42; gaster width 36.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Guanacaste, Estación Pitilla, 700m, v.1994, P. Rios, LN 330200_380200, #3339" (NHMUK).

Etymology. From the Latin *clarus* = brilliant.

Closterocerus coffeellae Ihering
(Figs 1, 6–12, 70–74, 202–204, 208, 220, 233)

Closterocerus coffeellae Ihering, 1914:95. Unknown number of syntypes, type locality: Brazil, Sao Paulo, Tayuva, depository unknown. I have not seen any type material of *C. coffeellae*, but I have been able to examine a long series of specimens reared from the same host, the coffee leaf-miner (*Leucoptera coffeella*), as the type of this species, from Colombia. These specimens agree well with the original description of *C. coffeellae* and I am certain that they represent this species.

Diagnosis. Antenna dark brown, flattened, scape triangular and widest at apex (Fig. 220); frons with upper border with a blunt edge (Figs 204, 233); pronotal collar with a carina along anterior margin (Figs 70, 72); midlobe of mesoscutum with 3–5 pairs of short setae; fore wing infuscate with an uninterrupted hyaline band close to apical margin and with bare patch below marginal vein hyaline (Figs 1, 70, 72, 208); petiole 0.5–1× as long as wide, dorsally with strong sculpture; length of body female 1.1–2.0mm, male 1.1–1.8mm.

Redescription (female non-types, material below, ratios based on a female non-type specimen from Colombia reared from *Leucoptera coffeella*). Length of body: 1.1–2.0mm.

Antenna dark brown. Frons metallic purple to golden-green. Vertex metallic bluish-purple or purple. Midlobe of mesoscutum dark non-metallic with anterolateral parts and sidelobes metallic bluish-green or bluish-purple, completely dark non-metallic, midlobe metallic bluish-green with a golden-red medio-posterior spot and sidelobes metallic bluish-purple, or completely metallic

bluish-purple or purple. Mesoscutellum black non-metallic with sides metallic bluish-green or bluish-purple, completely metallic purple, metallic bluish-green with a golden-red antero-median spot, or completely bluish-purple. Dorsellum golden-purple, metallic bluish-green or purple. Propodeum black non-metallic or golden-purple. Coxae, femora, mid and hind tibiae dark brown; fore tibia whitish with basal one-third dark brown; fore and mid tarsi infuscate, hind tarsus with T1&4 dark brown, T2&3 white, occasionally with only T4 dark brown. Fore wing infuscate with an uninterrupted hyaline band close to apical margin and with bare patch below marginal vein hyaline, hind wing hyaline. Petiole black. Gaster dark brown with sides of $Gt_{1,2}$ metallic bluish-purple, to completely metallic bluish-purple.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped; frons with upper border with a blunt edge. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli narrow and complete; midlobe of mesoscutum with 3–5 pairs of short setae. Mesoscutellum with strong to weak reticulation. Dorsellum flat and smooth. Propodeum with a complete median carina and with strong reticulation, or without median carina and smooth. Fore wing with speculum closed; with a stigmal hairline and with radial cell bare.

Petiole 0.5–1× as long as wide with strong sculpture on dorsal surface. Gaster ±circular with apex rounded.

Relative measurements: head length dorsal 18.5; head length frontal 23; head width 40; POL 6; OOL 4; lateral ocellus maximum width 3.5; eye length 19.5; malar space 5.5; mouth width 9.5; mesosoma length 48; mesosoma width 37.5; mesoscutellum length 20; mesoscutellum width 22; fore wing length 68; fore wing width 43.5; marginal vein length 38; postmarginal vein length 3; stigmal vein length 6; fore wing marginal fringe length 3.5; gaster length 46; gaster width 38.

Male. Length of body: 1.1–1.8mm. Scape less expanded apically than in female. Vertex metallic bluish-purple in anterior one-half, metallic purple in posterior one-half; anterior one-half with strong reticulation, posterior one-half with very weak reticulation. Mesoscutum with midlobe golden-green to golden-red, sidelobes metallic purple. Mesoscutellum golden-red with sides metallic purple, or black medially and golden-green laterally. Dorsellum metallic purple or blue. Propodeum black with metallic tinges.

Hosts. The coffee leafminer (*Leucoptera coffeella*, Lepidoptera: Lyonetiidae) (Ihering 1914) and in material here from Colombia and Costa Rica. **New records**: *Evippe* sp. (Lepidoptera: Gelechiidae) on *Erythroxylum tortuosum* (Erythroxylaceae) (Brazil); *Porphyrosela* sp. (Lepidoptera: Gracillariidae) on *Phaseolus lunatus* (Leguminosae) (Costa Rica); *Phyllocnistis* sp. (Lepidoptera: Gracillariidae) (Brazil).

Distribution. Argentina (De Santis 1967), Brazil (Ihering 1914), Colombia (De Santis 1989). **New records**: Costa Rica, Guatemala, Honduras, Mexico, Peru.

Material examined.

Non-type material (CNC, MZLU, MZUCR, NHMUK, TAMU). BRAZIL: 3♀, Sao Paulo, Fazenda, Palmeira-da-Serra, Pratania, viii.2005, ex Evippe sp. on Erythroxylum tortuosum (M.N. Ishino); 1♀, Sao Paulo, Campinas, 2.x.1998, ex Phyllocnistis sp. (V.A. Costa). COLOMBIA: 55♀ 2♂, Departamento Caldas, Naranjal, 1400m, 15.viii.1994, ex Leucoptera coffeella (C.V. Lopez); 3♀, Valle Pradera, 1300m, 1981 (E. Florez); 2♀, Boyacá, SFF Iguaque, Cabaña Mamaramos, 2855m, 5°25'N, 73°27'W, 1-19.iv.2000 (P. Reina); 1♂ from same locality as previous but collected 17.viii-1.ix.2000; 1♂, Palacio, Paramo de Palacio, 4°41'N, 73°50'W, 2900m, 20.v.1992. COSTA RICA: 1♀, Alajuela, vicinity of Boca Tapada de San Carlos, 10°40'N, 84°12'W, 250m, 28.iii.1989, ex Tischeria sp. on Cecropia insignis (L.M. LaPierre); 1♀, Alajuela, P.N. Arenal,

10°28'N, 84°45'W, 617m, 21-28.ii.2005 (C. Hansson); 3♀, Cartago, La Cangreja, 9°48'N, 83°58'W, 1950m, ix-x.1991 (P. Hanson); 2♀, Cartago, Turrialba, P.N. Barbilla, Sendero Bartnon, LN21700_602550, 1550m, 26.iv.2001 (F. Umaña); 2♀, Cartago, Ochomogo, Centro de Investigacion, del Ganado lechero, Alfredo Volio Mata, 1300m, 6-8.iv.2001, ex larva of Porphyrosela sp. leaf miner on Phaseolus lunatus (A. Thiry); 1♀, Guanacaste, Est. Pitilla (ACG), 700m, 24.i-27.ii.1996 (J.S. Noyes); 1♀ from same locality as previous but collected 4-25.xi.1991; 1♀, Guanacaste, Guanacaste N.P., below Volcan Cacao, 400-600m, 3.iii.1990 (J.S. Noyes); 1♀, Guanacaste, R.V.S. Bosque Diriá, Torre Vigilancia, Cerrot Retallano, LN239083_358610, 700m, 12.vi-9.vii.2001 (I. Jiménez); 2♂, Heredia, Est. La Esperanza, 2500m, 24.iii.2002 (J. Azofeifa); 1♀, Heredia, 11km SE La Virgen, 450-500m, 23.ii-26.iv.2003, 05/M/NOTN, INBio-OET-ALAS; 1♀, Heredia, 16km SSE La Virgen, 10°16'N, 84°05'W, 1050-1150m, 9-29.iii.2001, 11/M/NOTN, INBio-OET-ALAS; 1♀, Limón, Valle Silencio, Zona de Acampar, LS341250_577200, 2400m, 17.iv-17.v.2001 (D. Rubí); 12♀ 5♂, Puntarenas, Est. Altamira, 9°02'N, 83°00'W, 1450-1700m, 7.ii-5.iii.2002 (C. Hansson & parataxonomos); 3♀, Puntarenas, San Vito, Las Cruces, Wilson Botanico, 8°47'N, 82°58'W, 1150m, 18-22.iii.1990 (J.S. Noyes); 1♀ from same locality as previous but collected 7-19.ii.2007; 3♀, Puntarenas, E.B. Monteverde, 10°20'N, 84°49'W, 1540m, 18-25.ii.2004 (C. Hansson); 3♀ from same locality as previous but collected 26.ii.2007; 1♀, San José, 6km N San Gerardo, 2800m, iv.1992 (P. Hanson); 1♂, San José, 26km N San Isidro, 9°30'N, 83°43'W, 2100m, ii-v.1991 (P. Hanson); 1♂ from same locality as previous but collected ix-x.1992; 3♀ 1♂, San José, 19km S, 1km W Empalme, Mirador Quetzales, 2600m, xii.1999-iv.2000 (P. Hanson); 4♀, San José, San Gerardo de Dota, 20-21.ii.2013 (J.S. Noyes); 1♀, San José, Cerro de la Muerte, , 20km S Empalme, 2800m, vii-ix.1990 (P. Hanson); 1♀, San José, Zurqui de Moravia, 1600m, ix-x.1993 (P. Hanson); 1♀, San José, San Pedro, UCR Campus, v.1993, ex Leucoptera on coffee (J. Bernal); 1♀ 2♂, Hwy. #2 km66, 9°36'N, 83°45'W, 2400m, 3-4.iv.1985 (L. Masner & H. Goulet). GUATEMALA: 1♀, 5km E Antigua Guatemala, 1780m, 7.xii.1991 (R. Baranowski). HONDURAS: 1♀, San Francisco Morazan, San Antonio de Oriente, Uyuca, 6.iii.1997 (C. Hansson); 1♀, Cortéz, P.N. San Cusuco, 5km N Buenos Aires, 15°29'N, 83°13'W, 8.iii.1997 (C. Hansson). MEXICO: 1♀, Durango, 30mi W La Ciudad, 6500' [1981m], 4.viii.1964 (W.R.M. Mason); 1♀, Guerrero, 32mi SE Petatlan, 14.vii.1984 (J.B. Woolley); 1♀, Jalisco, Rd to Parque Nacional de Volcan de Colima, 11mi W Hwy. junct. 54 (nr Atenquique), 11-12.vii.1984 (J.B. Woolley); 1♀, Puebla, 3.7mi S Zacapoaxtla, 23.vii.1985 (J.B. Woolley). PERU: 3♀ 1♂, Cusco, Ollantaytambo, 19.xii.1983 (L. Huggert).

Comments. The variation in colour on the thoracic dorsum is extensive in this species, in both sexes, as described above (Figs 70, 72, 202, 203).

Closterocerus complanatus sp.nov.

(Figs 75, 76, 209, 219)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Fig. 76, 219); pronotal collar with a rounded edge along anterior margin (Fig. 75, 76); midlobe of mesoscutum with two pairs of setae (Fig. 75); mesoscutum and mesoscutellum flattened (Fig. 76); hind tarsus white (Fig. 76); fore wing truncate and infuscate with two hyaline areas, one just below marginal vein and one band close to apical margin reaching from anterior to posterior margin of wing (Figs 76, 209); length of body female 1.2–1.4mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum and mesoscutellum metallic bluish-purple. Dorsellum and propodeum golden-purple. Coxae, femora and hind tibia dark brown, fore and mid tibiae white; fore tarsus infuscate, mid and hind tarsi white. Fore wing truncate and infuscate with two hyaline areas, one just below marginal vein and one band close to apical margin reaching from anterior to posterior margin of wing; hind wing hyaline. Petiole dark brown. Gt_{1-2} metallic purple, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation (but weaker than on vertex); frontofacial suture V-shaped; with upper border distinct. Vertex with strong reticulation. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a transverse and rounded edge along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli narrow and complete; midlobe of mesoscutum with two pairs of setae. Dorsellum convex and smooth. Propodeum with weak reticulation, partly smooth, without median carina; callus with two setae. Fore wing truncate; speculum closed; with a stigmal hairline and with radial cell bare.

Petiole short, just a narrow band. Gaster ovate; tergites smooth.

Relative measurements: head length dorsal 15; head length frontal 21; head width 31.5; POL 7; OOL 3.5; lateral ocellus maximum width 2.5; eye length 16.5; malar space 6; mouth width 8; mesosoma length 42; mesosoma width 27; mesoscutellum length 15; mesoscutellum width 16.5; fore wing length 65; fore wing width 41; marginal vein length 38; postmarginal vein length 2; stigmal vein length 5.5; fore wing marginal fringe length 6; gaster length 47; gaster width 29.

Variation in paratype material. Length of body: 1.2–1.4mm. Vertex, mesoscutum and mesoscutellum metallic bluish-purple, or purple.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: San José, Zurqui de Moravia, 1600m, 10˚03'N, 84˚0'W, iii.1995, Hanson & Godoy" (NHMUK). Paratype: 1♀ from same locality as holotype but collected vi.1995 (MZLU).

Etymology. From the Latin *complanatus* = flattened, referring to the dorsoventrally flattened body.

Closterocerus concinnus sp.nov.

(Figs 77, 78)

Diagnosis. Antenna not flattened, scape narrow, white with weak infuscation (Fig. 78); pronotal collar without a carina along anterior margin (Fig. 77); mesoscutum and mesoscutellum with strong and dense reticulation (Fig. 77); midlobe of mesoscutum with two pairs of setae (Fig. 77); fore wing hyaline with area below stigmal vein weakly infuscate (Fig. 77); legs white (Fig. 78); length of body female 1.1–1.3mm.

Female holotype: length of body 1.3mm.

Antenna white with weak infuscations. Frons metallic bluish-green. Vertex metallic purple. Mesoscutum, mesoscutellum and propodeum metallic bluish-purple; dorsellum metallic purple. Legs white. Fore wing hyaline with area below stigmal vein with weak infuscation, hind wing hyaline. Petiole dark brown. Gaster with Gt_1 metallic purple, Gt_{2-3} dark brown medially and metallic purple laterally, $Gt_{4,7}$ dark brown, Gt_5 metallic bluish-purple with median part dark brown, Gt_6 metallic bluish-purple.

Antenna not flattened, scape narrow. Frons with strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior two-thirds; midlobe with two pairs of setae. Mesoscutellum flat, with strong reticulation. Dorsellum convex with strong reticulation. Propodeum with rather strong reticulation; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; tergites with strong reticulation.

Relative measurements: head length dorsal 14; head length frontal 17; head width 27; POL 4; OOL 2.5; lateral ocellus maximum width 2.5; eye length 15; malar space 2.5; mouth width 7; mesosoma length 29; mesosoma width 22; mesoscutellum length 12; mesoscutellum width 13.5; fore wing length 45; fore wing width 28; marginal vein length 21; postmarginal vein length 2; stigmal vein length 4.5; fore wing marginal fringe length 3; gaster length 34; gaster width 24.

Variation in paratype material. Length of body: 1.1–1.3mm. The paratypes are similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Dominican Republic.

Material examined.

Type material. Holotype ♀ "DOMINICAN REPUBLIC: Prov. Pedernales, Sta Bahoruco, Alcoa Road, 530-750m, 14.vii.1990, L. Masner" (CNC). Paratypes (2♀, CNC, NHMUK): 1♀ "DOMINICAN REPUBLIC: Sierra de Bahoruca, Alcoa Road, 18.i.1989, montane dry forest, L.Masner"; 1♀ "DOMINICAN REPUBLIC: Barahonia, 4km N Paraiso, 150m, 22.iii.1991, L.Masner".

Etymology. From the Latin *concinnus* = elegant.

Closterocerus crassicornis sp.nov.

(Figs 79, 80)

Diagnosis. Antennal flagellum not flattened but thick, pedicel and scape slightly flattened, scape not expanded at apex (Figs 79, 80); pronotal collar without a carina along anterior margin (Fig. 79); midlobe of mesoscutum with four pairs of relatively short setae and with strongly curved notauli in anterior one-half (Fig. 79); fore wing hyaline with area below stigmal vein infuscate (Fig. 80); legs predominantly dark brown (Fig. 80); length of body female 1.5mm.

Female holotype: length of body 1.5mm.

Antenna dark brown. Frons golden-green. Vertex with anterior one-half metallic purple, posterior one-half metallic bluish-green. Mesoscutum, mesoscutellum and dorsellum metallic bluish-green. Propodeum metallic bluish-green on median part, metallic purple on lateral parts. Coxae, femora and hind tibia dark brown, fore and mid tibiae with basal one-half dark brown and apical one-half pale brown; fore and hind tarsi dark brown, mid tarsus with T1 whitish and T2–4 pale brown. Fore wing hyaline with area below stigmal vein infuscate, hind wing hyaline. Petiole black with metallic tinges. Gaster with $Gt_{1,6}$ metallic bluish-green, $Gt_{2\text{-}5}$ dark brown with sides metallic bluish-green, Gt_7 dark brown.

Antennal flagellum not flattened but thick, pedicel and scape slightly flattened. Frons with strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with four pairs of relatively short setae. Mesoscutellum flat, with relatively weak reticulation. Dorsellum convex and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; all tergites with weak reticulation.

Relative measurements: head length dorsal 17.5; head length frontal 23; head width 33.5; POL

7; OOL 3; lateral ocellus maximum width 2.5; eye length 15.5; malar space 6; mouth width 8; mesosoma length 44; mesosoma width 28; mesoscutellum length 17; mesoscutellum width 15.5; fore wing length 68; fore wing width 38; marginal vein length 35; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 4.5; gaster length 47; gaster width 30.

Male. Unknown.

Hosts. Unknown.

Distribution. Guatemala.

Material examined.

Type material. Holotype ♀ "GUATEMALA: Departamento Zacapa, 5km NW San Lorenzo, 12.vii.1986, L. LeSage" (CNC).

Etymology. From the Latin *crassus* = thick, and *cornu* = horn (equals antenna), referring to the thick antennal flagellum.

Closterocerus crinitus sp.nov.

(Figs 81, 82)

Diagnosis. Antenna flattened, scape widest in upper-median part (Fig. 82); pronotal collar without a carina along anterior margin (Fig. 82); midlobe of mesoscutum without setae (Fig. 82); mesoscutellum with weak reticulation (Fig. 82); fore wing narrow, 2.3× as long as wide, with long marginal fringe (Fig. 81); wings weakly infuscate ±throughout (Fig. 81); legs yellowish-white with hind coxa predominantly dark brown (Figs 81, 82); length of body female 0.9–1.0mm.

Female holotype: length of body 0.9mm.

Antenna dark brown. Frons golden with area above frontofacial suture metallic purple. Vertex metallic bluish-green with metallic purple tinges. Mesoscutum with midlobe metallic bluish-green, sidelobes metallic purple. Mesoscutellum metallic bluish-green with medio-anterior one-half golden-red. Dorsellum and propodeum metallic bluish-purple. Legs yellowish-white, except hind coxa that is predominantly dark brown. Wings weakly infuscate throughout. Petiole black with metallic tinges. Gaster with Gt_1 metallic bluish-purple, remaining tergites golden-purple.

Antenna flattened, scape widest in upper-median part. Frons with strong reticulation. Vertex with very weak reticulation and shiny. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with rather strong reticulation on midlobe, sidelobes with weak reticulation; notauli distinct in anterior one-third; midlobe without setae. Mesoscutellum convex with weak reticulation. Dorsellum flat and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing narrow with long marginal fringe, speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; all tergites smooth.

Relative measurements: head length dorsal 11.5; head length frontal 16.5; head width 22; POL 4; OOL 2.5; lateral ocellus maximum width 2; eye length 13; malar space 3; mouth width 6; mesosoma length 27; mesosoma width 21; mesoscutellum length 12; mesoscutellum width 12; fore wing length 54; fore wing width 23.5; marginal vein length 28; postmarginal vein length 2; stigmal vein length 4; fore wing marginal fringe length 11; gaster length 28; gaster width 16.

Variation in paratype material. Length of body: 0.9–1.0mm. Midlobe of mesoscutum metallic

bluish-green or golden-green. Mesoscutellum metallic bluish-green with medio-anterior one-half golden-red or golden-green. Wings weakly infuscate throughout or hyaline without infuscation.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, P.N. Tapanti, 9º45′N, 83º47′W, 1200-1550m, 20.iii-10.iv.2000, C. Hansson & D. Rubí" (MZLU). Paratypes: 10♀ with same label data as holotype (MZLU, MZUCR, NHMUK).

Etymology. From the Latin *crinitus* = fringed, referring to the long marginal fringe in fore wing.

***Closterocerus cuspidis* sp.nov.**
(Figs 83, 84)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 84); pronotal collar with a carina along anterior margin (Fig. 83); midlobe of mesoscutum with three pairs of setae, notauli ±complete, narrow and distinct (Fig. 83); fore wing infuscate with a hyaline band close to apical margin (Fig. 84); hind tarsus with T1 infuscate, T2–3 white, T4 dark brown (Fig. 84); female gaster elongate with apex pointed (Fig. 83); length of body female 1.5mm.

Female holotype: length of body 1.5mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum with midlobe metallic blue, sidelobes metallic purple. Mesoscutellum metallic blue. Dorsellum metallic purple. Propodeum golden-purple. Coxae, femora, mid and hind tibiae dark brown, fore tibia infuscate with base brown; fore tarsus infuscate, mid tarsus with T1–3 white and T4 infuscate, hind tarsus with T1 infuscate, T2–3 white, T4 dark brown. Fore wing infuscate with a hyaline band close to apical margin; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1,6}$ metallic bluish-purple, Gt_{2-3} dark brown with sides metallic bluish-purple, $Gt_{4,5,7}$ dark brown.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli narrow and distinct almost throughout, missing just close to anterior margin of mesoscutellum; midlobe of mesoscutum with three pairs of rather strong setae. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster elongate with apex pointed; $Gt_{1,2,7}$ smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 18; head length frontal 22; head width 34; POL 5.5; OOL 3.5; lateral ocellus maximum width 2.5; eye length 18.5; malar space 3; mouth width 8; mesosoma length 41; mesosoma width 29; mesoscutellum length 17; mesoscutellum width 18; fore wing length 63; fore wing width 41; marginal vein length 36; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 4; gaster length 56; gaster width 30.

Male. Unknown.

Hosts. Unknown.

Distribution. Dominican Republic.

Material examined.

Type material. Holotype ♀ "DOMINICAN REPUBLIC: Sierra de Bahoruca, Alcoa Road, 18.i.1989, montane dry forest, L. Masner" (CNC).

Etymology. From the Latin *cuspidis* = pointed end, referring to the pointed apex of gaster.

Closterocerus cymatilis sp.nov.

(Figs 85–87)

Diagnosis. Antenna dark brown with flagellum and scape narrow, pedicel flattened with a sharp edge along dorsal and ventral margins (Fig. 87); pronotal collar without a carina along anterior margin (Figs 85, 86); midlobe of mesoscutum with three pairs of setae (Fig. 85); fore wing hyaline with area below stigmal vein and along apical margin infuscate (Fig. 85); hind tarsus white (Figs 85, 86); length of body female 1.0–1.2mm, male 0.8–1.1mm.

Female holotype: length of body 1.2mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple. Mesoscutum metallic blue, anterior one-half metallic purple. Mesoscutellum metallic blue with purple tinges in posterior part. Dorsellum metallic purple. Propodeum metallic blue. Legs with coxae and femora dark brown; fore and mid tibiae dark brown in basal one-half and white in apical one-half, hind tibia dark brown with apical one-third white; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with area below stigmal vein and along apical margin infuscate; hind wing hyaline. Petiole dark brown. Gaster with Gt_1 metallic blue, $Gt_{2,3.5}$ metallic blue laterally and dark brown medially, $Gt_{4,6,7}$ dark brown.

Antenna with flagellum and scape narrow, pedicel flattened with a sharp edge along dorsal and ventral margins. Frons with strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with three pairs of short setae. Mesoscutellum with strong reticulation, with weak reticulation along posterior margin. Dorsellum convex with very weak reticulation, partly smooth. Propodeum with very weak reticulation, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a transverse strip. Gaster ovate; tergites with weak reticulation.

Relative measurements: head length dorsal 13; head length frontal 26; head width 32.5; POL 7; OOL 2.5; lateral ocellus maximum width 2.5; eye length 17.5; malar space 6.5; mouth width 8.5; mesosoma length 38.5; mesosoma width 26; mesoscutellum length 15.5; mesoscutellum width 16; fore wing length 60; fore wing width 36; marginal vein length 32; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 3.5; gaster length 42; gaster width 30.

Variation in paratype material. Length of body: 1.0–1.2mm. Mesoscutum metallic blue with anterior one-half metallic purple, or entirely metallic blue. Gt_1 metallic blue or purple.

Male (Fig. 86). Length of body 0.8–1.1mm. Vertex, mesoscutum and mesoscutellum golden-green; dorsellum metallic blue. Otherwise similar to female.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO: Puebla, 4.7mi. SW La Cumbre, 5100' [1555m], 23.vii.1987, J.B. Woolley, 87/055" (TAMU). Paratypes (2♀ 3♂, MZLU, TAMU): 1♀ 1♂ with same label data as holotype; 1♀ "MEXICO: Michoacan, 10mi. S Uruapan, 6.vii.1985, J.B. Woolley, 85/032"; 2♂ "MEXICO: Guerrero, 4.5mi. NW El Ocotito, 2800' [853m], 7.vii.1987, J.B. Woolley, 87/018".

Etymology. From the Latin *cymatilis* = sea-coloured, blue, referring to colour on thoracic dorsum.

Comments. The holotype has the head detached from the body and glued separately on the same card, and also lacks left wing pair.

Closterocerus deltoides sp.nov.

(Figs 3, 88–92, 210, 221)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 89, 221); frontofacial suture straight (Fig. 90); vertex flat, in same plane as thoracic dorsum, with long and strong setae (Fig. 90); head triangular in lateral view (Fig. 89); pronotal collar without a carina along anterior margin (Fig. 88); midlobe of mesoscutum with one pair of long and strong setae (Figs 88, 89); fore wing with apical one-third with median one-third infuscate and with an infuscate spot just below stigmal vein and one infuscate spot further down below level of stigmal vein (Fig. 210), to predominantly infuscate with dorso-apical and ventro-apical one-third and basal one-third hyaline (Figs 3, 88, 89); hind tarsus with T1&4 whitish, T2&3 infuscate (Fig. 89); length of body female 0.7–1.4mm, male 1.0–1.3mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Frons golden below level of toruli, golden-green above this level. Vertex metallic bluish-purple. Mesoscutum, mesoscutellum and dorsellum metallic purple. Propodeum brown with metallic purple tinges. Legs with fore coxa white, mid and hind coxae dark brown; fore and mid femora white with dorsal margin infuscate, hind femur dark brown with ventral part infuscate; tibiae white; tarsi with T1&4 whitish, T2&3 infuscate. Fore wing hyaline with apical one-third with median one-third infuscate and with an infuscate spot just below stigmal vein and one infuscate spot further down below level of stigmal vein; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1\text{-}2}$ metallic purple, remaining tergites dark brown with metallic tinges.

Antenna flattened with all flagellomeres distinctly separated, scape widest at apex. Frons and vertex with strong reticulation, reticulation on frons weaker than on vertex. Frontofacial suture straight. Subtorular sutures present but very short. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with one pair of long and strong setae, attached in posterior one-half of mesoscutum. Mesoscutellum smooth and shiny. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate-elongate.

Relative measurements: head length dorsal 17; head length frontal 19; head width 34; POL 6; OOL 4; lateral ocellus maximum width 3; eye length 14; malar space 6; mouth width 10; mesosoma length 42; mesosoma width 28; mesoscutellum length 17; mesoscutellum width 16; fore wing length 66; fore wing width 39; marginal vein length 31; postmarginal vein length 4; stigmal vein length 5; fore wing marginal fringe length 6; gaster length 50; gaster width 28.

Variation in paratype material. Length of body: 0.7–1.4mm. Vertex metallic bluish-purple or bluish-green. Mesoscutum metallic purple, metallic bluish-purple or metallic bluish-green, with strong reticulation to smooth. Mesoscutellum metallic purple, bluish-purple or bluish-green. Fore

wing hyaline with apical one-third with median one-third infuscate and with an infuscate spot just below stigmal vein and one infuscate spot further down below level of stigmal vein, *or* predominantly infuscate with dorso-apical and ventro-apical one-third and basal one-third hyaline.

Male (Figs 91, 92). Length of body 1.0–1.3mm. Antenna weakly flattened; flagellomeres with setae confined to a basal whorl. Mesoscutum with midlobe golden-green, sidelobes metallic bluish-purple, or completely metallic purple. Mesoscutellum golden-red with lateral and posterior parts metallic bluish-purple. Gaster with a white spot medially in anterior one-half. Otherwise similar to female.

Hosts. Unknown.

Distribution. Costa Rica, Ecuador.

Material examined.

Type material. Holotype ♀ "COSTA RICA: San José, Zurqui de Moravia, 1600m, 10˚3'N, 84˚0'W, v.1992, P. Hanson" (MZLU). Paratypes (42♀ 3♂, CNC, MZLU, MZUCR, NHMUK): 1♀ with same label data as holotype; 1♀ from same locality as holotype but collected viii.1991; 1♀ "COSTA RICA: San José, San Gerardo de Dota, 20-21.ii.2013, J.S. Noyes, NHM (Ent) 2012-91"; 1♀ "COSTA RICA: Alajuela, P.N. Arenal, Send. Pilón, 10º27'N, 84º43'W, 26.ii.2003, J.S. Noyes"; 1♀ "COSTA RICA: Alajuela, R.F. Rincon, Estación Caribe, 10º53'N, 83º18'W, 19-20.ii.2003, J.S. Noyes"; 1♀ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♀ "COSTA RICA: Cartago, La Represa, Torre del I.C.E., entre Porras y Villegas, 1800m, xii.1996, R. Delgado, MT, LN 186150_560100, #45678"; 1♀ "COSTA RICA: Guanacaste, Estación Pitilla, 700m, 24.i-27.ii.1998, J.S. Noyes, MT/YPT"; 3♀ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 27-28.ii.2003, J.S. Noyes"; following from same locality as previous but collected 28-29.ii.2008 (1♀), 22-24.ii.2012 (1♀)"; 1♂ "COSTA RICA: Heredia, Estación La Esperanza, 2500m, 24.iii.2002, J. Azofeifa"; 2♀ "COSTA RICA: Limón, R.B. Hitoy Cerere, V. Estrella, Send. Espavel, 560m, 18.ix-4.x.2003, E. Rojas, B. Gamboa, W. Arana, LS 401200/569800, #75496"; 1♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 9º40'N, 83º02'W, 100m, 22-23.ii.2010, J.S. Noyes"; 1♀ "COSTA RICA: Limón, A.C.L.A.C, Central, R.B. Hitoy Cerere, Est Hitoy Cerere, Send Bobócara. 740m, 17.iv-13.v.1999, F. Umaña, MT, LN 184750 _639500, #52773"; 1♀ from same locality as previous but collected 24-25.ii.2004; 2♀ "COSTA RICA: Limón, Pococí, P. N. Braulio Carrillo, Estación Quebrada González, 400-500m, 23.iv.2002, P. Hanson & C. Godoy, LN 238380/543100, #67598"; 2♀ "COSTA RICA: Braulio Carrillo N.P., 10˚10'N, 84˚07'W, 500m, 10.iv.1985, H. Goulet & L. Masner"; 1♀ "COSTA RICA: Puntarenas, Golfo Dulce, 3km SW Rincon, 10m, vii.1991. P. Hanson"; 1♀ "COSTA RICA: Puntarenas, Golfo Dulce, 3km S Rincon, 10m, iii-v.1989. P. Hanson"; 1♀ "COSTA RICA: Puntarenas, Golfo Dulce, 24km W Piedras Blancas, 200m, 8˚46'N, 83˚24'W, xii.1990, P. Hanson"; following from same locality as previous but collected i-iii.1991 (2♀), iv-v.1991 (1♀), ii.1992 (1♀), iii.1992 (1♀), iv.1993 (1♀); 1♀ 2♂ "COSTA RICA: Puntarenas, Estación Altamira, Send. Los Gigantes, 1450m, 9º02'N, 83º00'W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos"; 1♀ from same locality as previous but collected 11.i-11.ii.2002; 1♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º46'N, 82º57'W, 1300m, 15-16.ii.2012, J.S. Noyes"; 1♀ "COSTA RICA: Puntarenas, Golfito, Estación Agujas, 300m, 13.i-15.ii.2001, J. Azofeifa. MT, LS 526550/276750, #61326"; following from same locality as previous but collected 10.iv-10.v.2001 (1♀), 20.xii.2001-7.ii.2002 (1♀); 1♀ "COSTA RICA: Puntarenas, Golfito, P.N. Corcovado, Send. a Sirena, La Casona, 100m, 25.xii.2000-13.ii.2001, J. Azofeifa, LS 514200/276500, #61322"; 2♀ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 8º29'N, 83º35'W, 5m, 19-20.ii.2004, J.S. Noyes"; 1♀ "COSTA RICA: Highway #2km66, 9˚45'N, 84˚10'W, 2400m, 4.iv.1985, H. Goulet & L. Masner". 1♀ "ECUADOR: Pichin, Puerto Quito, 2.iii.1983, L. Huggert".

Etymology. Named after the shape of head in lateral view (triangular), the Greek letter *delta* is a triangle, and *eidos* = resemblance.

***Closterocerus eulampis* sp.nov.**
(Figs 93, 94, 98)

Diagnosis. Antenna with scape, pedicel and F1–2 flattened, F3–5 not flattened, scape widest in apical part, F1–3 dark brown and F4–5 pale brown (Fig. 94); pronotal collar without a carina along anterior margin (Fig. 93); midlobe of mesoscutum with very weak reticulation and with two pairs of long and strong setae (Fig. 93); mesoscutellum with very weak reticulation (Fig. 93); fore wing hyaline with median one-third and apical margin infuscate (Fig. 93); length of body female 0.8–1.1mm, 0.7–1.1mm.

Female holotype: length of body 0.9mm.

Antenna dark brown, except pale brown F4–5. Frons golden-green. Vertex metallic bluish-purple in anterior one-half, golden-green in posterior one-half. Mesoscutum with midlobe golden-green, sidelobes metallic purple. Mesoscutellum golden-green in anterior one-half, metallic bluish-purple in posterior one-half. Dorsellum and propodeum black with metallic purple tinges. Legs with coxae and femora dark brown; fore tibia infuscate, mid tibia white, hind tibia dark brown; tarsi white. Fore wing hyaline with median one-third and apical margin infuscate; hind wing hyaline. Petiole dark brown. Gastral tergite 1 metallic purple, remaining tergites golden-purple.

Antenna with scape, pedicel and F1–2 flattened, F3–5 not flattened and narrow, scape widest in apical part. Frons with strong reticulation. Vertex with strong reticulation in anterior one-half, with very weak reticulation in posterior one-half. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with very weak reticulation; notauli distinct in anterior two-thirds; midlobe of mesoscutum with two pairs of long and strong setae. Mesoscutellum ±flattened, with very weak reticulation. Dorsellum convex and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing with speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster circular; tergites smooth and shiny.

Relative measurements: head length dorsal 14; head length frontal 20; head width 28; POL 4.5; OOL 2; lateral ocellus maximum width 2.5; eye length 16; malar space 3.5; mouth width 6; mesosoma length 29; mesosoma width 24; mesoscutellum length 13; mesoscutellum width 13; fore wing length 52; fore wing width 29; marginal vein length 26; postmarginal vein length 1.5; stigmal vein length 4; fore wing marginal fringe length 5.5; gaster length 30; gaster width 25.

Variation in paratype material. Length of body: 0.8–1.1mm. Mesoscutum with midlobe golden-green or golden-red, sidelobes metallic purple or golden-green. Mesoscutellum golden-green or golden-red in anterior one-half, metallic bluish-purple or golden-green in posterior one-half. Dorsellum black with metallic purple tinges or golden-green. Gt_1 metallic purple or blue.

Male (Fig. 98). Length of body: 0.7–1.1mm. Similar to, and with same colour variations as in females.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, La Selva Biological Station, 50m, 10º25'N, 84º01'W, xii.1995" (NHMUK). Paratypes (57♀ 48♂, CNC, MZLU, MZUCR, NHMUK): 14♀ from same locality as holotype but collected ix.1995-iv.1996; following from same locality as holotype but collected 27-28.ii.2001 (2♂), 30-31.iii.2002 (1♂), 27-28.ii.2003 (4♀ 4♂), 23-24.ii.2005 (2♀ 4♂), 23.ii.2006 (1♀ 2♂), 28-29.ii.2008 (1♀), 22-24.ii.2012 (7♂); 1♀ "COSTA RICA: Heredia, 11km SE La Virgen, 450-550m, 13.ii-20.iv.2003"; 1♀

"COSTA RICA: Heredia, Chilamate, 75m, 25.iii.1989, Hanson & Godoy"; 2♀ 3♂ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10º41'N, 84º11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♂ "COSTA RICA: Alajuela, P.N. Arenal, Send. Ceibo, 10º27'N, 84º41'W, 22-23.ii.2016, J.S. Noyes, NHM (Ent) 2016-79"; 1♀ "COSTA RICA: Guanacaste, P.N. Palo Verde, Sct Palo Verde, Camino a area de acampar; 0-50m, 10-18.vii.2000, I. Jiménez, LN 260952/385020"; 3♀ "COSTA RICA: Limón, Pococi, P.N.Braulio Carrillo, Estación Quebrada Gonzalez, 10º09'N, 83º57'W, 400-500m, 23.iv.2002, Hanson & Godoy"; following from same locality as previous but collected 4.vi.2002 (2♀), 21.viii.2002 (3♀), 24.ix.2002 (3♀), 15.ii.2003 (1♀ 9♂), 25.ii.2005 (2♀ 7♂); 2♀ 1♂ "COSTA RICA: Limón, R.B. Hitoy-Cerere, HQ, 100m, 9º40'N, 83º02'W, 14-18.i.1991, J.S. Noyes"; following from same locality as previous but collected 8.v.1999 (1♀), 17.iv-17.vii.1999 (3♀), 17.ii-17.vi.2000 (2♀), 24-25.ii.2004 (1♀ 4♂), 20-22.ii.2006 (2♀ 2♂), 22-23.ii.2010 (1♂); 2♀ "COSTA RICA: Limón, 16km W Guapiles, 400m, iii.1989, Paul Hanson"; 1♀ from same locality as previous but collected x-xi.1989; 2♀ "COSTA RICA: Puntarenas, P.N. Piedras Blancas, Estación El Bonito, 100m, 08º43'N, 83º13'W, 13-14.ii.2012, J.S. Noyes, NHM (Ent) 2012-91".

Etymology. From the Greek *eulampes* = bright, shining, referring to the shiny dorsum.

Comments. Female holotype missing F5 on right antenna.

Closterocerus flammeus sp.nov.

(Figs 95–97)

Diagnosis. Antenna slightly flattened, scape widest at apex (Fig. 96); flagellum with F4–5 paler than remainder of antenna (Fig. 96); pronotal collar without a carina along anterior margin (Fig. 95); mesoscutellum with weak reticulation and 0.9× as long as wide (Fig. 95); major part of midlobe of mesoscutum and scutellum golden-red (Fig. 95); fore wing hyaline with area below stigmal vein infuscate (Fig. 95); hind tarsus yellowish-brown (Fig. 95); length of body female 0.8–1.2mm, male 0.6–1.0mm.

Female holotype: length of body 1.2mm.

Antenna with scape, pedicel and F1–3 dark brown, F4–5 infuscate. Frons golden-green. Vertex metallic blue in anterior one-half, golden-green in posterior one-half. Mesoscutum with midlobe golden-red, sidelobes metallic blue. Mesoscutellum golden-red with lateral and posterior margins golden-green. Dorsellum metallic bluish-green. Propodeum golden-green medially and metallic bluish-purple laterally. Legs with coxae, femora, mid and hind tibiae dark brown, fore tibia white with base brown; fore tarsus infuscate, mid and hind tarsi yellowish-brown. Fore wing hyaline with area below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1,6}$ metallic blue, Gt_{2-5} dark brown with sides metallic blue, Gt_7 dark brown.

Antenna slightly flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin with a rounded edge behind ocellar triangle.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct ±throughout and strongly curved; midlobe without setae. Mesoscutellum slightly flattened with weak reticulation. Dorsellum convex with weak reticulation. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a transverse strip. Gaster ovate; Gt_{1-2} with weak reticulation, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 14; head length frontal 18.5; head width 31; POL 5; OOL 2.5; lateral ocellus maximum width 2; eye length 16; malar space 4; mouth width 9.5; mesosoma length 34; mesosoma width 26; mesoscutellum length 13.5; mesoscutellum width 15.5; fore

wing length 55; fore wing width 32; marginal vein length 27; postmarginal vein length 1.5; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 40; gaster width 26.

Variation in paratype material. Length of body: 0.8–1.2mm. Vertex metallic blue in anterior one-half and golden-green in posterior one-half, or metallic purple in anterior one-half and metallic blue in posterior one-half, to completely metallic purple; with strong reticulation throughout, or with strong reticulation in anterior one-half and weak reticulation in posterior one-half. Midlobe of mesoscutum with strong reticulation, or with posterior two-thirds with same weak reticulation as on mesoscutellum; sidelobes metallic blue or purple. Propodeum golden-green medially and metallic bluish-purple laterally, or metallic purple. Gaster with Gt_1 metallic blue or purple.

Male (Fig. 97). Length of body: 0.6–1.0mm. Vertex golden-green, or metallic blue. Otherwise similar to female.

Hosts. Unknown.

Distribution. Costa Rica, Venezuela.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, Humo, El Copal, 9°47'N, 83°45'W, 1050-1250m, 29.ii-6.iii.2008, C. Hansson" (MZLU). Paratypes (55♀ 37♂, CNC, MZLU, MZUCR, NHMUK, TAMU): 5♀ with same label data as holotype; 5♀ "COSTA RICA: Alajuela, P.N. Arenal, Send. Ceibo, 10º27'N, 84º41'W, 22-23.ii.2016, J.S. Noyes, NHM (Ent) 2016-79"; 1♀ 1♂ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 11♀ 9♂ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 23-24.ii.2005, J.S. Noyes"; following from same locality as previous but collected 23.ii.2006 (3♀ 1♂), 28-29.ii.2008 (1♀ 3♂), 23-24.ii.2012 (3♂); 1♀ "COSTA RICA: Heredia, R.P. Selva Verde, 10°27'N, 84°04'W, 75m, 13.ii.2005, C. Hansson"; 7♀ 3♂ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 24-25.ii.2004, J.S. Noyes"; following from same locality as previous but collected 20-22.ii.2006 (1♀ 3♂), 22-23.ii.2010 (2♂); 1♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º47'N, 82º58'W, 1000-1300m, 7-19.ii.2007, C. Hansson"; 1♀ from same locality as previous but collected 15-16.ii.2006; 7♀ 4♂ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 8º29'N, 83º35'W, 5m, 19-20.ii.2004, J.S. Noyes"; 1♀ 4♂ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 305m, 9˚52'N, 85˚03'W, 14-15.ii.2005, J.S. Noyes"; 1♀ 2♂ from same locality as previous but collected 17-18.ii.2011; 1♀ "COSTA RICA: Puntarenas, P.N. Piedras Blancas, 100m, 8˚43'N, 83˚13'W, 13-14.ii.2012, J.S. Noyes, NHM (Ent) 2012-91"; 1♀ "COSTA RICA: Puntarenas, Dominical, 31.viii.1986, L. Masner, S.S.[screen sweeping]". 7♀ 2♂ "VENEZUELA: Araqua, Rancho Grande, 28.v.1990, 3650´, J.B. Woolley, 90/003".

Etymology. From the Latin *flammeus* = fiery-red, flame-coloured, in reference to the colour of midlobe of mesoscutum and mesoscutellum.

Closterocerus flavicinctus De Santis
(Figs 4, 99–103)

Closterocerus flavicinctus De Santis, 1983:12. Holotype female, type locality: Brazil, Sao Paulo, Jaboticabal, in a private collection (Dr. Gravena, Brazil), not examined. The holotype has not been located but the detailed original description by De Santis, including illustrations, is sufficient to identify it.

Diagnosis. Female: antenna slightly flattened, scape relatively narrow and widest close to apex, dark brown except F4 that is yellowish-white, infuscate or pale brown (Fig. 100), i.e. paler than remaining flagellomeres; ocelli small, ratio POL/posterior ocellus width = 1.8 (Fig. 101); pronotal collar without a carina along anterior margin (Fig. 99); midlobe of mesoscutum with three pairs of

setae (Fig. 99); midlobe of mesoscutum and mesoscutellum with strong reticulation and with same colour (metallic blue, bluish-purple to purple) (Fig. 99); fore wing hyaline with area below stigmal vein and along apical margin infuscate (Figs 4, 99). Male: antennal flagellum narrow, not flattened, F1 dark brown and F2–F5 orange-brown to pale brown (Fig. 103), i.e. with F1 darker than F2–5; length of body female 0.6–1.3mm, male 0.6–0.9mm.

Redescription based on material accounted for below. Length of body: 0.6–1.3mm.

Antenna dark brown with F4 yellowish-white, infuscate to pale brown. Frons black with metallic green tinges. Vertex black with metallic green tinges in anterior one-half, posterior one-half metallic bluish-purple, or completely metallic purple. Mesoscutum golden-green, metallic bluish-purple, purple or blue, midlobe and sidelobes usually with different colour. Mesoscutellum golden-green, metallic bluish-purple, purple or blue. Dorsellum black with metallic tinges, or metallic purple. Propodeum golden-purple or metallic purple. Legs with coxae dark brown; fore and mid femora infuscate to dark brown - usually dark brown, hind femur dark brown; fore and mid tibiae white with base dark brown, hind tibia dark brown; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with area below stigmal vein and along apical margin infuscate; hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic purple or blue tinges.

Antenna slightly flattened, scape relatively narrow and widest close to apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation, reticulation slightly weaker on mesoscutellum; notauli distinct in anterior two-thirds; midlobe of mesoscutum with three pairs of weak setae. Dorsellum convex with very weak sculpture. Propodeum smooth; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; tergites smooth and shiny.

Relative measurements (from a specimen from Costa Rica, body length 1.1 mm): head length dorsal 16; head length frontal 21.5; head width 31; POL 5.5; OOL 2.5; lateral ocellus maximum width 3; eye length 17; malar space 4; mouth width 8.5; mesosoma length 35; mesosoma width 28; mesoscutellum length 15; mesoscutellum width 16.5; fore wing length 50; fore wing width 32; marginal vein length 25; postmarginal vein length 2; stigmal vein length 5; fore wing marginal fringe length 3; gaster length 33; gaster width 26.

Male (Figs 102, 103). Length of body 0.6–0.9mm. Scape, pedicel and F1 dark brown, F2–5 orange-brown to pale brown. Vertex metallic bluish-purple to blue. Mesoscutum with midlobe golden-green, golden-red or golden, sidelobes metallic bluish-purple, purple or golden-green. Mesoscutellum golden-green, golden-red or golden. Dorsellum metallic purple. Propodeum metallic bluish-green. Fore wing narrow with long marginal fringe.

Hosts. The coffee leaf-miner (*Leucoptera coffeella* Guérin-Meneville) (Lepidoptera: Lyonetiidae) (De Santis 1983). **New records**: the citrus leaf-miner (*Phyllocnistis citrella* Stainton) (Lepidoptera: Gracillariidae) (USA), unidentified Lepidoptera leafminer on *Cecropia polyphlebia* (Cecropiaceae) (Costa Rica), unidentified Gracillariidae on *Canavalia maritima* (Leguminosae) (Honduras), *Liriomyza sativae* Blanchard (Diptera: Agromyzidae) (Honduras), *Pachyscelus nigricollis* (Coleoptera: Buprestidae) on *Cecropia insignis* (Costa Rica), *Pachyscelus* sp. on *Terminalia catappa* (Costa Rica).

Distribution. Brazil (De Santis 1983). **New records**: Argentina, Bahamas, Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Mexico, St Vincent, Trinidad & Tobago, USA (Florida), Virgin Islands.

Material examined.

Non-type material (CNC, MZLU, MZUCR, NHMUK, TAMU). ARGENTINA: 1♀, S de Estero, 5km NE Los Telares, 23-24.xi.1979 (C&M Vardy). BAHAMAS: 2♀, Run Key, pan trap, v.1993 (B. Bowen). COLOMBIA: 1♀, Magdalena, PNN Tayrona, Zaino, 11°20'N, 74°02'W, 50m, 28.vi-17.vii.2000 (R. Henriquez). COSTA RICA: 33♀ 44♂, Alajuela, P.N. Arenal, 10°28'N, 84°45'W, 617m, 21-28.ii.2005 (C. Hansson); 8♀ 6♂, Alajuela, P.N. Arenal, La Peninsula, 10°27'N, 84°45'W, 600m, 25.ii.2003 (J.S. Noyes); 2♀, Alajuela, P.N. Arenal, Sendero Ceibo, 10°27'N, 84°44'W, 620m, 22-23.ii.2016, (J.S. Noyes); 1♀, Alajuela, P.N. Arenal, 10°28'N, 84°45'W, 617m, 21-28.ii.2005 (C. Hansson); 1♀, Alajuela, P.N. Arenal, Sendero Pilón, 10°27'N, 84°43'W, 600m, 26.ii.2003 (J.S. Noyes); 1♀ from same locality as previous but collected 15.iii-5.iv.2001; 1♀, Alajuela, Est. Pilón, 10°43'N, 85°59'W, 700m, 12-18.ii.2004, (C. Hansson & J.A. Azofeifa); 2♂, Alajuela, R.F. Rincón, Est. Caribe, 10°53'N, 83°18'W, 19-20.ii.2003 (J.S. Noyes); 1♀, Alajuela, N slope Volcan Cacao, 650m, 17.iii.1986 (C. Hansson); 1♀, Alajuela, Est. Caño Negro, LN319062_450083, 0-100m, 4.ix.2005 (M. Moraga, J. Azofeifa, Y. Cárdenas); 1♀, Cartago, Paraiso, P.N. Tapantí-Macizo de la Muerte, Torre #31, LN561800_188500, 9.vii-10.viii.2000 (D. Rubí); 2♀, Cartago, Rio Chitaria, NE de Jabillos, 750m, 28.iv.1988 (P. Hanson); 3♀, Guanacaste, P.N. Palo Verde, Sector Palo Verde, LN385020_260952, 10-18.viii.2000 (I. Jiménez); following from same locality as previous but collected 13-20.ix.2000 (2♀), 11-21.x.2000 (3♀), 13-20.xi.2000 (1♀); 2♀ ♂, Guanacaste, R.F. Monte Alto, Cerro Romo, LN220700_382545, 883m, 27-29.x.2001 (I. Jiménez); 1♀, Guanacaste, P.N. Bosque Diriá, Retallano, alrededores Torre Control de Incendio, LN238550_358650, 600-700m, 16.xii.2001-16.i.2002 (I. Jiménez); 1♀ from same locality as previous but collected 14-15.ii.2011; 1♀. Guanacaste, Los Pailas, LN389145_306004, 1080m, 27.i-1.ii.2001 (P.N. Thomas & C. Moraga); 1♀, Guanacaste, Est. Cacao (ACG), 1100m, 23-24.ii.2001 (J.S. Noyes); 1♀, Guanacaste, Santa Cruz, P.N. Marino Las Baulas, LN258040_332690, 0m, 16.viii.2000 (Y. Cárdenas); 1♀ from same locality as previous but collected 14.xii.2000; 4♀, Guanacaste, Cañas, Rio Chiquito, LN292500_417000, 410m, 25.vii.2003 (J. Azofeifa); 1♀, Guanacaste, Volcán Cacao, Cerro Pedregal, 1000m, ii-iv.1989 (I. Gauld); 1♀, Guanacaste, P.N. Santa Rosa, 300m, 18.x-8.xi.1986 (D.H. Janzen & I.D. Gauld); 1♀ from same locality as previous but collected 4-25. iv.1987; 122♀ 13♂, Heredia, Santo Domingo, INBio-Parque, iii.2002 (J.S. Noyes & J.A. Azofeifa); following from same locality as previous but collected ii-iii.2000 (2♀), 6.xi-6.xii.2000 (1♀), 19.ii.2001 (1♀), 22.v-27. vi.2001 (1♂), 1-12.iv.2002 (1♂), 11-25.ii.2006 (2♀ 4♂), 13.ii.2016 (1♀); 4♀ 1♂, Heredia, Est. Biol. La Selva, LN264463_532850, 100-200m, 30-31.ii.2002 (J.A. Azofeifa); 2♀ from same locality as previous but collected 27.iii.1988; 1♀, Heredia, 16km SSE La Virgen, 10°16'N, 84°05'W, 1050-1150m, 9-29.iii.2001, 11/M/NOTN, INBio-OET-ALAS intersect; 1♀, Heredia, Chilamate, 75m, 4.ii.1989 (Hanson & Godoy); 4♀ 1♂, Puntarenas, Est. Altamira, Sendero Casa Coca, 9°02'N, 83°00'W, 1450-1700m, 7.ii-5.ii.2002, (C. Hansson & parataxonomos); 4♀, Puntarenas, Isla San Lucas, Playa El Coco, LN214450_437850, 0-10m, 9.iii.2005 (J. Azofeifa); 1♀, Puntarenas, P.N. Carara, 9°46'N, 84°57'W, 41m, 1-7.iii.2005 (C. Hansson); 1♀, Puntarenas, Golfito, P.N. Corcovado, Est. Agujas, 11.iii.2002 (J. Azofeifa); 3♀, Puntarenas, Golfito, Est. El Tigre, LS277800_529600, 34m, 7.ii.2002 (J. Azofeifa); 1♀ from same locality as previous but collected 25.iv.2001; 1♀, Puntarenas, R.P. Karen Mogensen, 9°52'N, 85°03'W, 305m, 14-15.ii.2005 (J.S. Noyes); 1♀, Puntarenas, San Vito, Las Cruces, 8°47'N, 82°58'W, 1000-1300m, 7-19.ii.2007 (C. Hansson); 1♀, Puntarenas, E.B. San Miguel, 9°34'N, 85°08'W, 0-50m, 2.xii.1998, ex Pachyscelus sp. on Terminalia catappa (L.M. LaPierre); 1♀, Puntarenas, upper San Luis Valley, 10°15'N, 84°45'W, 100m, iv.1999, ex Pachyscelus nigricollis on Cecropia insignis (L.M. LaPierre); 1♀, Puntarenas, San Luis de Monteverde & vicinities, 10°17'N, 84°49'W, 50-150m, xii.1997, ex lep. leaf miner on Cecropia polyphlebia (L.M. LaPierre); 1♂, Puntarenas, Monteverde, "Ecological Farm", 10°18'N, 84°49'W, 1350m, 16-17.ii.2003 (J.S. Noyes); 1♀, San José, Zurqui de Moravia, 10°03'N, 84°00'W, 1600m, iv.1995 (P. Hanson); 1♀ from same locality as previous but collected ix.1995; 3♀, San José, Ciudad Colón, 800m, 1.iii.1997 (C. Hansson); 1♀ from same locality as previous but collected ii.1990; 1♀, San José, San Pedro, UCR Campus, 1200m, 28.ii.1997 (C. Hansson). DOMINICAN REPUBLIC: 2♀, Barahonia, 4km N Paraiso, 150m, 22.iii.1991 (L. Masner); 1♀, Barahonia, 7km NW Paraiso, rain forest remnant, 27.xi.1991 (L. Masner & S. Peck. GUATEMALA: 2♀, Dpto Zacapa, below San Lorenzo, 750m, 18.xi.1986 (M. Sharkey). HONDURAS: 9♀ 4♂, Atlantida, La Ceiba, 14.viii.1992, ex Gracillariidae on Canavalia maritima (R. Cave); 9♀, Colon, Puerto Castilla, 21.vii.1992, ex Gracillariidae on Canavalia maritima (R. Cave); 2♀, Yoro, Pico Pijol, 9.iii.1997 (C. Hansson); 1♀, Choluteca, Los Colorados, 21.iii.1992, ex Liriomyza sativae on Cucumis sativus (N. Acosta); 4♀, Francisco Morazan, San Antonio de Oriente, El Zamorano, 27.ii-2.iv.1992, ex Liriomyza sativae on Cucumis sativus (N. Acosta); 1♀, El Paraiso, Danli, Opalaca, 3.xi.1994, ex Phaseolus vulgaris (R. Cordero). MEXICO: 1♀, Chiapas, 47.2mi S Palenque, 12300' [3749m], 21.vii.1983 (R. Anderson);

1♂, Guerrero, 6.2mi SW Xochipala, 13.vii.1985 (J.B. Woolley); 2♀, Hidalgo, 12.4mi NE Tlanchinol, 2500' [762m], 14.vi.1983 (R. Anderson); 1♀ 1♂, Michoacan, 6mi N Cheran, 8.vii.1985 (J.B. Woolley); 2♀, Michoacan, 2mi S Carapan, 6.vii.1985 (J.B. Woolley); 1♂, Michoacan, 10mi S Uruapan, 6.vii.1985 (J.B. Woolley); 1♀ 3♂. Oaxaca, 16.xi.1983 (C.M. Yoshimoto); 2♀, Oaxaca, 15.1mi N San Gabriel Mixtepec, 3850' [1174m], 11.vii.1987 (Woolley & Zolnerowich); 1♀, Oaxaca, 19mi S San Miguel Suchixtepec, 17.vii.1985 (Woolley & Zolnerowich); 3♀, Oaxaca, 8mi NE El Punto, 18.vii.1985 (Woolley & Zolnerowich); 3♀, Oaxaca, 10mi E Totolapan, 4000' [1219m], 20.vii.1987 (J.B. Woolley); 1♀, Oaxaca, 29.1mi E Pochutla, 80' [24m], 13.vii.1987 (Woolley & Zolnerowich); 1♀, Puebla, 4.7mi SW La Cumbre, 5100' [1555m], 23.vii.1987 (J.B. Woolley); 1♀, Tamaulipas, Altas Cumbre, 12mi SW Victoria, 19.iii.1986 (G. Zolnerowich); 1♀, Tamaulipas, 6mi W Gomez Farias, 5.vii.1986 (G. Zolnerowich); 1♀, Veracruz, 3mi NE Huatusco, 22.vii.1985 (J.B. Woolley). St VINCENT: 1♂, St. Andrew, Maloney, edge of rainforest, 12.vii.1976 (J.S. Noyes); 1♀, Charlotte, Mt Perseverence, edge of rainforest 11.vii.1976 (J.S. Noyes); ♀, St David, Richmond Beach, coastland, 10.vii.1976 (J.S. Noyes); 1♀ 1♂, St. George, Belmont, wasteground, 6.vii.1976 (J.S. Noyes); 1♀, St. Patrick, Wallilabou, wasteground, 12.vii.1976 (J.S. Noyes). TRINIDAD & TOBAGO: 3♀ St. George, St. Augustine, 19.vi.1976, ix-xi.1976 (F.D. Bennett, J.S. Noyes); 1♀, Curepe, 30.xi.1977; 1♀, Caroni, Gran Couva, cocoa plantation, 27.vi.1976 (J.S. Noyes); 1♂, St. Patrick, Mount Irvine Bay, coastal grassland, 19.vii.1976 (J.S. Noyes). USA: 6♀ 2♂, Florida, Polk Co., ex *Phyllocnistis citrella,* 22.v.1994 (H.W. Browning). VIRGIN ISLANDS: 1♀, St. John, Central Road, 400m, 29.vii.1971 (L. Masner).

Closterocerus fulgens sp.nov.

(Figs 104, 105)

Diagnosis. Antenna pale brown, F1 enlarged and slightly flattened, F2–5 not flattened, scape narrow (Fig. 105); pronotal collar without a carina along anterior margin (Fig. 104); thoracic dorsum smooth and shiny (Fig. 104); midlobe of mesoscutum with one pair strong setae; fore wing hyaline with median ¼ infuscate (Figs 104, 105); legs white (Fig. 105); length of body female 0.8–0.9mm.

Female holotype: length of body 0.9mm.

Antenna pale brown. Frons dark brown with golden tinges. Vertex metallic bluish-purple. Mesoscutum golden-purple. Mesoscutellum golden-green with anterior one-third golden-purple. Dorsellum and propodeum golden-green. Legs white. Fore wing hyaline with median ¼ infuscate, hind wing hyaline. Petiole dark brown. Gaster with Gt_1 metallic bluish-purple, remaining tergites golden-purple.

Antenna with F1 enlarged and slightly flattened, F2–5 and pedicel not flattened, scape narrow. Frons with weak reticulation. Vertex smooth and shiny. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum smooth and shiny; notauli distinct in anterior one-third; midlobe with one pair of strong setae. Mesoscutellum convex, smooth and shiny. Dorsellum flat and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; all tergites smooth.

Relative measurements: head length dorsal 10; head length frontal 17; head width 21.5; POL not measurable; OOL not measurable; lateral ocellus maximum width 2; eye length 13.5; malar space 3.5; mouth width 7; mesosoma length 25; mesosoma width 18.5; mesoscutellum length 10.5; mesoscutellum width 11; fore wing length 43; fore wing width 23; marginal vein length 19.5; postmarginal vein length 2; stigmal vein length 4; fore wing marginal fringe length 7; gaster length 33; gaster width 20.

Variation in paratype material. Length of body: 0.8mm. The paratype is similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 20-22.ii.2006, J.S. Noyes" (NHMUK). Paratype 1♀ from same locality as holotype but collected 24-25.ii.2004 (NHMUK).

Etymology. From the Latin *fulgens* = shining, referring to shiny thoracic dorsum.

***Closterocerus hansoni* sp.nov.**
(Figs 106, 107)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 107); ocelli small (Fig. 106); fore wing infuscate with a hyaline band close to apical margin (Fig. 106); pronotal collar without a carina along anterior margin (Fig. 106); midlobe of mesoscutum without setae (Fig. 106); hind tarsus with T1–3 white, T4 dark brown (Fig. 107); length of body female 1.1–1.4mm.

Female holotype: length of body 1.3mm.

Antenna dark brown to black. Frons golden-green. Vertex metallic purple. Mesoscutum metallic purple with posterior one-half of midlobe ±golden-green. Mesoscutellum metallic purple. Dorsellum and propodeum black with metallic tinges. Coxae, femora, mid and hind tibiae black with metallic tinges; fore tibia white with dorsal margin brown; fore tarsus infuscate, mid and hind tarsi with T1–3 white, T4 dark brown. Fore wing infuscate with a hyaline band close to apical margin, hind wing hyaline. Petiole not visible on type specimen, but presumably dark brown or black. Gaster dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Subtorular sutures present. Vertex with strong reticulation. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation, posterior one-half of midlobe with weak reticulation; notauli distinct in anterior one-half; midlobe without setae. Mesoscutellum ±flat, with strong reticulation. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole not visible on type specimen, but presumably very short. Gaster ovate; tergites with strong reticulation.

Relative measurements: head length dorsal 14.5; head length frontal 19.5; head width 31; POL 8; OOL 3; lateral ocellus maximum width 1.5; eye length 13; malar space 7; mouth width 9.5; mesosoma length 36; mesosoma width 28; mesoscutellum length 15; mesoscutellum width 17; fore wing length 62; fore wing width 36.5; marginal vein length 34; postmarginal vein length 1.5; stigmal vein length 6; fore wing marginal fringe length 6; gaster length 47; gaster width 28.

Variation in paratype material. Length of body: 1.1–1.4mm. Mesoscutum metallic purple with posterior one-half of midlobe ±golden-green, completely metallic purple or metallic bluish-purple.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica, Guatemala, Mexico.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, Cerro de la Muerte, Villa Mills, 3000m, vii-ix.1990, P. Hanson" (NHMUK). Paratypes (4♀, CNC, TAMU): 1♀ "GUATEMALA: Departamento Zacapa, 5km NW San Lorenzo, 2200m, xii.1986, M. Sharkey"; 1♀ "GUATEMALA: Departamento Zacapa, 13.vii.1986, L. LeSage"; 1♀ "MEXICO: Puebla, 3.7mi. S Zacapoaxtla, 23.vii.1985, J.B. Woolley, 85/085"; 1♀ "MEXICO: Chiapas, Munic. Tenejapa, Paraje Yashanal, 5200-5800' [1585-1768m], 4.viii.1990, J.B. Woolley".

Etymology. Named after Paul E. Hanson (MZUCR), collector of the holotype.

Closterocerus hirsutus sp.nov.

(Figs 108, 109)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Fig. 109); upper frons separated from vertex by a transverse edge (Fig. 109); pronotal collar with a carina along anterior margin (Fig. 108); midlobe of mesoscutum without setae (Fig. 108); propodeal callus with eight setae; fore wing infuscate with basal one-third and a band close to apical margin hyaline, speculum open below (Fig. 108); hind tarsus with T1 and T4 dark brown, T2&3 white (Fig. 108); petiole as long as wide; length of body female 1.7mm. Similar to *C. arenalensis* but with more setae on propodeal callus, mesoscutellum with stronger reticulation, and hind tarsus longer, 0.73× as long as hind tibia.

Female holotype: length of body 1.7mm.

Antenna dark brown to black. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum metallic blue with posterior one-half of midlobe black with golden tinges. Mesoscutellum golden with lateral and posterior margins metallic blue. Dorsellum metallic blue. Propodeum black with metallic tinges. Coxae, femora, mid and hind tibiae black with metallic tinges; fore tibia whitish with base dark brown; fore tarsus infuscate, mid tarsus with T1–3 white and T4 infuscate, hind tarsus with T1 and T4 black, T2&3 white. Fore wing infuscate with basal one-third and a band close to apical margin hyaline; hind wing hyaline. Petiole black. Gaster with Gt_{1-2} metallic bluish-green, remaining tergites metallic purplish.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped; upper frons separated from vertex by a transverse edge. Subtorular sutures present but dark and difficult to see. Occipital margin rounded.

Pronotal collar with carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct throughout; midlobe of mesoscutum without setae. Mesoscutellum with strong reticulation, reticulation weaker along posterior margin. Dorsellum convex and smooth. Propodeum with a complete median carina and with reticulation, partly smooth; callus with eight setae. Fore wing speculum open below; with a stigmal hairline and with radial cell bare.

Petiole as long as wide with strong sculpture on dorsal surface. Gaster short ovate; Gt_{1-2} smooth, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 20; head length frontal 25; head width 43; POL 7; OOL 5.5; lateral ocellus maximum width 3; eye length 19; malar space 6; mouth width 11; mesosoma length 56; mesosoma width 40; mesoscutellum length 23; mesoscutellum width 24; fore wing length 86; fore wing width 52; marginal vein length 48; postmarginal vein length 2; stigmal vein length 7; fore wing marginal fringe length 7; gaster length 58; gaster width 46.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, Monteverde, 1400m, 15.viii.84, L. Masner" (CNC).

Etymology. From the Latin *hirsutus* = bristly, referring to the many setae on propodeal callus (species of *Closterocerus* usually only have two setae on propodeal callus).

***Closterocerus huggerti* sp.nov.**
(Figs 110, 111)

Diagnosis. Scape and pedicel distinctly flattened, flagellum only weakly flattened, scape widest in median part (Fig. 111); ocelli small (Fig. 110); pronotal collar without a carina along anterior margin (Fig. 110); midlobe of mesoscutum with three pairs of setae (Fig. 110); hind tarsi white (Fig. 111); fore wing hyaline with an infuscate band below stigmal vein, speculum open below and towards base of wing (Fig. 110); length of body female 1.2–1.4mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Frons dark brown with golden tinges. Vertex metallic bluish-green. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple. Propodeum black with metallic tinges. Coxae, femora, mid and hind tibiae dark brown; fore tibia white with base dark brown; tarsi white. Fore wing hyaline with an infuscate band below stigmal vein; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1\&5}$ metallic blue, $Gt_{2\text{-}3}$ metallic bluish-purple with median part metallic purple, $Gt_{4\&7}$ metallic purple, Gt_6 golden-green.

Antenna with scape and pedicel distinctly flattened, flagellum only weakly flattened. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with weak reticulation; notauli distinct throughout; midlobe with three pairs of setae. Mesoscutellum convex with very weak reticulation. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum open below and towards base of wing; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; tergites with weak reticulation.

Relative measurements: head length dorsal 18; head length frontal 22; head width 33; POL 7.5; OOL 3.5; lateral ocellus maximum width 2; eye length 17; malar space 5.5; mouth width 9; mesosoma length 40; mesosoma width 27; mesoscutellum length 17; mesoscutellum width 16.5; fore wing length 56; fore wing width 33; marginal vein length 31; postmarginal vein length 1.5; stigmal vein length 6; fore wing marginal fringe length 3.5; gaster length 45; gaster width 32.

Variation in paratype material. Length of body: 1.2–1.4mm. Vertex metallic bluish-green or metallic purple. Mesoscutum and mesoscutellum metallic bluish-purple or purple.

Male. Unknown.

Hosts. Unknown.

Distribution. Peru.

Material examined.

Type material. Holotype ♀ "PERU: Loreto, Iquitos, 9.ii.1984, Lars Huggert" (MZLU). Paratypes: 2♀ "PERU: Cusco, Quillabamba, 23.xii.1983, Lars Huggert" (MZLU).

Etymology. Named after the Swedish entomologist Lars Huggert, collector of the type specimens.

Comments. Left antenna is missing in holotype.

Closterocerus iomus sp.nov.

(Figs 112–115)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 113); upper border of frons ±distinct (Fig. 113); pronotal collar with a carina along anterior margin (Fig. 112); midlobe of mesoscutum without setae (Fig. 112); propodeal callus with four setae; petiole as long as wide with strong sculpture on dorsal surface; hind tarsus with T1 dark brown, T2–3 white, T4 infuscate (Fig. 115); fore wing infuscate with basal one-third and two large subapical spots hyaline, speculum open below (Figs 112, 115); length of body female 1.4–2.3mm, male 1.4mm.

Female holotype: length of body 1.6mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple in anterior one-half, golden-green in posterior one-half. Mesoscutum with posterior two-thirds of midlobe golden-green, sidelobes and anterior one-third of midlobe metallic purple. Mesoscutellum with anteromedian one-half golden-green, remaining parts metallic purple. Dorsellum golden-green. Propodeum black. Coxae, femora, mid and hind tibiae black; fore tibia whitish; fore tarsus infuscate, mid tarsus white, hind tarsus with T1 dark brown, T2–3 white, T4 infuscate. Fore wing infuscate with basal one-third and two large spots close to apical margin hyaline, hind wing hyaline. Petiole black. Gaster with Gt_1 metallic purple, remaining tergites dark brown.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; upper border of frons ±distinct. Subtorular sutures absent. Vertex with anterior one-half with strong reticulation, posterior one-half with very weak reticulation. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior four-fifths; midlobe without setae. Mesoscutellum convex, with relatively strong reticulation in anteromedian one-half, remaining parts with very weak reticulation. Dorsellum convex and smooth. Propodeum smooth, with two parallel median carinae; callus with four setae. Fore wing speculum open below; with a stigmal hairline and with radial cell bare.

Petiole as long as wide with strong sculpture on dorsal surface. Gaster short-ovate, almost circular; Gt_1 smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 21; head length frontal 25; head width 40; POL 6; OOL 4.5; lateral ocellus maximum width 2.5; eye length 20.5; malar space 5.5; mouth width 11; mesosoma length 56; mesosoma width 36; mesoscutellum length 20.5; mesoscutellum width 21; fore wing length 93; fore wing width 52; marginal vein length 55.5; postmarginal vein length 3.5; stigmal vein length 6; fore wing marginal fringe length 7.5; gaster length 44; gaster width 40.

Variation in paratype material. Length of body: 1.4–2.3mm. Vertex metallic purple in anterior one-half, golden-green in posterior one-half or entirely metallic purple. Mesoscutum with posterior two-thirds of midlobe golden-green, golden-red or metallic purple. Mesoscutellum with anteromedian one-half golden-green and remaining parts metallic purple, or golden-red with sides metallic purple. Propodeum with or without median carinae.

Male (Fig. 114). Length of body: 1.4mm. Scape narrower than in female and widest just below apex. Frons golden-purple. Vertex with anterior one-half metallic bluish-purple, posterior one-half black with metallic purple tinges. Mesoscutum with sidelobes metallic bluish-purple, midlobe with anterior one-half golden-green and posterior one-half golden-red. Mesoscutellum golden-red with lateral and posterior margins metallic bluish-green. Dorsellum metallic bluish-green. Gaster with Gt_1 metallic bluish-green. Sculpture as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, P.N. Tapanti, 9˚45'N, 83˚47'W, 1200-1500m, 20.iii-10.iv.2000, swept, C. Hansson & D. Rubí" (MZLU). Paratypes (6♀, MZLU, MZUCR, NHMUK): 2♀ with same label data as holotype; 1♀ "COSTA RICA: Heredia, 6km ENE Vara Blanca, 10˚11'N, 84˚07'W, 2000m, iii.2002, 20/TN/ALL, INBio, OET, ALAS"; 1♀ "COSTA RICA: Puntarenas, E.B. Monteverde, 10˚20'N, 84˚49'W, 1540m, 18-25.ii.2004, C. Hansson"; 1♀ 1♂ from same locality as previous but collected 26.ii.2007; 1♀ "COSTA RICA: San José, San Gerardo de Dota, 20-21.ii.2013, J.S. Noyes, NHM (Ent) 2012-91".

Etymology. From the Greek *ion* = purple, violet, and *omos* = shoulder, referring to the colour of sidelobes of mesoscutum.

Closterocerus latiscapus sp.nov.

(Figs 116, 121)

Diagnosis. Antenna flattened, scape short and wide, 2.2× as long as wide and widest in apical part, flagellum dark brown (Fig. 121); frons with upper border distinct (Fig. 121); pronotal collar without a carina along anterior margin (Fig. 116); midlobe of mesoscutum with weak reticulation and with two pairs of long and strong setae (Fig. 116); mesoscutellum with weak reticulation (Fig. 116); fore wing hyaline with an infuscate band below stigmal vein and one below median part of marginal vein (Fig. 116); coxae, femora and tibiae dark brown (Fig. 121); gaster ovate-elongate (Fig. 116); length of body female 1.3mm.

Female holotype: length of body 1.3mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-green. Mesoscutum, mesoscutellum, dorsellum and propodeum metallic purple. Legs with coxae, femora and tibiae dark brown; tarsi infuscate with T4 darker. Fore wing hyaline with an infuscate band below stigmal vein and one below median part of marginal vein, hind wing hyaline. Petiole dark brown. Gastral tergite 1 metallic bluish, remaining tergites golden-purple.

Antenna flattened, scape widest in apical part. Frons with strong reticulation. Vertex with weak reticulation. Frontofacial suture V-shaped; frons with upper border distinct. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with weak reticulation; mesoscutum with notauli distinct in anterior one-third, midlobe two pairs of long and strong setae. Dorsellum convex and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing speculum closed; without a stigmal hairline and radial cell with setae.

Petiole very short, just a narrow band. Gaster ovate-elongate; tergites smooth and shiny.

Relative measurements: head length dorsal 12.5; head length frontal 14.5; head width 28; POL 6.5; OOL 3.5; lateral ocellus maximum width 2; eye length 13; malar space 5.5; mouth width 9; mesosoma length 36; mesosoma width 22; mesoscutellum length 12.5; mesoscutellum width 11.5; fore wing length 65; fore wing width 38; marginal vein length 34; postmarginal vein length 4.5; stigmal vein length 5; fore wing marginal fringe length 3.5; gaster length 53; gaster width 24.

Male. Unknown.

Hosts. Unknown.

Distribution. Ecuador.

Material examined.

Type material. Holotype ♀ "ECUADOR: Napo, Quito-Baeza Road, 4000m, 18.ii.1983, Masner & Sharkey" (CNC).

Etymology. From the Latin *latus* = wide, referring to the short and wide antennal scape.

***Closterocerus lineatus* sp.nov.**
(Figs 117–120)

Diagnosis. Antenna not flattened, scape narrow with dorsal and ventral margins ±parallel-sided (Fig. 118); scape dark brown with upper one-third whitish, border between dark brown and white sharp (Figs 118, 120); pedicel and F1–3 dark brown, F4–5 whitish (Figs 118, 120); vertex, mesoscutum and mesoscutellum with same colour, metallic blue to purple, with very strong and dense reticulation (Fig. 117); pronotal collar without a carina along anterior margin (Fig. 117); midlobe of mesoscutum with two pairs of short setae and with strongly curved notauli (Fig. 117); fore wing hyaline with area below stigmal vein infuscate (Fig. 120); legs predominantly white (Figs 118, 120); length of body female 0.7–1.1mm, male 0.8–0.9mm.

Female holotype: length of body 0.9mm.

Antenna with scape dark brown with upper one-third white and with border between dark brown and white sharp, pedicel and F1–3 dark brown, F4–5 whitish. Frons metallic bluish-green. Vertex metallic purple. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple. Propodeum metallic purple. Legs with fore coxa dark brown with metallic tinges on outer part and white on inner part, mid coxa white with base dark brown, hind coxa metallic bluish-green; fore and mid femora, tibiae and tarsi white; hind femur white upper-basal one-half brownish, hind tibia white with basal one-third brownish, hind tarsus white. Fore wing hyaline with area just below stigmal vein infuscate, hind wing hyaline. Petiole black with metallic tinges. Gaster metallic bluish-purple with a large dark brown median spot.

Antenna not flattened, scape narrow with dorsal and ventral margins ±parallel-sided. Frons with strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with two pairs of short setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex with strong reticulation. Propodeum with very weak reticulation and shiny; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; all tergites with strong reticulation.

Relative measurements: head length dorsal 14; head length frontal 16; head width 17.5; POL 4; OOL 2.5; lateral ocellus maximum width 2.5; eye length 15; malar space 2; mouth width 6; mesosoma length 27; mesosoma width 21; mesoscutellum length 10.5; mesoscutellum width 12; fore wing length 40; fore wing width 23.5; marginal vein length 16; postmarginal vein length 1.4; stigmal vein length 4; fore wing marginal fringe length 3; gaster length 29; gaster width 20.

Variation in paratype material. Length of body: 0.7–1.1mm. Mesoscutum and mesoscutellum metallic bluish-purple or purple; mesoscutellum with slightly different colour than vertex and mesoscutum in a few paratype specimens.

Male (Figs 119, 120). Length of body: 0.8–0.9mm. Vertex metallic bluish-purple. Mesoscutum

with midlobe metallic blue, sidelobes metallic bluish-purple. Mesoscutellum metallic blue with medio-anterior one-half blackish with golden tinges. Dorsellum and propodeum metallic purple. Sculpture as in female.

Hosts. Reared from *Brachys* sp. (Coleoptera: Buprestidae) on an unidentified Zingiberaceae (Costa Rica); *Pachyscelus* sp. (Coleoptera: Buprestidae) on *Terminalia catappa* (Combretaceae) (Costa Rica), *Leucoptera coffeella* (Lepidoptera: Lyonetiidae) (Nicaragua).

Distribution. Costa Rica, Honduras, Nicaragua.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Guanacaste, R.V.S. Bosque Diriá, 10º10'N, 85º36'W 700m, 14-15.ii.2011, J.S. Noyes, NHM (Ent) 2011-93" (NHMUK). Paratypes (181♀, 4♂, CNC, MZLU, MZUCR, NHMUK): 25♀ with same label data as holotype; 10♀ "COSTA RICA: Guanacaste, P.N. Santa Rosa, Bosque Humedo, 10°51'N, 85°37'W, 300m, 23.ii.2009, J.S.Noyes"; 2♀ "COSTA RICA: Guanacaste, Santa Rosa N.P., 300m, 2-23.iii.1986, D.H. Janzen, & I.D. Gauld"; 4♀ "COSTA RICA: Guanacaste, Estación Maritza, (ACG), 10˚58'N, 85˚29'W, 700m, 21.ii.2005, J.S. Noyes"; 2♀ "COSTA RICA: Guanacaste, Z.P. Nosara, Sendero La Ceiba, LN221100/382950, 600m, 20.iii.2002, I. Jimenez"; 1♀ "COSTA RICA: Guanacaste, Bagaces, P.N.Palo Verde, Sct. PaloVerde, Extremo E Campo Aterrizaje, LN388400/250050, 10m, 10.i-9.ii.2001, I Jimenez"; 7♀ 4♂ "COSTA RICA: Alajuela, P.N. Arenal, Send. Ceibo, 10º27'N, 84º41'W, 22-23.ii.2016, J.S. Noyes, NHM (Ent) 2016-79"; 1♀ "COSTA RICA: Alajuela, P.N. Arenal, 10˚28'N, 84˚45'W, 617m, 21-28.ii.2005, C. Hansson"; 2♀ "COSTA RICA: Alajuela, Estación Pilón, 10º43'N, 85º59'W, 12-18.ii.2004, C. Hansson & J.A. Azofeifa"; 1♀ from same locality as previous but collected 15.iii-5.iv.2001; 1♀ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♀ "COSTA RICA: Alajuela, vicinity of Boca Tapada de San Carlos, 250m, 10º40'N, 84º12'W, 9.iv.1999, L.M. La Pierre, #99.279, ex Brachys sp. on Zingiberaceae"; 1♀ "COSTA RICA: Cartago, Turrialba, P.N. Barbilla, 3km SE de Estacion, LN217200/598500, 500-600m, 19.viii-20.ix.2000, E. Rojas"; 1♀ "COSTA RICA: Cartago, Turrialba, CATIE, Reventazon, 4.ix.1986, L. Masner"; 2♀ "COSTA RICA: Heredia, La Selva, 10º26'N, 84º01'W, 75m, 28-29.ii.2008, J.S. Noyes"; following from same locality as previous but collected ii.1991 (1♀), 23-24.ii.2005 (1♀), 22-24.ii.2012 (1♀); 1♀ "COSTA RICA: Heredia, Santo Domingo, INBio-Parque, 13.ii.2016, J.S. Noyes"; 2♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 24-25.ii.2004, J.S. Noyes"; following from same locality as previous but collected 20-22.ii.2006 (3♀), 24-26.ii.2008 (1♀); 14♀ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 9º52′N 85º03′W, 305m, 11-21.ii.2005, C. Hansson"; following from same locality as previous but collected 14-15.ii.2005 (28♀), 17-18.ii.2011 (11♀), 23-24.ii.2013 (5♀), 19-20.ii.2016 (10♀), 11-12.ii.2018 (14♀); 2♀ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 8º29'N, 83º35'W, 5m, 19-20.ii.2004, J.S. Noyes"; 1♀ "COSTA RICA: Puntarenas, P.N.Corcovado, Estación Leona, Sendero Toma de Agua, 4m, 18.ii.2002, S. Madrigal"; 10♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º47'N, 82º58'W, 1000-1300m, 7-19.ii.2007, C. Hansson"; following from same locality as holotype but collected 15-16.ii.2006 (3♀), 19-29.ii.2008 (1♀), 15-16.ii.2012 (1♀); 1♀ "COSTA RICA: Puntarenas, Estación Altamira, Send. Los Gigantes, 1450m, 9º02'N, 83º00'W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos"; 1♀ "COSTA RICA: Puntarenas, Estación Altamira, Send. a Casa Coca, 1450-1700m, 9º02'N, 83º00'W, 7.ii-5.iii.2002, C. Hansson & Parataxonomos"; 2♀ "COSTA RICA: Puntarenas, E.B. San Miguel, 9º34'N, 85º08'W, 2.xii.1998, L.M. LaPierre, #98.225, Pachyscelus sp. on Terminalia catappa"; 3♀ "COSTA RICA: Puntarenas, Manuel Antonio N.P. 23-28.viii.1986, L. Masner". 2♀ "HONDURAS: Cortés, P.N. Cusuco, 5km N Buenos Aires, 15º29'N, 83º13'W, 8.iii.1997, C. Hansson". 1♀ "NICARAGUA: Carazo, San Marcos, 11.iii.1998, A de la Llana, ex. Leucoptera coffeella".

Etymology. From the Latin *linea* = line, referring to the white dorsal line on antennal scape.

Closterocerus masneri sp.nov.
(Figs 122, 123)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Fig. 122); pronotal collar with a carina along anterior margin (Fig. 123); midlobe of mesoscutum with three pairs of setae (Fig. 123); petiole as long as wide; fore wing infuscate with base and a band close to apical margin hyaline (Fig. 123); hind tarsus with T1 infuscate, T2–4 white (Fig. 122); length of body female 1.5–1.7mm.

Female holotype: length of body 1.5mm.

Antenna dark brown to black. Frons golden-green with black parts above frontofacial suture. Vertex metallic purplish. Mesoscutum with midlobe black and sidelobes metallic bluish-purple. Mesoscutellum black with lateral and posterior margins metallic bluish-purple. Dorsellum metallic purple. Propodeum black. Coxae, femora, mid and hind tibia dark brown; fore tibia with basal one-half brown and apical one-half white; tarsi with T1 infuscate and T2–4 white. Fore wing infuscate with base and a band close to apical margin hyaline, hind wing hyaline. Petiole black. Gaster with Gt_1 metallic blue, remaining tergites dark brown with metallic purple tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; upper border of frons ±distinct. Vertex with strong reticulation in anterior one-half, smooth lateral to ocellar triangle. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli narrow and complete; midlobe of mesoscutum with three pairs of setae. Dorsellum convex and smooth. Propodeum with weak reticulation, partly smooth, with an irregular median carina; callus with three setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole as long as wide. Gaster ovate; tergites mainly smooth, partly with very weak reticulation.

Relative measurements: head length dorsal 18; head length frontal 21; head width 35; POL 6; OOL 4.5; lateral ocellus maximum width 2.5; eye length 17.5; malar space 5.5; mouth width 9; mesosoma length 51; mesosoma width 30; mesoscutellum length 20; mesoscutellum width 18; fore wing length 75; fore wing width 43; marginal vein length 41; postmarginal vein length 2; stigmal vein length 5.5; fore wing marginal fringe length 5.5; gaster length 53; gaster width 35.

Variation in paratype material. Length of body: 1.7mm. The paratype is similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Ecuador, Venezuela.

Material examined.

Type material. Holotype ♀ “ECUADOR: Napo, El Chaco, Feb. 1983, 2000m, Masner & Sharkey” (CNC). Paratype: 1♀ “VENEZUELA: Merida, Mucuy nr Tabay, 2300m, L. Masner”, “2.v.1981, cloud forest, screen sweeping” (CNC).

Etymology. Named after Lubomir Masner (CNC), one of the collectors of type material.

***Closterocerus melanogrammus* sp.nov.**
(Figs 124–126)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 124); pronotal collar without a carina along anterior margin (Figs 125, 126); midlobe of mesoscutum with four pairs of setae (Fig. 125); midlobe of mesoscutum and median part of mesoscutellum black with golden-purple tinges (Fig. 125); fore wing infuscate with two hyaline areas, one below marginal vein and one subapical (Figs 124, 126); hind tarsus with T1–3 white, T4 dark brown (Fig. 124); length of body female 1.1–1.3mm.

Female holotype: length of body 1.3mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-purple in anterior one-half, metallic blue in posterior one-half. Mesoscutum with midlobe black with golden-purple tinges, sidelobes metallic bluish-purple. Mesoscutellum black with golden-purple tinges, lateral parts metallic bluish-purple. Dorsellum metallic purple. Propodeum golden-purple. Coxae, femora, mid and hind tibiae dark brown; fore tibia with basal one-half dark brown and apical one-half infuscate; fore tarsus infuscate, mid and hind tarsi with T1–3 white and T4 dark brown. Fore wing infuscate with two hyaline areas, one below marginal vein and subapical; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1,6}$ metallic purple, Gt_2 dark brown with sides metallic purple, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with four pairs of setae. Dorsellum convex with weak reticulation. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and bare radial cell.

Petiole very short, just a narrow band. Gaster oval-shaped; Gt_1 smooth, remaining tergites with very weak reticulation.

Relative measurements: head length dorsal 16; head length frontal 19; head width 33; POL 6; OOL 3; lateral ocellus maximum width 2,2; eye length 13.5; malar space 6.5; mouth width 9; mesosoma length 46; mesosoma width 32; mesoscutellum length 17; mesoscutellum width 20; fore wing length 68; fore wing width 40; marginal vein length 36; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 4; gaster length 50; gaster width 31.

Variation in paratype material. Length of body 1.1–1.3mm. The paratypes are similar to the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO: Michoacan, 6mi. N Cheran, 8.vii.1985, J.B. Woolley, 85/034" (TAMU). Paratypes (9♀, MZLU, TAMU): 7♀ with same label data as holotype; 2♀ "MEXICO: Michoacan, 2mi. S Carapan, 6.vii.1985, J.B. Woolley, 85/031".

Etymology. From the Greek *melanos* = black and *gramme* = line, stripe, referring to black median parts of mesoscutum and mesoscutellum.

Closterocerus mirandus sp.nov.

(Figs 128, 129, 211, 223)

Diagnosis. Antenna flattened, F4–5 less flattened, scape widest at apex (Figs 129, 223); pronotal collar with a blunt edge along anterior margin (Fig. 128); midlobe of mesoscutum with two pairs of weak setae (Fig. 128); fore wing hyaline with an infuscate band below stigmal vein, band reaching to hind margin of wing (Figs 128, 129, 211); hind tarsus white (Fig. 129); length of body female 1.1–1.2mm, male 1.0mm.

Female holotype: length of body 1.2mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple; propodeum metallic purple. Coxae, femora and hind tibia dark brown; fore and mid tibiae white with basal one-third to two-thirds brown; tarsi white. Fore wing hyaline with an infuscate band below stigmal vein, band reaching to hind margin of wing; hind wing hyaline. Petiole dark brown. Gaster with Gt_{1-2} metallic purple, $Gt_{3,5,6}$ metallic blue, $Gt_{4,7}$ dark brown.

Antenna flattened, F4–5 less flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a blunt edge along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli almost complete, missing in very posterior part; midlobe of mesoscutum with two pairs of weak setae. Dorsellum convex with rather strong reticulation. Propodeum with weak reticulation, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster oval-shaped; tergites with strong reticulation.

Relative measurements: head length dorsal 15; head length frontal 22.5; head width 31.5; POL 6; OOL 3; lateral ocellus maximum width 3; eye length 17.5; malar space 3.5; mouth width 8.5; mesosoma length 35; mesosoma width 27.5; mesoscutellum length 16; mesoscutellum width 16; fore wing length 48; fore wing width 37; marginal vein length 29; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 2.5; gaster length 42; gaster width 28.

Variation in paratype material. Length of body 1.1mm. The paratypes are similar to the holotype.

Male. Length of body 1.0mm. Scape slightly narrower than in female and widest just below apex of scape. Vertex metallic bluish-green. Midlobe of mesoscutum golden-green, sidelobes metallic bluish-purple. Mesoscutellum golden-green. Dorsellum metallic bluish-green. Propodeum metallic purple.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ “MEXICO: Michoacan, 2mi. S Carapan, 6.vii.1985, J.B. Woolley, 85/031” (TAMU). Paratypes: 2♀ 1♂ with same label data as holotype (MZLU, TAMU).

Etymology. From the Latin *mirandus* = wonderful.

***Closterocerus nitidulus* sp.nov.**
(Figs 127, 136, 212, 222, 232)

Diagnosis. Antenna with scape and pedicel flattened, flagellum only slightly flattened, scape ±triangular and widest at apex (Figs 136, 222); setae on vertex and on mesoscutellum long and strong, 3× as long as maximum width of lateral ocelli (Fig. 232); pronotal collar without a carina along anterior margin (Fig. 127); midlobe of mesoscutum without setae (Fig. 127); mesoscutum and mesoscutellum shiny, with very weak reticulation (Fig. 127); fore wing hyaline with median one-third infuscate (Figs 127, 212); hind tarsus white (Fig. 136); length of body female 1.0–1.3mm.

Female holotype: length of body 1.2mm.

Antenna with scape, pedicel and F1–3 dark brown, F4–5 white with weak infuscations. Frons golden-green. Vertex metallic bluish-purple in anterior one-half, metallic bluish-green in posterior one-half. Mesoscutum with midlobe golden and sidelobes metallic purple. Mesoscutellum and dorsellum metallic bluish-purple. Propodeum golden-green. Coxae, femora and hind tibiae dark brown; fore and mid tibiae white; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with median one-third infuscate; hind wing hyaline. Petiole dark brown. Gaster with $Gt_{1\&6}$ metallic bluish-green, remaining tergites dark brown with metallic purple tinges.

Scape and pedicel flattened but flagellum only slightly flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum shiny with very weak reticulation, partly smooth; notauli distinct in anterior one-half; midlobe of mesoscutum without setae. Dorsellum convex and smooth. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate, almost circular.

Relative measurements: head length dorsal 17; head length frontal 21.5; head width 33; POL 4,8; OOL 3; lateral ocellus maximum width 3; eye length 18; malar space 4; mouth width 8; mesosoma length 38; mesosoma width 27; mesoscutellum length 14.5; mesoscutellum width 16; fore wing length 64; fore wing width 36; marginal vein length 32; postmarginal vein length 1.5; stigmal vein length 5.5; fore wing marginal fringe length 6.5; gaster length 37; gaster width 31.

Variation in paratype material. Length of body: 1.0–1.3mm. Mesoscutum with midlobe golden and sidelobes metallic purple, or dark brown with metallic purple tinges, or midlobe bright metallic bluish-green. Mesoscutellum metallic bluish-purple, metallic purple, or golden-red with lateral and posterior margins metallic bluish-green. Propodeum golden-green or metallic purple.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, La Selva Biological Station, 50m, ii.1991, J.S. Noyes" (NHMUK). Paratypes (39♀, CNC, MZLU, MZUCR, NHMUK): following from same locality as holotype but collected iv.1991 (2♀), 2.i.1996 (1♀), iii.1996 (1♀); 1♀ "COSTA RICA: Alajuela, Cordillera Tilaram, Peñas Blancas, 700m, xii.1986, E. Cruz"; 1♀ from same locality as previous but collected 9.i.1987; 6♀ "COSTA RICA: Alajuela, San Carlos, Sendero Pilón, 650m, 9.ix-22.xi.1999, G. Carballo, LN 457900_269100"; following from same locality as previous but collected 22.xii.1999-7.iv.2000 (3♀), 4.viii-7.xii.2000 (5♀), 5.iii-20.iv.2001 (2♀); 1♀"COSTA RICA: Alajuela, Estación Pilón, 10º43'N, 85º59'W, 12-18.ii.2004, C. Hansson &

J.A. Azofeifa"; 1♀ "COSTA RICA: Cartago, Turrialba, R. Dantas, 0.4 Km Aguas Arriba Margen Derecho, 400-500m, 6.ii-10.iii.2000, E. Rojas, LN 218100/593650, #55294"; 1♀ "COSTA RICA: Guanacaste, ACG, Estación Pitilla, 10º59'N, 85º25'W, 700m, 4-7.i.2001, R. Thomas, C. Moraga"; 1♀ from same locality as previous but collected 22-30.i.2001; 2♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 24-26.ii.2008, J.S. Noyes"; following from same locality as previous but collected 17.v-17.vii.1999 (3♀), 22-23.ii.2010 (3♀); 1♀ "COSTA RICA: Limón, Pococí, P. N. Braulio Carrillo, Estación Quebrada González, 400-500m, 24.ix.2002, P. Hanson & C. Godoy, LN 238380/543100, #71291"; 1♀ "COSTA RICA: Limón, 16km W Guapiles, 400m, iii.1989, Paul Hanson"; 1♀ from same locality as previous but collected iv-v.1989; 1♀ "COSTA RICA: Limón, 4km NE Bribri, 50m, i-iii.1990, P. Hanson"; 1♀ "COSTA RICA: San José, P.N. Braulio Carrillo, 9.5km E tunel. 1000m, x-xii.1989, P. Hanson".

Etymology. From the Latin *nitidulus* = shiny, referring to the shiny thoracic dorsum.

Closterocerus noyesi sp.nov.

(Figs 130–132)

Diagnosis. Antenna flattened, scape widest in apical part (Fig. 131); pronotal collar without a carina along anterior margin (Fig. 130); midlobe of mesoscutum with weak reticulation and with two pairs of long and strong setae (Figs 130, 131); mesoscutellum with weak reticulation (Fig. 130); fore wing hyaline with median and apical parts infuscate (Figs 130–132); coxae and femora dark brown (Fig. 131); length of body female 0.9–1.0mm, male 0.7–0.9mm.

Female holotype: length of body 0.9mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple in anterior one-third, metallic blue in posterior two-thirds. Mesoscutum with midlobe golden-green with sides metallic blue, sidelobes metallic purple; mesoscutellum golden-green with lateral and posterior margins metallic purple; dorsellum metallic bluish-purple. Propodeum dark brown with metallic purple tinges. Legs with coxae and femora dark brown; fore and mid tibiae white, hind tibia dark brown; tarsi white. Fore wing hyaline with median and apical parts infuscate, hind wing hyaline. Petiole dark brown. $Gt_{1\&6}$ metallic bluish-purple, remaining tergites brown with metallic tinges.

Antenna flattened, scape widest in apical part. Frons with rather strong reticulation. Vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with weak reticulation on midlobe, sidelobes with strong reticulation; notauli distinct in anterior two-thirds; midlobe of mesoscutum with two pairs of long and strong setae. Mesoscutellum with weak reticulation. Dorsellum flat and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing with speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short ovate; Gt_{1-2} smooth, Gt_{3-5} with weak reticulation, Gt_{6-7} with strong reticulation.

Relative measurements: head length dorsal 14; head length frontal 15.5; head width 25; POL 4; OOL 2.5; lateral ocellus maximum width 2.5; eye length 13.5; malar space 3; mouth width 6.5; mesosoma length 28; mesosoma width 19.5; mesoscutellum length 11.5; mesoscutellum width 11.5; fore wing length 42; fore wing width 24; marginal vein length 20.5; postmarginal vein length 2; stigmal vein length 4.5; fore wing marginal fringe length 5; gaster length 30; gaster width 20.

Variation in paratype material. Length of body: 0.9–1.0mm. Vertex with strong reticulation, or with very weak reticulation in posterior one-half. Midlobe of mesoscutum golden-green with sides metallic blue or golden-red. Mesoscutellum golden-green with lateral and posterior margins metallic purple, or golden-red. Fore tarsus white to infuscate.

Male (Fig. 132). Length of body 0.7–0.9mm. Antennal flagellum less flattened than in female. Otherwise similar to female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 24-25.ii.2004, J.S. Noyes" (NHMUK). Paratypes (4♀ 25♂, MZLU, MZUCR, NHMUK): 1♀ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 13♂ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 23.ii.2006, J.S. Noyes"; 1♂ from same locality as previous but collected 27-28.ii.2003; 11♂ "COSTA RICA: Limón, P. N. Braulio Carrillo, Estación Quebrada González, 10˚09'N, 83˚57'W, 450m, 25.ii.2005, J.S.Noyes"; 1♀ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 305m, 9˚52'N, 85˚03'W, 19-20.ii.2016, J.S. Noyes"; 2♀ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 5m, 8˚29'N, 83˚35'W, 19-20.ii.2004, J.S. Noyes".

Etymology. Named after John S. Noyes (NHMUK), the collector of the majority of type material of this species, and of material of other *Closterocerus* species treated here.

Closterocerus oligothrix sp.nov.

(Figs 133, 134)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 134); flagellum dark brown with F5 white, flagellomeres with few long and erect setae attached at base (Figs 133, 134); pronotal collar without a carina along anterior margin (Fig. 133); midlobe of mesoscutum with one pair of setae (Fig. 133); fore wing hyaline with weak infuscation along apical margin and below stigmal vein (Fig. 133); length of body female 0.7–1.0mm.

Female holotype: length of body 1.0mm.

Antenna dark brown with F5 white. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum metallic bluish-green with anterior part metallic bluish-purple. Mesoscutellum with anterior one-half metallic bluish-green and posterior one-half metallic purple. Dorsellum golden-red. Propodeum metallic purple. Legs with fore coxa with basal one-half dark brown and apical one-half white, mid coxa white, hind coxa dark brown; fore and mid femora infuscate, hind femur white with median part dark brown with metallic tinges; tarsi white. Fore wing hyaline with weak infuscation along apical margin and below stigmal vein; hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic purple, green, blue and golden tinges.

Antenna predominantly flattened, F4 less flattened and F5 not flattened, flagellomeres with few long and erect setae attached at base. Frons and vertex with strong reticulation, vertex smooth lateral to ocellar triangle. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with one pair of setae. Mesoscutellum convex with relatively strong reticulation in anterior one-half, with very weak reticulation in posterior one-half. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 15.5; head length frontal 13.5; head width 28; POL 4; OOL 3; lateral ocellus maximum width 2,2; eye length 12.5; malar space 3.5; mouth width 8;

mesosoma length 29; mesosoma width 23; mesoscutellum length 13; mesoscutellum width 14; fore wing length 48; fore wing width 27; marginal vein length 24; postmarginal vein length 2.5; stigmal vein length 4; fore wing marginal fringe length 7; gaster length 36; gaster width 27.

Variation in paratype material. Length of body: 0.7–1.0mm. Vertex metallic bluish-purple or golden-green. Mesoscutum metallic bluish-green with anterior part metallic bluish-purple or golden-green. Mesoscutellum with relatively strong reticulation in anterior one-half and very weak reticulation in posterior one-half, to smooth and shiny without reticulation. Fore wing in some paratypes with infuscate areas, especially the band along apical margin, very weak.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º47'N, 82º58'W, 1000-1300m, 7-19.ii.2007, C. Hansson" (MZLU). Paratypes (22♀, CNC, MZLU, MZUCR, NHMUK): from same locality as previous but collected 15-16.ii.2006 (1♀), 19-29.ii.2008 (1♀); 3♀ "COSTA RICA: Puntarenas, Golfito, Estación Agujas, Sendero Corona, 245m, 23.iv.2002, J. Azofeifa"; 1♀ "COSTA RICA: Puntarenas, Golfito, P.N. Corcovado, Sct La Bonanza, 500m, 20.iv.2002, J. Azofeifa, LS 275700_524800, #70850"; 1♀ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 5m, 8˚29'N, 83˚35'W, 19-20.ii.2004, J.S. Noyes"; 1♀ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 9º52′N 85º03′W, 305m, 11-21.ii.2005, C. Hansson"; 1♀ from same locality as previous but collected 11-12.ii.2018; 1♀ "COSTA RICA: Alajuela, P.N. Arenal, Send. Pilón, 10º27'N, 84º43'W, 26.ii.2003, J.S. Noyes"; 1♀ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♀ "COSTA RICA: Guanacaste, P.N. Santa Rosa, Bosque Humedo, 10°51'N, 85°37'W, 300m, 23.ii.2009, J.S.Noyes"; 2♀ "COSTA RICA: Heredia, E.B. La Selva, 75m, 10º26'N, 84º01'W, 27-28.ii.2003, J.S. Noyes"; following same locality as previous but collected 23-24.ii.2005 (1♀), 28-29.ii.2008 (3♀); 3♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9º40'N, 83º02'W, 24-25.ii.2004, J.S. Noyes"; 1♀ from same locality as previous but collected 20-22.ii.2006.

Etymology. From the Greek *oligos* = few, and *thrix* = hair, seta, referring to the few erect setae on the flagellomeres.

Closterocerus petiolatus sp.nov.

(Figs 137–140, 213, 224, 234)

Diagnosis. Antenna flattened, scape long with one-third of its length reaching above level of vertex and widest at apex, all flagellomeres distinctly separated (Figs 224); pronotal collar with a carina along anterior margin (Figs 137, 139); mesoscutum with one pair of weak setae in posterior part (Fig. 137); fore wing infuscate with two elongate hyaline parts in apical part of wing, separated by infuscation (Figs 137, 138, 140, 213); hind tarsus with T1–3 white and T4 dark brown (Fig. 138); petiole as long as wide with strong sculpture on dorsal part; length of body female 1.7–2.3mm, male 1.4–2.0mm.

Female holotype: length of body 2.0mm.

Antenna dark brown. Frons metallic bluish-green. Vertex metallic purple. Mesoscutum metallic bluish-purple with posterior one-half of midlobe golden-green. Mesoscutellum golden-green with sides and posterior part metallic bluish-purple. Dorsellum metallic bluish-purple. Propodeum golden-green. Coxae black, femora, mid and hind tibiae dark brown, fore tibia infuscate with ventral

part dark brown; fore tarsus infuscate, mid and hind tarsi with T1–3 white and T4 dark brown. Fore wing infuscate with two elongate hyaline parts in apical part of wing, separated by infuscation; hind wing hyaline. Petiole black. Gaster with Gt_{1-2} metallic bluish-purple, remaining tergites dark brown with metallic tinges.

Antenna flattened, scape long with one-third of its length reaching above level of vertex and widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli narrow and complete; midlobe of mesoscutum with one pair of weak setae in posterior part. Mesoscutellum with strong, but weaker than mesoscutum, reticulation. Dorsellum convex and smooth. Propodeum reticulate in posterior two-thirds, otherwise smooth, without a median carina; callus with two setae. Fore wing speculum small and closed; without stigmal hairline and with radial cell hairy.

Petiole about as long as wide with strong sculpture on dorsal surface. Gaster ovate; Gt_1 smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 21; head length frontal 27; head width 46; POL 9; OOL 6.5; lateral ocellus maximum width 3; eye length 18.5; malar space 10.5; mouth width 11; mesosoma length 69; mesosoma width 43; mesoscutellum length 25; mesoscutellum width 25; fore wing length 132; fore wing width 80; marginal vein length 70; postmarginal vein length 3; stigmal vein length 9; fore wing marginal fringe length 8; gaster length 67; gaster width 47.

Variation in paratype material. Length of body: 1.7–2.3mm. Vertex metallic purple or bluish-green. Fore wing wing infuscate with two elongate hyaline parts in apical part of wing, separated by infuscation, sometimes with a hyaline part below basal one-half of marginal vein.

Male (Figs 139, 140). Length of body 1.4–2.0mm. Vertex golden-green or golden-red; mesoscutum golden-red with anterior one-third and sidelobes golden-green; mesoscutellum completely golden-red; gaster elongate. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: San José, Cerro de la Muerte, 20km S Empalme, 2800m, iii-iv.1989, P. Hanson” (NHMUK). Paratypes (19♀ 6♂, CNC, MZLU, MZUCR, NHMUK): 6♀ with same label data as holotype; 1♀ “COSTA RICA: San José, 2km SE Empalme, xi.1988, P. Hanson”; 1♀ “COSTA RICA: San José, Cerro de la Muerte, 19km S, 3km W Empalme, 2600m, v-vi.1989, Hanson & Godoy”; 1♀ “COSTA RICA: San José, E.B. Cerro de la Muerte, 3100m, vii.2000, P. Hanson”; 1♀ “COSTA RICA: San José, Zurqui de Moravia, 1600m, 10˚3’N, 84˚0’W, v.1992, P. Hanson”; 2♀ “COSTA RICA: San José, San Gerardo de Dota, 20-21.ii.2013, J.S. Noyes, NHM (Ent) 2012-91”; 2♀ “COSTA RICA: Puntarenas, Potrero Grande, Cerro Kasir, 2959m, 19.vii-19.viii.2000, M. Alfaro, LS 349700/566850 #59114”; following from same locality as previous but collected 20.viii.2000 (1♀), 19.ix-19.x.2000 (1♀); 1♀ “COSTA RICA: Puntarenas, Buenos Aires, Estación Altamira, Sendero a Casa Coca, 1700m, 16.vii-16.viii.2000, D. Rubí, MT, LS 574400 /331750 #84976”; 1♂ “COSTA RICA: Puntarenas, E.B. Monteverde, 10º20′N, 84º49′W, 1540m, 26.ii.2007, J.S. Noyes, BMNH(Ent) 2010-21”; 2♂ “COSTA RICA: Highway #2, Km 72, 9˚38’N, 83˚50’W, 2850m, 31.iii.1985, Goulet & Masner”; 1♀ 1♂ “COSTA RICA: Highway #2, Km 93, 9˚36’N, 83˚45’W, 3200m, 1.iv.1985, Goulet & Masner”; 2♂ “COSTA RICA: Highway #2, Km 66, 9˚45’N, 84˚10’W, 2400m, 4.iv.1985, Goulet & Masner”.

Etymology. Name referring to large petiole, as long as wide, which is unusual but not unique within this genus. Most species has petiole very short, just a narrow band.

***Closterocerus platycerus* sp.nov.**
(Figs 135, 141, 142, 214, 225, 235)

Diagnosis. Antenna flattened, scape widest at apex (Figs 142, 225); upper frons with an edge separating it from vertex (Fig. 235); pronotal collar with a carina along anterior margin (Fig. 141); mesoscutum and mesoscutellum with very weak reticulation and shiny (Fig. 141); midlobe of mesoscutum without setae (Fig. 141); fore wing infuscate with basal one-half and two subapical spots hyaline, speculum open below (Figs 142, 214); hind tarsus with T1 infuscate, T2–4 white (Fig. 142); petiole as long as wide; gaster circular (Fig. 141); length of body female 1.4–1.7mm, male 1.1mm.

Female holotype: length of body 1.6mm.

Antenna dark brown to black. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum metallic bluish-green with posterior one-half of midlobe golden-red. Mesoscutellum metallic blue with anteromedian one-half golden-red. Dorsellum metallic bluish-purple. Propodeum metallic purple. Coxae, femora and hind tibia dark brown; fore and mid tibiae infuscate; fore tarsus infuscate, mid tarsus white, hind tarsus with T1 infuscate, T2–4 white. Fore wing infuscate with basal one-half and two spots close to apical margin hyaline; hind wing hyaline. Petiole black. Gaster with Gt_{1-2} metallic bluish-purple, remaining tergites dark brown.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; part above suture with distinct margin separating it from vertex. Vertex with strong reticulation in anterior one-half, posterior one-half with very weak reticulation, partly smooth. Subtorular sutures missing. Occipital margin with an edge behind ocellar triangle.

Pronotal collar with a carina along anterior margin. Mesoscutum and mesoscutellum with very weak reticulation and shiny; notauli distinct in anterior one-half; midlobe of mesoscutum without setae. Dorsellum convex and smooth. Propodeum with a median carina in posterior two-thirds, otherwise smooth; callus with two setae. Fore wing speculum open below; with a stigmal hairline and with radial cell bare.

Petiole as long as wide, with strong sculpture on dorsal surface. Gaster circular.

Relative measurements: head length dorsal 21; head length frontal 24; head width 40; POL 6; OOL 4,4; lateral ocellus maximum width 3; eye length 19.5; malar space 6.5; mouth width 11; mesosoma length 52; mesosoma width 34; mesoscutellum length 20; mesoscutellum width 20; fore wing length 80; fore wing width 42; marginal vein length 50; postmarginal vein length 2; stigmal vein length 5; fore wing marginal fringe length 6; gaster length 47; gaster width 40.

Variation in paratype material. Length of body: 1.4–1.7mm. Vertex metallic bluish-purple, golden-green, or with anterior one-half metallic purple and posterior one-half metallic bluish-green.

Male (Fig. 135). Length of body 1.1mm. Entire vertex with very weak reticulation and metallic purple. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Alajuela, Peñas Blancas, 700m, 18.viii.1986, L. Masner” (CNC). Paratypes (2♀ 1♂, MZLU. NHMUK): 1♂ “COSTA RICA: Alajuela, P.N. Arenal, La Peninsula, 10˚27’N, 84˚45’W, 600m, 25.ii.2003, J.S. Noyes”; 1♀ “COSTA RICA: Alajuela, P.N. Arenal, 10˚28’N, 84˚45’W, 617m, 21-28.ii.2005, C. Hansson”; 1♀ “COSTA RICA: Alajuela, San Carlos, Sendero Pilón, 650m, 6-14.xi.2000, G. Carballo, LN 458050_269200, #60086”.

Etymology. From the Greek *platys* = broad, flat and *keras* = horn, antenna, referring to the flattened antenna.

***Closterocerus porphyriops* sp.nov.**
(Figs 143, 144)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 144); pronotal collar with a carina along anterior margin (Fig. 143); midlobe of mesoscutum with three pairs of setae (Fig. 143); hind tarsus with T1 dark brown, T2–4 white (Fig. 143); fore wing hyaline with median one-third and apical margin infuscate (Figs 143, 144); length of body female 1.1mm.

Female holotype: length of body 1.1mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple. Mesoscutum and dorsellum metallic purple. Mesoscutellum golden-green with lateral and posterior margins metallic purple. Propodeum dark brown with metallic tinges. Coxae, femora, mid and hind tibiae dark brown; fore tibia, fore and mid tarsi white, hind tarsus with T1 dark brown, T2–4 white. Fore wing hyaline with median one-third and apical margin infuscate, hind wing hyaline. Petiole dark brown. Gaster with Gt_1 metallic purple, remaining tergites dark brown.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Fronto-facial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior two-thirds; midlobe with three pairs of setae. Mesoscutellum ±flat, with relatively weak reticulation. Dorsellum convex and smooth. Propodeum with weak reticulation, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster short-ovate; tergites smooth.

Relative measurements: head length dorsal 16; head length frontal 20; head width 31; POL 5; OOL 2.5; lateral ocellus maximum width 2.5; eye length 15.5; malar space 5; mouth width 6; mesosoma length 36; mesosoma width 26; mesoscutellum length 15.5; mesoscutellum width 15.5; fore wing length 55; fore wing width 32; marginal vein length 29; postmarginal vein length 1.5; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 35; gaster width 25.

Male. Unknown.

Hosts. Unknown.

Distribution. Venezuela.

Material examined.

Type material. Holotype ♀ "VENEZUELA: Araqua, Rancho Grande, 28.v.1990, 3650′, J.B. Woolley, 90/003" (TAMU).

Etymology. From the Greek *porphyrio* = purple, violet, and *ops* = appearance, referring to the colour of mesoscutum.

Closterocerus pulcher (Howard)
(Figs 145, 146)

Entedon pulcher Howard, 1897:168. Holotype female, type locality: West Indies, Grenada, NHMUK, examined.
Closterocerus pulcher (Howard); Ashmead (1900:263).
Entedon pulcher Howard; De Santis (1979:270).
Closterocerus pulcher (Howard); LaSalle & Schauff (1992:9).

Diagnosis. Antenna with F1–3 flattened and dark brown, F4–5 less flattened and pale brown, scape completely dark brown and widest medially (Fig. 146); pronotal collar without a carina along anterior margin (Fig. 145); midlobe of mesoscutum with three pairs of setae and strong reticulation, sidelobes metallic bluish-purple and midlobe golden-green (Fig. 145); mesoscutellum golden-green with strong reticulation (Fig. 145); fore wing hyaline with two infuscate parts: along apical margin and below stigmal vein (Fig. 145); hind tarsus whitish with T4 slightly darker (Fig. 145).

Hosts. Unknown.

Distribution. Grenada (Howard 1897).

Material examined.
Type material. Holotype ♀ of *E. pulcher* (B.M.Type Hym. No. 5.3575).

Closterocerus pumilus sp.nov.
(Figs 147–151)

Diagnosis. Antenna flattened, dark brown with F5 pale brown, male F4&5 not flattened, scape widest at apex (Fig. 149); flagellomeres with long setae, longer in male (Figs 147–151); head strongly transverse in frontal view with frontofacial suture straight (Fig. 150); pronotal collar without a carina along anterior margin (Fig. 147); midlobe of mesoscutum with two pairs of relatively long and strong setae (Fig. 147); fore wing hyaline with a narrow infuscate band below stigmal vein reaching to hind margin (Figs 148, 149); length of body female 0.7mm, male 0.6–0.7mm. A small, dark brown, non-metallic and predominantly smooth species.

Female holotype: length of body 0.7mm.

Antenna dark brown with F5 pale brown. Head, meso- and metasoma dark brown non metallic. Legs ±infuscate with hind coxa and hind femur darker. Fore wing hyaline with a narrow infuscate band below stigmal vein, band reaching hind margin; hind wing hyaline.

Antenna flattened, flagellomeres with long setae. Frons and vertex with weak reticulation. Frontofacial suture straight. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum smooth with anterior and lateral parts with weak reticulation; notauli missing; midlobe with two pairs of setae. Mesoscutellum convex and smooth. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; without a stigmal hairline and with radial cell hairy.

Petiole transverse and smooth. Gaster ovate; tergites smooth.

Relative measurements: head length dorsal 9.5; head length frontal 11; head width 21.5; POL 4; OOL 3; lateral ocellus maximum width 1.5; eye length 7.5; malar space 3.5; mouth width 5.5; mesosoma length 21; mesosoma width 15; mesoscutellum length 8; mesoscutellum width 9; fore wing length 37; fore wing width 19; marginal vein length 20; postmarginal vein length 1; stigmal vein length 3; fore wing marginal fringe length 8.5; gaster length 25; gaster width 14.

Male (Figs 148, 149). Length of body 0.6–0.7mm. Setae on flagellomeres longer than in female; F4&5 long and narrow, not flattened. Otherwise as in female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º46'N, 82º57'W, 1300m, 15-16.ii.2006, J.S. Noyes" (NHMUK). Paratypes: 3♂ "COSTA RICA: Alajuela, P.N. Arenal, Send. Pilón, 10º27'N, 84º43'W, 26.ii.2003, J.S. Noyes" (MZLU, NHMUK).

Etymology. From the Latin *pumilus* = dwarfish, little, referring to the small size of this species.

***Closterocerus purpureus* (Howard) comb. rev.**
(Fig. 199)

Necremnus purpureus Howard, 1897:164-165. Holotype female, type locality: West Indies, Grenada, NH*M*UK, examined.
Closterocerus purpureus (Howard); Waterston (1915:330).
Chrysonotomyia purpurea (Howard); Bouček (1977:7).
Chrysonotomyia (*Achrysocharella*) *purpurea* (Howard); De Santis (1983:22).
Chrysonotomyia purpureus (Howard); LaSalle & Schauff (1992:9).

This species belongs to *Closterocerus* s.str., but it is difficult to establish its species identity because the head, including the antennae, are missing. Especially the antennae are very important for the identification of *Closterocerus* species, but to a certain extent also the head, e.g. the sculpture on, and size of vertex, are used to separate species. Therefore it cannot be included in the key.

The holotype female (Fig. 199) lacks a carina along anterior margin of pronotum. Mesoscutum and mesoscutellum have quite strong reticulation; mesoscutum is metallic purple and mesoscutellum metallic purple with median part golden-green; midlobe of mesoscutum has short setae of an uncertain number. Legs: coxae difficult to see; fore and mid femora predominantly white, hind femur dark brown with apex white; tibiae white; tarsi white. Fore wing hyaline with parts below stigmal vein and along apical margin infuscate; speculum is closed. This combination of features does not match any of the included species and I therefore keep *C. purpureus* as a valid species of *Closterocerus*.

Hosts. Unknown.

Distribution. Grenada (Howard 1897).

Material examined.

Type material. Holotype ♀ of *N. purpureus* (B.M.Type Hym. No. 5.1299).

***Closterocerus scitulus* sp.nov.**
(Figs 152, 153, 215, 227, 236)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Figs 153, 227); frontofacial suture straight (Fig. 236); pronotal collar with a weak carina along anterior margin

(Fig. 152); midlobe of mesoscutum with one pair of strong setae (Figs 152, 153); fore wing with basal one-half weakly infuscate, almost hyaline, apical one-half strongly infuscate with two hyaline spots (Figs 152, 153, 215); hind tarsus completely pale (infuscate to white) (Fig. 153); length of body female 1.7–2.0mm.

Female holotype: length of body 1.7mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple. Propodeum metallic purple. Coxae and femora dark brown with metallic tinges; fore and mid tibiae white, hind tibia dark brown; tarsi white to slightly infuscate. Fore wing predominantly infuscate, weakly infuscate in basal one-half and darker in apical one-half, apical one-half with two large hyaline spots, hind wing hyaline. Petiole black with metallic tinges. Gaster golden-purple with metallic bluish-purple tinges.

Antenna flattened, scape widest at apex. Frons with strong reticulation. Vertex with strong reticulation in anterior one-half, with very weak reticulation in posterior one-half. Frontofacial suture straight. Subtorular sutures present but short. Occipital margin rounded.

Pronotal collar with a weak carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with one pair of strong setae. Mesoscutellum convex with strong reticulation, smooth along hind margin. Dorsellum flat and almost smooth. Propodeum smooth, some parts with weak reticulation; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate-elongate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 20; head length frontal 24; head width 43; POL 8; OOL 5; lateral ocellus maximum width 3,2; eye length 19; malar space 6; mouth width 11.5; mesosoma length 54; mesosoma width 36; mesoscutellum length 22; mesoscutellum width 21.5; fore wing length 89; fore wing width 60; marginal vein length 47; postmarginal vein length 6.5; stigmal vein length 7; fore wing marginal fringe length 3; gaster length 65; gaster width 33.

Variation in paratype material. Length of body: 1.9–2.0mm. Fore wing predominantly infuscate, weakly infuscate in basal one-half and darker in apical one-half, apical one-half with two large hyaline spots, or with basal one-half hyaline.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Cartago, La Cangreja, 1950m, 9˚48’N, 83˚58’W, iii-v.1992, P. Hanson” (NHMUK). Paratypes (4♀, MZLU, MZUCR, NHMUK): 1♀ from same locality as holotype but collected vi-vii.1992; 1♀ “COSTA RICA: San José, Cuericí, Sendero el Carbon, 5km al E. de Villa Mills, 2700m, 23.viii.1996, B. Gamboa, swept, LS 390100_500100, #8376”; 1♀ “COSTA RICA: San José, 19km S, 1km W Empalme, Mirador Quetzal, 2600m, i.2000, P. Hanson”; ♀ “COSTA RICA: San José, San Gerardo de Dota, 20-21.ii.2013, J.S. Noyes, NHM (Ent) 2012-91”.

Etymology. From the Latin *scitulus* = beautiful, elegant.

Closterocerus setosus sp.nov.
(Figs 154, 155)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Fig. 155); temples with scattered setae (Fig. 154); pronotal collar with a strong carina along anterior margin (Fig. 154); midlobe of mesoscutum with six pairs of setae (Fig. 154); fore wing infuscate with a hyaline band close to apical margin, speculum absent – this part completely setose (Fig. 154); petiole as long as wide with strong sculpture on dorsal surface; length of body female 2.2mm.

Female holotype: length of body 2.2mm.

Antenna dark brown to black. Frons golden-green, metallic bluish-purple in upper part. Vertex metallic bluish-green. Mesoscutum with midlobe black, sidelobes metallic bluish-green. Mesoscutellum black with sides metallic bluish-green. Dorsellum metallic bluish-green. Propodeum black. Coxae, femora, mid and hind tibiae black with metallic tinges, fore tibia dark brown with apex pale brown; fore tarsus dark brown; mid and hind tarsi with T1–3 white, T4 black. Fore wing infuscate with a hyaline band close to apical margin, hind wing hyaline. Petiole black. Gaster dark brown.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present but difficult to see because they are dark. Temples with scattered setae. Occipital margin with a sharp carina behind ocellar triangle.

Pronotal collar with a strong carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior ¾; midlobe with six pairs of setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex and smooth. Propodeum with a complete median carina; with strong reticulation; callus with four setae. Fore wing with speculum absent; with a stigmal hairline and with radial cell bare.

Petiole as long as wide, with strong sculpture on dorsal surface. Gaster short ovate; Gt_{1-3} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 21; head length frontal 27; head width 49; POL 9; OOL 7; lateral ocellus maximum width 3; eye length 21; malar space not measurable; mouth width not measurable; mesosoma length 74; mesosoma width 47; mesoscutellum length 30; mesoscutellum width 29; fore wing length 135; fore wing width 79; marginal vein length 67; postmarginal vein length 4; stigmal vein length 10; fore wing marginal fringe length 3; gaster length 74; gaster width 52.

Male. Unknown.

Hosts. Unknown.

Distribution. Ecuador.

Material examined.

Type material. Holotype ♀ "ECUADOR: Napo, Papallacta, 4000m, 14.ii.1983, L. Huggert" (MZLU).

Etymology. From the Latin *setosus* = bristly, referring to fore wing speculum obliterated by setae.

Closterocerus stigmalis sp.nov.
(Figs 158, 159, 229, 237)

Diagnosis. Antenna flattened, scape widest at apex (Figs 159, 229); frontofacial suture straight (Fig. 237); pronotal collar without a carina along anterior margin (Fig. 158); midlobe of mesoscutum with one pair of strong setae (Figs 158, 159); fore wing hyaline with a strong infuscate band below

stigmal vein, reaching to hind margin of wing, with apical margin infuscate and with an infuscate spot below marginal vein (Fig. 158); stigmal vein elongate, ca 3.5× as long as wide (Fig. 158); length of body female 1.7–2.2mm.

Female holotype: length of body 2.2mm.

Antenna dark brown. Frons golden-green. Vertex metallic purple. Mesoscutum metallic purple. Mesoscutellum, dorsellum and propodeum metallic bluish-purple. Coxae, femora and tibiae dark brown; tarsi with T1–3 white, T4 dark brown. Fore wing hyaline with a strong infuscate band below stigmal vein, reaching to hind margin of wing, with apical margin infuscate and with an infuscate spot below marginal vein; hind wing hyaline. Petiole black. Gaster metallic purple.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture straight. Subtorular sutures present but difficult to see as they are short and dark. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli distinct in anterior one-half; midlobe with one pair of strong setae. Dorsellum convex, with strong reticulation. Propodeum with weak reticulation, without median carina; callus with two setae. Fore wing speculum closed, stigmal vein elongate, without stigmal hairline but with radial cell bare.

Petiole very short, just a narrow band. Gaster elongate; $Gt_{1,2,7}$ with weak reticulation, remaining tergites with strong reticulation.

Relative measurements: head length dorsal 21.5; head length frontal 30; head width 55; POL 11; OOL 6.5; lateral ocellus maximum width 4; eye length 23; malar space 9; mouth width 14.5; mesosoma length 67; mesosoma width 53; mesoscutellum length 31; mesoscutellum width 32; fore wing length 110; fore wing width 72; marginal vein length 64; postmarginal vein length 4; stigmal vein length 14.5; fore wing marginal fringe length 3; gaster length 85; gaster width 47.5.

Variation in paratype material. Length of body 1.7–2.2mm. Frons golden-green or dark brown with metallic tinges. Mesoscutellum with strong to weak reticulation to almost smooth. Mesoscutum and mesoscutellum metallic bluish-green, bluish-purple or purple. Fore wing in paratypes with infuscate parts along apical margin and below marginal vein weak. Gaster metallic purple or dark brown with metallic bluish-purple tinges.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica, Mexico.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Puntarenas, Buenos Aires, Cerro Frantzius, 2134m, 16.vii-16.viii.2000, D. Rubí, MT, LS 574800_334750, #57863” (NHMUK). Paratypes (4♀, MZLU, TAMU): 1♀ “MEXICO: Oaxaca, 3mi SE Matatlan, Micro-ondas Road, 17.vii.1987, 6050’ [1844m], J.B. Woolley & G. Zolnerowich, 87/049”; 1♀ “MEXICO: Oaxaca, 6.7mi SE El Camaron, 19.vii.1987, 4300’ [1311m], J.B. Woolley, 87/051”; 1♀ “MEXICO: Guerrero, 2mi E Ocotito, 11.vii.1985, J.B. Woolley, 85/048”; 1♀ “MEXICO: Guerrero, 17mi E Tixtla, 11.vii.1985, J.B. Woolley & G. Zolnerowich, 85/050”.

Etymology. Name referring to the elongate stigmal vein in fore wing.

***Closterocerus sulcatus* sp.nov.**
(Figs 160–162)

Diagnosis. Antenna with scape, pedicel and F1 dark brown, F2–5 pale brown, scape narrow, pedicel slightly flattened, scape and flagellum not flattened (Figs 161, 162); eyes large, 8.3× as long as malar space (Fig. 162); vertex, mesoscutum and mesoscutellum with very strong reticulation (Fig. 160); pronotal collar without a carina along anterior margin (Fig. 160); notauli as deep grooves, almost complete (Fig. 160); midlobe of mesoscutum without setae (Fig. 160); fore wing hyaline with area below stigmal vein infuscate (Fig. 161); length of body female 0.9mm.

Female holotype: length of body 0.9mm.

Antenna with scape, pedicel and F1 dark brown, F2–5 pale brown. Frons metallic bluish-green. Vertex black with purple tinges. Mesoscutum black with metallic greenish-purple tinges. Mesoscutellum and dorsellum black with metallic purple tinges. Propodeum golden-purple. Legs with coxae dark brown; fore and mid femora infuscate, hind femur dark brown with apex white; fore and mid tibiae white with base infuscate, hind tibia with basal one-half dark brown and apical one-half white; tarsi white. Fore wing hyaline with area below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster golden-purple.

Antenna with pedicel slightly flattened, scape and flagellum not flattened, scape thus narrow. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with very strong reticulation, with a groove in medio-posterior part. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with very strong reticulation; notauli as distinct and deep grooves, missing in very posterior part; midlobe without setae. Mesoscutellum with very strong reticulation. Dorsellum convex with very strong reticulation. Propodeum with weak reticulation, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline, radial cell bare.

Petiole very short, just a narrow band. Gaster almost circular; tergites with strong reticulation.

Relative measurements: head length dorsal 13; head length frontal 20; head width 26; POL 4.5; OOL 3; lateral ocellus maximum width 2.5; eye length 17; malar space 2; mouth width 6; mesosoma length 28; mesosoma width 21.5; mesoscutellum length 12; mesoscutellum width 12.5; fore wing length 40; fore wing width 24; marginal vein length 20; postmarginal vein length 2; stigmal vein length 4.5; fore wing marginal fringe length 3; gaster length 26; gaster width 21.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Guanacaste, Bagaces, P.N. Palo Verde, Estación Palo Verde, 10m, 10.x-10.xi.2000, I. Jiménez, LN 259050/388400, #60220” (NHMUK).

Etymology. From the Latin *sulcus* = furrow, referring to the deep notauli.

Closterocerus tapantibius sp.nov.
(Figs 164–166)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 165); vertex long and flat (Fig. 166), 0.9× as long as wide; pronotal collar with a weak carina along median anterior margin (Fig. 164); midlobe of mesoscutum without setae (Fig. 164); fore wing hyaline with median part and apical margin infuscate (Figs 164, 165); hind tarsus with T1 dark brown, T2–4 white (Fig. 165); length of body female 1.0–1.2mm.

Female holotype: length of body 1.2mm.

Antenna dark brown. Head with frons golden with median part golden-green; vertex metallic purple. Mesoscutum and mesoscutellum metallic purple. Dorsellum and propodeum black. Coxae and femora dark brown with metallic tinges, fore and mid tibiae whitish, hind tibia dark brown; fore and mid tarsi infuscate, hind tarsus with T1 dark brown, T2–4 white. Fore wing hyaline with median part and apical margin infuscate, hind wing hyaline. Petiole hidden in type specimen. Gaster with Gt_{1-2} golden-green, Gt_{3-7} metallic bluish-purple.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a weak carina medially along anterior margin. Mesoscutum with strong reticulation; notauli distinct throughout; midlobe without setae. Mesoscutellum flat, with strong reticulation. Dorsellum convex with strong reticulation. Propodeum smooth and shiny without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole hidden in type specimen. Gaster ovate; tergites with weak reticulation.

Relative measurements: head length dorsal 17; head length frontal 18; head width 32; POL 5,2; OOL 3; lateral ocellus maximum width 3; eye length 15; malar space 5; mouth width 9; mesosoma length 38; mesosoma width 30; mesoscutellum length 15; mesoscutellum width 17; fore wing length 61; fore wing width 39; marginal vein length 33; postmarginal vein length 2; stigmal vein length 6; fore wing marginal fringe length 5.5; gaster length 42; gaster width 26.

Variation in paratype material. Length of body: 1.0mm. The paratype is similar to the holotype.

Male. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Cartago, P.N. Tapanti, 9˚45'N, 83˚47'W, 1200-1500m, 20.iii-10.iv.2000, swept, C. Hansson & D. Rubí" (MZLU). Paratype 1♀ "COSTA RICA: Puntarenas, E.B. Monteverde, 10º20′N, 84º49′W, 1540m, 26.ii.2007, J.S. Noyes, BMNH(Ent) 2010-21" (NHMUK).

Etymology. Named after the type locality, Parque Nacional de Tapantí.

Closterocerus tischeriae sp.nov.
(Figs 167–169, 174)

Diagnosis. Antenna flattened with all flagellomeres distinctly separated, scape widest at apex (Fig. 174); frons with upper border distinct; pronotal collar with a carina along anterior margin (Fig. 168); midlobe of mesoscutum with one pair of strong setae (Fig. 168); fore wing hyaline with three infuscate bands, one along apical margin, one below stigmal vein and one below marginal vein

(Figs 167, 168); hind tarsus with T1&4 black, T2&3 white; length of body female 1.1–1.7mm, male 0.8–1.1mm.

Female holotype: length of body 1.5mm.

Antenna dark brown. Frons black with golden-green tinges. Vertex black with metallic purple tinges. Mesoscutum with midlobe golden and sidelobes metallic bluish-purple. Mesoscutellum golden with lateral and posterior margins metallic bluish-purple. Dorsellum golden with blue tinges. Propodeum black with metallic purple tinges, median part golden-green. Coxae, femora, mid and hind tibiae dark brown; fore tibia white with base brown; fore tarsus pale brown, mid and hind tarsi with T1&4 dark brown, T2&3 white. Fore wing hyaline with three infuscate bands, one along apical margin, one below stigmal vein and one below marginal vein; hind wing hyaline. Petiole dark brown. Gaster metallic purple.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped; frons with upper border distinct. Vertex with strong reticulation in anterior one-half, with very weak reticulation to smooth in posterior one-half. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with one pair of strong setae attached in posterior part. Mesoscutellum convex, with weak reticulation. Dorsellum convex with weak reticulation. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate-elongate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 19; head length frontal 23; head width 40; POL 7; OOL 5; lateral ocellus maximum width 2.5; eye length 19; malar space 5.5; mouth width 10; mesosoma length 47; mesosoma width 33; mesoscutellum length 18.5; mesoscutellum width 20; fore wing length 65; fore wing width 36; marginal vein length 40; postmarginal vein length 2; stigmal vein length 4.5; fore wing marginal fringe length 5; gaster length 55; gaster width 35.

Variation in paratype material. Length of body: 1.1–1.7mm. Vertex with posterior one-half metallic purple, anterior one-half golden-green. Midlobe of mesoscutum golden-purple. Mesoscutellum golden-purple. Gaster golden-purple.

Male (Figs 167, 169). Length of body: 0.8–1.1mm. Vertex black with metallic purple tinges or golden-green; with strong reticulation in anterior one-half, with very weak reticulation to smooth in posterior one-half or with very weak reticulation throughout. Mesoscutum with midlobe golden and sidelobes metallic bluish-purple, or entirely golden-purple. Mesoscutellum golden with lateral and posterior margins metallic bluish-purple, or entirely golden-purple.

Hosts. Reared from *Tischeria* sp. (Lepidoptera: Tischeriidae) on *Cecropia insignis* (Cecropiaceae).

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, E.B. La Selva, 50-150m, 10º25'N, 84º01'W, 8.xi.1998; L.M. LaPierre, #98.180, ex Tischeria sp. on Cecropia insignis" (NHMUK). Paratypes (23♀ 7♂, CNC, MZLU, MZUCR, NHMUK): 4♀ 1♂ with same label data as holotype; following from same locality and host as holotype but collected 21.ii.1998 (5♀ 1♂), ii.2000 (7♀ 3♂); 7♀ 1♂ "COSTA RICA: Alajuela, vic. Boca Tapada de San Carlos, 250m, 10º40'N, 84º12'W, 20.iii.1999, L.M. LaPierre, #99.121, ex Tischeria sp. on Cecropia insignis"; 1♂ from same locality and host as previous but collected 20.iv.1999.

Etymology. Named after host.

Closterocerus trimaculatus sp.nov.

(Figs 5, 171–173, 206, 228)

Diagnosis. Frontofacial suture straight, vertex flat and in same plane as thoracic dorsum (both characters difficult to see in many specimens since head is collapsed); scape almost rectangular, with ±parallel ventral and dorsal margins, all flagellomeres distinctly separated (Figs 172, 173, 228); pronotal collar without a carina along anterior margin (Figs 171); midlobe of mesoscutum with two pairs of setae, anterior pair only one-half as long as posterior pair (Fig. 171); thoracic dorsum smooth and shiny (Figs 171); fore wing (Figs 5, 171, 206) hyaline with three infuscate spots, one at medio-apical margin, one just below stigmal vein, and one at ventral margin below stigmal vein, infuscate spots with flattened setae on dorsal surface of membrane, cubital vein strongly curved upwards, marginal fringe long, longest setae 0.43× maximum width of wing; length of body both sexes 0.6–1.0mm.

Female holotype: length of body 0.8mm.

Antenna completely dark brown. Frons golden-red. Vertex metallic bluish-green. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple. Propodeum golden-purple. Legs with fore coxa infuscate, mid and hind coxae dark brown; fore femur and tibia white with ventral margin dark brown, mid and hind femora dark brown; mid tibia white with ventral margin dark brown, hind tibia dark brown; tarsi whitish. Fore wing hyaline with three infuscate spots, one at medio-apical margin, one just below stigmal vein, and one at ventral margin below stigmal vein; hind wing hyaline. Petiole dark brown. Gastral tergites dark brown with metallic purple and green tinges.

Antenna flattened, scape with ±parallel dorsal and ventral margins. Frons and vertex smooth and shiny. Frontofacial suture straight. Subtorular sutures present but very short. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum smooth and shiny; notauli distinct in anterior one-half; midlobe of mesoscutum with two pairs of setae, anterior pair one-half as long as posterior pair. Dorsellum flat and smooth. Propodeum smooth and shiny; callus with two setae. Fore wing with speculum closed; with a stigmal hairline and with radial cell bare.

Petiole short and smooth. Gaster circular.

Relative measurements: head length dorsal 12; head length frontal 16; head width 24; POL 4; OOL 2; lateral ocellus maximum width 2; eye length 12.5; malar space 3.5; mouth width 9; mesosoma length 25; mesosoma width 20; mesoscutellum length 10; mesoscutellum width 12; fore wing length 44; fore wing width 23; marginal vein length 23; postmarginal vein length 2; stigmal vein length 4; fore wing marginal fringe length 10; gaster length 26; gaster width 23.

Variation in paratype material. Length of body: 0.6–1.0mm. Antennal flagellum with F5 dark brown to white. Vertex metallic bluish-green, bluish-purple, or golden-purple. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple, bluish-green, or golden-purple.

Male (Figs 170, 173). Length of body 0.6–1.0mm. Very similar to the female except for shape and colour of gaster that is elongate with a pale non-metallic spot.

Hosts. Unknown.

Distribution. Brazil, Colombia, Costa Rica, Ecuador.

Material examined.

Type material. Holotype ♀ “COSTA RICA: Puntarenas, Golfo Dulce, 3km SW Rincon, 10m, xi.1991, P. Hanson” (NHMUK). Paratypes (73♀ 149♂, CNC, MZLU, MZUCR, NHMUK): 2♀ “COSTA RICA: Puntar-

enas, Golfo Dulce, 24km W Piedras Blancas, 200m, 8˚46'N, 83˚24'W, i-iii.1991, P. Hanson"; 2♀ "COSTA RICA: Puntarenas, Golfo Dulce, 10km W Piedras Blancas, 100m, iii-v.1989, P. Hanson"; 1♂ "COSTA RICA: Puntarenas, R.P. Karen Mogensen, 9º52′N 85º03′W, 305m, 11-21.ii.2005, C. Hansson"; following from same locality as previous but collected 14-15.ii.2005 (2♀ 3♂), 17-18.ii.2011 (1♀ 1♂), 23-24.ii.2013 (1♀ 2♂); 16♀ 106♂ "COSTA RICA: Puntarenas, P.N. Corcovado, Sirena, 5m, 8˚29'N, 83˚35'W, 19-20.ii.2004, J.S. Noyes"; 2♀ COSTA RICA: Puntarenas, Golfito, P.N. Corcovado, Send. a Sirena, 100m, 25.xii.2000-13.ii.2001, J. Azofeifa, LS 514200_276500, #61322"; following from same locality as previous but collected 25.xii.2000-13.ii.2001 (1♀), 13.ii-18.iii.2001 (4♀), 18.iii-5.v.2001 (5♀), 20.ii.2002 (3♀ 14♂); 1♀ 1♂ "COSTA RICA: Puntarenas, Est Agujas, Cerro Quebraditos 782m, 15.iii-28.iv.2001. J. Azofeifa, MT, LS 521400/274300, #62408"; 1♂ "COSTA RICA: Puntarenas, Los Charcos de Osa, 8º40′N, 83º30′W, 50m, 18-19.ii.2008, J.S. Noyes"; 1♂ "COSTA RICA: Puntarenas, P.N. Piedras Blancas, Estación El Bonito, 100m, 8˚43'N, 83˚13'W, 13-14.ii.2012, J.S. Noyes, NHM (Ent) 2012-91"; 2♀ "COSTA RICA: Puntarenas, P.N. Carara, 9º46′N, 84º57′W, 41m, 1-7.iii.2005, C. Hansson"; 2♀ "COSTA RICA: Puntarenas, San Vito, Las Cruces, 8º47'N, 82º58'W, 1000-1300m, 7-19.ii.2007, C. Hansson"; 2♀ from same locality as previous but collected 15-16.ii.2006; 1♀ "COSTA RICA: Alajuela, P.N. Arenal, Send. Pilón, 10º27'N, 84º43'W, 26.ii.2003, J.S. Noyes"; 1♀ "COSTA RICA: Alajuela, R.F. Rincon, Estación Caribe, 10º53'N, 83º18'W, 19-20.ii.2003, J.S. Noyes"; 1♂ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♀ "COSTA RICA: Guanacaste, Santa Rosa N.P., 27.ix-18.x.1986, D. Janzen, & I.D. Gauld"; 1♀ "COSTA RICA: Guanacaste, Bagaces, P.N. Palo Verde, 0.150km NE de Est., 0-50m, 13.ix-12.x1999, I. Jiménez, MT, LN 260952 /385020#53503"; 1♀ "COSTA RICA: Guanacaste, A.C.T, Bagaces, P.N. Palo Verde, Sct Catalina. 0-50m, 8-12.ix.1999, I. Jiménez, de Luz, LN 260952/385020, #53252"; 5♀ "COSTA RICA: Heredia, La Selva, 50m, ii.1991, J.S. Noyes"; following from same locality as previous but collected iv.1991 (1♀), xi.1992 (1♀), xii.1992 (1♀), 30-31.iii.2002 (1♂), 27-28.ii.2003 (1♂), 28-29.ii.2008 (6♂), 22-24.ii.2012 (1♂); 1♀ "COSTA RICA: Limón, 4km NE Bribri, 50m, xii.1989-iii-1990, P. Hanson"; 1♀ "COSTA RICA: Limón, Valle de la Estrella, R.B. Hitoy Cerere, Send. Toma de Agua, 140m, 8.v.1999, F. Umaña, MT, LN 184300/643500, #54234"; following from same locality as previous but collected 17.ix-10.x.1999 (2♀), 11.x-11.xi.1999 (1♀), 22-23.ii.2010 (1♀); 1♀ "COSTA RICA: Limón, R.B. Hitoy-Cerere, 100m, 9˚40'N, 83˚02'W, 24-25.ii.2004, J.S. Noyes"; following from same locality as previous but collected 21-22.ii.2006 (1♂), 24-26.ii.2008 (1♂); 4♀ 4♂ from same locality as previous but collected 20-22.ii.2006; 1♀ "COSTA RICA: Limón, P.N. Tortuguero, Estación Agua Fria, Sendero Real, 20-50m, 16.viii.2004, M. Moraga, LN 266825/582339, #77975"; 1♀ "COSTA RICA: Turrialba, CATIE, Reventazon, 4.ix.1986, L. Masner". 2♀ "BRAZIL: Bahia Itabuna, viii.1983, F. Benton". 1♀ "COLOMBIA: Amazonas, PNN Amacayacu, San Martin, 03º23'N, 70º06'W, 150m, 19-26.iii.2000, B. Amado"; 1♀ "ECUADOR: Napo, P. Misahualli, 350m, ii.1983, M. Sharkey".

Etymology. From the Latin *tri* = three, and *macula* = spot, referring to the three infuscate spots in the fore wing.

Closterocerus triquetrus sp.nov.

(Figs 170, 175–177, 216, 226)

Diagnosis. Antenna flattened, scape widest at apex (Figs 177, 226); frons with upper border distinct (Fig. 177); ocelli small, ratio POL/posterior ocellus width = 3.2 (Fig. 175); pronotal collar without a carina along anterior margin (Figs 170, 175); midlobe of mesoscutum with two pairs of setae (Figs 170, 175); fore wing triangular and infuscate with two hyaline areas, one L-shaped spot below marginal vein and one band close to apical margin (Figs 175, 216); hind tarsus with T1–3 white, T4 dark brown (Fig. 176); length of body both sexes 1.1mm.

Female holotype: length of body 1.1mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-green. Mesoscutum, mesoscutellum, dorsellum and propodeum metallic bluish-purple. Coxae, femora, mid and hind tibiae dark brown; fore tibia white with basal one-third dark; all tarsi with T1–3 white and T4 dark brown. Fore wing triangular and infuscate with two hyaline areas, one L-shaped spot below marginal vein

and one band close to apical margin; hind wing hyaline. Petiole dark brown. Gaster with Gt_{1-3} dark brown with lateral parts metallic purplish; remaining tergites dark brown with metallic tinges.

Antenna flattened, scape widest at apex. Frons with weak reticulation; frontofacial suture V-shaped; upper border distinct. Vertex with strong reticulation; ocelli small. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with weak reticulation, meshes small and slightly transverse; notauli narrow and complete; midlobe of mesoscutum with two pairs of setae. Dorsellum convex and smooth. Propodeum reticulate with median part smooth, without median carina; callus with two setae. Fore wing triangular; speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster oval-shaped; tergites with very weak reticulation.

Relative measurements: head length dorsal 15; head length frontal 18; head width 28; POL 5.5; OOL 3; lateral ocellus maximum width 1,7; eye length 13.5; malar space 5; mouth width 7; mesosoma length 32; mesosoma width 21.5; mesoscutellum length 13.5; mesoscutellum width 13.5; fore wing length 46; fore wing width 27.5; marginal vein length 28; postmarginal vein length 1.5; stigmal vein length 3.5; fore wing marginal fringe length 5; gaster length 40; gaster width 26.

Male. Length of body: 1.1mm. Frons golden-purple. Mesoscutum with sidelobes golden-purple, midlobe of mesoscutum and mesoscutellum golden-red with sides metallic bluish-green, dorsellum and propodeum metallic bluish-green. Otherwise as in female.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO: Oaxaca, 10mi E Totolapan, 20.vii.1987, 4000' [1219m], J.B. Woolley, 87/052" (TAMU). Paratype: 1♂ with same label data as holotype (TAMU).

Etymology. From the Latin *triquetrus* = triangular, referring to the triangular fore wing.

Closterocerus tumidus sp.nov.

(Figs 178–181)

Diagnosis. Female antenna with scape slightly flattened, widest medially, pedicel and flagellum not flattened (Fig. 179); male scape strongly inflated (Fig.181), ca 2× as long as wide; pronotal collar without a carina along anterior margin (Figs 178, 180); midlobe of mesoscutum with three pairs of short setae (Fig. 178); mesoscutum and mesoscutellum metallic purple with strong and dense reticulation (Fig. 178); fore wing hyaline with apical margin and part below stigmal vein infuscate (Fig. 179); hind tarsus with T1–3 white, T4 pale brown (Fig. 179); length of body female 1.1–1.2mm, male 0.8–1.3mm.

Female holotype: length of body 1.2mm.

Antenna with scape, pedicel and F1 dark brown, F2–5 pale brown. Frons golden-green. Vertex metallic purple. Mesoscutum, mesoscutellum and dorsellum metallic purple. Propodeum dark brown with golden-green tinges. Coxae and femora dark brown; fore and mid tibiae infuscate with base darker, hind tibia dark brown with apex white; fore tarsus pale brown, mid and hind tarsi with T1–3 white and T4 pale brown. Fore wing hyaline with apical margin and part below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic tinges.

Antenna with scape slightly flattened, widest medially, pedicel and flagellum not flattened. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation. Subtorular sutures missing. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with three pairs of short setae. Dorsellum convex with weak reticulation. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; without a stigmal hairline and with radial cell ±hairy.

Petiole very short, just a narrow band. Gaster oval-shaped; Gt_1 smooth, remaining tergites with very weak reticulation.

Relative measurements: head length dorsal 15.5; head length frontal 24; head width 32; POL 7; OOL 3.5; lateral ocellus maximum width 2; eye length 16; malar space 6.5; mouth width not measurable; mesosoma length 41; mesosoma width 31; mesoscutellum length 17; mesoscutellum width 18.5; fore wing length 69; fore wing width 39; marginal vein length 33.5; postmarginal vein length 2; stigmal vein length 5; fore wing marginal fringe length 5; gaster length 45; gaster width 30.

Variation in paratype material. Length of body 1.1–1.2mm. The paratype is similar to the holotype.

Male (Figs 180, 181). Length of body 0.8–1.3mm. Scape strongly inflated, pale brown with dorsal part dark brown. Vertex metallic purple, or with anterior one-half metallic blue and posterior one-half metallic purple. Mesoscutum metallic bluish-green, or metallic purple. Mesoscutellum golden, or golden-red. Propodeum metallic purple. Otherwise as in female.

Hosts. Unknown.

Distribution. Peru.

Material examined.

Type material. Holotype ♀ "PERU: Cusco, Ollantaytambo, 19.xii.1983, L. Huggert" (MZLU). Paratypes 1♀ 9♂ with same label data as holotype (MZLU).

Etymology. From the Latin *tumidus* = swollen, referring to the inflated male scape.

Closterocerus variotinctus sp.nov.

(Figs 182–184)

Diagnosis. Antenna not flattened, only pedicel slightly flattened, scape ±narrow (Fig. 182); fore wing hyaline with area below stigmal vein infuscate (Fig. 184); pronotal collar without a carina along anterior margin (Fig. 184); midlobe of mesoscutum with one pair of setae (Fig. 184); vertex, mesoscutum and mesoscutellum with very weak reticulation, shiny (Fig. 184); mesoscutum and mesoscutellum with different colour (Fig. 184); fore wing with speculum open below and towards base of wing (Fig. 184); length of body female 0.8–1.3mm, male 0.9–1.1mm.

Female holotype: length of body 1.3mm.

Antenna with scape, pedicel and F1–3 dark brown, F4–5 pale brown. Frons below frontofacial suture golden-green, above suture golden-red in lower part and metallic purple in upper part. Vertex metallic bluish-purple. Mesoscutum and dorsellum metallic bluish-green. Mesoscutellum golden-red. Propodeum metallic purple. Coxae, femora and hind tibia dark brown; fore and mid tibiae white; fore tarsus infuscate, mid and hind tarsi white. Fore wing hyaline with area below stigmal vein infuscate; hind wing hyaline. Petiole dark brown. Gaster with Gt_1 metallic bluish-purple, remaining

tergites golden-purple.

Antenna not flattened except pedicel that is slightly flattened, scape ±narrow, pedicel with sharp ventral and dorsal edges. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with very weak reticulation, shiny. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with very weak reticulation, shiny; notauli distinct throughout; midlobe with one pair of weak setae. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum open below and towards base of wing; with a stigmal hairline, radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; Gt_1 smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 15; head length frontal 22.5; head width 30; POL 5.5; OOL 2.5; lateral ocellus maximum width 3; eye length 18.5; malar space 4.5; mouth width 7.5; mesosoma length 35; mesosoma width 25.5; mesoscutellum length 15.5; mesoscutellum width 14.5; fore wing length 61; fore wing width 31; marginal vein length 30; postmarginal vein length 1.5; stigmal vein length 6; fore wing marginal fringe length 5; gaster length 40; gaster width 27.5.

Variation in paratype material. Length of body 0.8–1.3mm. Mesoscutum metallic bluish-green or purple. Propodeal callus with 2–3 setae.

Male (Fig. 183). Length of body 0.9–1.1mm. Mesoscutum, dorsellum and propodeum golden-green or metallic bluish-green. Otherwise similar to female.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: Heredia, La Selva, 75m, 10˚26'N, 84˚01'W, xii.1992, P. Hanson" (NHMUK). Paratypes (15♀ 3♂, CNC, MZLU, MZUCR, NHMUK): 1♀ with same label data as holotype; following from same locality as holotype but collected 14.xii.1995 (1♀), 23-24.ii.2005 (1♂); 2♀ "COSTA RICA: Alajuela, Estación Pilón, 10º43'N, 85º59'W, 12-18.ii.2004, C. Hansson & J.A. Azofeifa"; 1♀ "COSTA RICA: Alajuela, San Carlos, Sendero Pilón, 600m, 30.xi-22.xii.1999, G. Carballo, LN 457900_269100"; following from same locality as previous but collected 5.iv-7.v.2000 (1♀), 15.iii-5.vi.2001 (1♀); 1♀ "COSTA RICA: Alajuela, Caño Negro, Teñideros, 41m, 2.ix.2005, J.A. Azofeifa et al., LN 313346_450130, #84539"; 2♀ 2♂ "COSTA RICA: Alajuela, 7km N Boca Tapada, Laguna Lagarto Lodge, 55m, 10˚41'N, 84˚11'W, 18-19.ii.2018, J.S. Noyes, NHM (Ent) 2018-87"; 1♀ "COSTA RICA: Alajuela, R.F. Rincon, Estación Caribe, 10º53'N, 83º18'W, 19-20.ii.2003, J.S. Noyes"; 4♀ "COSTA RICA: Manuel Antonio N.P. 23-28.viii.1986, L. Masner".

Etymology. From the Latin *varius* = different, and *tinctus* = dye, colour, referring to the differently coloured mesoscutum and mesoscutellum.

Closterocerus verticillus sp.nov.

(Figs 185, 186)

Diagnosis. Antenna flattened, scape triangular and widest just below apex (Fig. 186); flagellomeres with setae/sensillae in a basal whorl (Figs 185, 186); pronotal collar without a carina along anterior margin (Fig. 185); midlobe of mesoscutum with one pair of strong setae (Fig. 185); fore wing hyaline with an infuscate spot below stigmal vein (Fig. 185); hind tarsus white (Fig. 186); length of body female 1.0–1.4mm.

Female holotype: length of body 1.0mm.

Antenna dark brown. Frons golden-green. Vertex golden-green. Mesoscutum golden-green. Mesoscutellum and dorsellum metallic bluish-purple. Propodeum dark brown. Coxae and femora dark brown; fore and mid tibiae white, hind tibia dark brown with apex pale brown; tarsi white. Fore wing hyaline with an infuscate spot below stigmal vein; hind wing hyaline. Petiole dark brown. Gaster with Gt_{1-3} golden-green with lateral parts metallic purple, remaining tergites brown with metallic tinges.

Antenna flattened. Frons with weak reticulation; frontofacial suture V-shaped. Vertex with very weak reticulation Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum and mesoscutellum with very weak reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with one pair of strong setae. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; Gt_{1-2} smooth, remaining tergites with very weak reticulation.

Relative measurements: head length dorsal 11; head length frontal 15; head width 24; POL 5; OOL 3; lateral ocellus maximum width 2; eye length 11; malar space 3.5; mouth width 7; mesosoma length 27; mesosoma width 21; mesoscutellum length 11; mesoscutellum width 12.5; fore wing length 54; fore wing width 28.5; marginal vein length 26; postmarginal vein length 2; stigmal vein length 4.5; fore wing marginal fringe length 10; gaster length 38; gaster width 20.

Variation in paratype material. Length of body: 1.0–1.4mm. Vertex golden-green or metallic purple. Mesoscutum golden-green or metallic purple. Mesoscutellum and dorsellum metallic bluish-purple or purple. Propodeum dark brown or metallic purple. Gt_{1-3} golden-green or metallic purple, Gt_6 brown with metallic tinges or metallic bluish-green.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ "COSTA RICA: San José, 2km W Empalme, 2300m, 9˚43'N, 83˚58'W, ii-iii.1995, G. Navarro" (NHMUK). Paratypes (2♀, MZLU, NHMUK): 1♀ "COSTA RICA: Heredia, 6km ENE Vara Blanca, 10˚11'N, 84˚07'W, 2000m, ii.2002, 20/M/NOTN, INBio, OET, ALAS"; 1♀ "COSTA RICA: Puntarenas, E.B. Monteverde, 10º20′N, 84º49′W, 1540m, 26.ii.2007, J.S. Noyes, BMNH(Ent) 2010-21".

Etymology. From the Latin *verticillus* = whirl, referring to the arrangement of setae on flagellomeres.

Closterocerus whartoni sp.nov.

(Figs 187, 188, 218)

Diagnosis. Antenna flattened, scape widest at apex (Fig. 188); pronotal collar with a weak carina along anterior margin (Fig. 187); midlobe of mesoscutum with four pairs of weak setae (Fig. 187); fore wing dark infuscate with a hyaline band close to apical margin (Figs 188, 218); hind tarsus with T1–3 white, T4 dark brown (Fig. 188); length of body female 1.6mm.

Female holotype: length of body 1.6mm.

Antenna dark brown. Frons golden-green. Vertex metallic bluish-purple. Mesoscutum, mesoscutellum and dorsellum metallic bluish-purple. Propodeum metallic purple. Coxae, femora, mid and hind tibiae dark brown, fore tibia whitish with base brown; tarsi with T1–3 white, T4 dark brown.

Fore wing dark infuscate with a hyaline band close to apical margin; hind wing hyaline. Petiole dark brown. Gaster metallic bluish-purple.

Antenna flattened, scape widest at apex. Frons with strong reticulation; frontofacial suture V-shaped. Vertex with strong reticulation. Subtorular sutures present. Occipital margin rounded.

Pronotal collar with a weak carina along anterior margin. Mesoscutum and mesoscutellum with strong reticulation; notauli distinct in anterior one-half; midlobe of mesoscutum with four pairs of weak setae. Dorsellum convex and smooth. Propodeum smooth, without median carina; callus with two setae. Fore wing speculum closed; with a stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate-elongate; Gt_{1-2} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 20; head length frontal 21; head width 38; POL 8; OOL 3.5; lateral ocellus maximum width 3; eye length 16; malar space 6.5; mouth width 10; mesosoma length 49; mesosoma width 36; mesoscutellum length 19; mesoscutellum width 21; fore wing length 84; fore wing width 52; marginal vein length 43; postmarginal vein length 3; stigmal vein length 8; fore wing marginal fringe length 4; gaster length 53; gaster width 34.

Male. Unknown.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO: Oaxaca, Llano de las Flores, 17.vii.1987, 8900' [2713m], R. Wharton" (TAMU).

Etymology. Named after Robert Wharton (TAMU), collector of the holotype.

Closterocerus woolleyi sp.nov.

(Figs 189–191, 217, 230, 231)

Diagnosis. Antenna flattened, scape widest at apex, all flagellomeres distinctly separated (Figs 190, 230); frontofacial suture straight (Fig. 231); vertex long and flat, 0.9× as long as wide (Figs 191, 230); fore wing hyaline with apical margin and part below stigmal vein infuscate (Figs 190, 217); pronotal collar without a carina along anterior margin (Fig. 189); midlobe of mesoscutum with one pair of strong setae (Figs 189, 190); hind tarsus white; length of body female 1.1mm.

Female holotype: length of body 1.1mm.

Antenna dark brown. Head with frons golden-green; vertex metallic bluish-purple. Mesoscutum and mesoscutellum metallic bluish-purple. Dorsellum and propodeum metallic purple. Fore and mid leg white; hind coxa dark brown, hind femur infuscate with apex white, hind tibia white with base infuscate; tarsus white. Fore wing hyaline with apical margin and part below stigmal vein infuscate, hind wing hyaline. Petiole dark brown. Gaster dark brown with metallic purple tinges.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation; vertex flat, 0.9× as long as wide. Frontofacial suture straight. Subtorular sutures present. Occipital margin rounded.

Pronotal collar without a carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-half; midlobe with one pair of strong setae. Mesoscutellum convex, with strong reticulation, posterior part with weak reticulation. Dorsellum convex and smooth. Propodeum smooth without median carina; callus with two setae. Fore wing speculum closed; with a

stigmal hairline and with radial cell bare.

Petiole very short, just a narrow band. Gaster ovate; Gt_{1-3} smooth, remaining tergites with weak reticulation.

Relative measurements: head length dorsal 17; head length frontal 14; head width 29; POL 5; OOL 3; lateral ocellus maximum width 2; eye length 11.5; malar space 4; mouth width 9; mesosoma length 32; mesosoma width 21; mesoscutellum length 12.5; mesoscutellum width 17.5; fore wing length 52; fore wing width 31; marginal vein length 29; postmarginal vein length 1.5; stigmal vein length 3.5; fore wing marginal fringe length 6.5; gaster length 43; gaster width 23.

Male. Unknown.

Hosts. Unknown.

Distribution. Mexico.

Material examined.

Type material. Holotype ♀ "MEXICO: Chiapas, 8 miles N Berriozabal, 9.viii.1990, 3600' [1097m], J.B. Woolley, 90/057B" (TAMU).

Etymology. Named after James B. Woolley (TAMU), collector of the holotype.

Closterocerus zurquiensis sp.nov.
(Figs 192–194)

Diagnosis. Antenna flattened with all flagellomeres distinctly separated, scape widest at apex (Figs 193, 194); frons with upper margin distinct (Fig. 194); pronotal collar with a carina along anterior margin (Fig. 192); midlobe of mesoscutum with two pairs of strong setae (Fig. 192); fore wing hyaline with an infuscate band below stigmal vein (Fig. 192); stigmal vein elongate, 2.0× as long as wide (Fig. 192); hind tarsus white (Fig. 193); petiole transverse with strong sculpture on dorsal surface; length of body female 1.3–1.8mm.

Female holotype: length of body 1.4mm.

Antenna dark brown. Head with frons golden-green; vertex metallic purple. Mesoscutum and mesoscutellum metallic bluish-green with purple tinges. Dorsellum and propodeum metallic bluish-green. Coxae dark brown; fore and mid legs with femora infuscate, tibiae and tarsi white; hind femur and tibia dark brown with apex white, tarsus white. Fore wing hyaline with an infuscate band below stigmal vein, hind wing hyaline. Petiole golden-green. Gaster with Gt_1 metallic bluish-purple, remaining tergites dark brown with golden-purple tinges.

Antenna flattened, scape widest at apex. Frons and vertex with strong reticulation. Frontofacial suture V-shaped; frons with upper margin distinct. Subtorular sutures absent. Occipital margin rounded.

Pronotal collar with a sharp carina along anterior margin. Mesoscutum with strong reticulation; notauli distinct in anterior one-third; midlobe with two pairs of strong setae. Mesoscutellum convex, with strong reticulation. Dorsellum convex, with strong reticulation, smooth medially. Propodeum smooth without median carina; callus with two setae. Fore wing speculum closed; without a stigmal hairline and with radial cell ±bare.

Petiole transverse with strong sculpture on dorsal part. Gaster ovate; Gt_1 smooth, remaining tergites with very weak reticulation.

Relative measurements: head length dorsal 17; head length frontal 22; head width 35; POL

6.5; OOL 3.5; lateral ocellus maximum width 3; eye length 18; malar space 5; mouth width 9.5; mesosoma length 45; mesosoma width 29; mesoscutellum length 17; mesoscutellum width 17; fore wing length 72; fore wing width 43; marginal vein length 38; postmarginal vein length 4; stigmal vein length 6; fore wing marginal fringe length 3; gaster length 42; gaster width 31.

Variation in paratype material. Length of body: 1.3–1.8mm. All femora infuscate to dark brown; hind tibia dark brown with apex white, to entirely white.

Male. Unknown.

Hosts. Unknown.

Distribution. Costa Rica.

Material examined.

Type material. Holotype ♀ 1♀ COSTA RICA: San José, Zurqui de Moravia, 1600m, 10°3'N, 84°0'W, i.1996, P. Hanson" (NHMUK). Paratypes (2♀, MZLU, MZUCR): from same locality as holotype but collected iv.1995 (1♀), xii.1995 (1♀).

Etymology. Named after the type locality.

DISCUSSION

All analyses including DNA data, as outlined in the introduction, show *Closterocerus* s.str. as a monophyletic sister group to remaining Entedoninae/Entedonini analyzed. *Achrysocharis* and some other genera sometimes treated as synonyms of *Closterocerus*, such as *Asecodes* and *Neochrysocharis*, are distinct from *Closterocerus* and nest with other Entedoninae genera in these analyses. Thus there is strong evidence to narrow the concept of *Closterocerus* and include only species with the diagnostic morphological features accounted for above under the diagnosis for *Closterocerus*. The majority of genera previously synonymized with *Closterocerus* are different from *Closterocerus* s.str. They do not share the combination of morphological features listed above, and molecularly they are quite different from *Closterocerus* s.str.

LIST OF SPECIES

C. aglaia **sp.nov.**
C. alas **sp.nov.**
C. albicrus **sp.nov.**
C. alpestris **sp.nov.**
C. altamiraensis **sp.nov.**
C. amaurus **sp.nov.**
C. amethystinus **sp.nov.**
C. angustipennis **sp.nov.**
C. apiculus **sp.nov.**
C. arenalensis **sp.nov.**
C. atrifasciatus **sp.nov.**
C. aureolus **sp.nov.**
C. aureopurpureus **sp.nov.**
C. azofeifai **sp.nov.**
C. barbatus **sp.nov.**
C. brevipes **sp.nov.**
C. brillante **sp.nov.**
C. byrrus **sp.nov.**
C. caelatus **sp.nov.**
C. cincinnatus Girault
C. cinctipennis Ashmead
C. clarus **sp.nov.**
C. coffeellae Ihering
C. complanatus **sp.nov.**
C. concinnus **sp.nov.**
C. crassicornis **sp.nov.**
C. crinitus **sp.nov.**
C. cuspidis **sp.nov.**
C. cymatilis **sp.nov.**
C. deltoides **sp.nov.**
C. eulampis **sp.nov.**
C. flammeus **sp.nov.**
C. flavicinctus De Santis
C. fulgens **sp.nov.**
C. hansoni **sp.nov.**
C. hirsutus **sp.nov.**
C. huggerti **sp.nov.**
C. iomus **sp.nov.**
C. latiscapus **sp.nov.**
C. lineatus **sp.nov.**
C. masneri **sp.nov.**
C. melanogrammus **sp.nov.**
C. mirandus **sp.nov.**
C. nitidulus **sp.nov.**
C. noyesi **sp.nov.**
C. oligothrix **sp.nov.**
C. petiolatus **sp.nov.**
C. platycerus **sp.nov.**
C. porphyriops **sp.nov.**
C. pulcher (Howard)
C. pumilus **sp.nov.**
C. purpureus (Howard)
C. scitulus **sp.nov.**
C. setosus **sp.nov.**
C. stigmalis **sp.nov.**
C. sulcatus **sp.nov.**
C. tapantibius **sp.nov.**
C. tischeriae **sp.nov.**
C. trimaculatus **sp.nov.**
C. triquetrus **sp.nov.**
C. tumidus **sp.nov.**
C. variotinctus **sp.nov.**
C. verticillus **sp.nov.**
C. whartoni **sp.nov.**
C. woolleyi **sp.nov.**
C. zurquiensis **sp.nov.**

Host	***Closterocerus* species**
LEPIDOPTERA	
Evippe sp. (Gelechiidae)	*C. coffeellae* Ihering
Leucoptera coffeella Guérin-Meneville (Lyonetiidae)	*C. coffeellae* Ihering, *C. flavicinctus* De Santis, *C. lineatus* sp.nov.
Phyllocnistis citrella Stainton (Gracillariidae)	*C. flavicinctus* De Santis
Phyllocnistis sp. (Gracillariidae)	*C. coffeellae* Ihering, *C. brevipes* sp.nov.
Porphyrosela sp. (Gracillariidae)	*C. coffeellae* Ihering
Tischeria sp. (Tischeriidae)	*C. tischeriae* sp.nov., *C. brevipes* sp.nov.
Unidentified Gracillariidae on *Canavalia maritima*	*C. flavicinctus* De Santis
Unidentified Lepidoptera leafminer on *Cecropia polyphlebia*	*C. flavicinctus* De Santis
COLEOPTERA	
Brachys sp. (Buprestidae)	*C. lineatus* sp.nov.
Pachyscelus sp. (Buprestidae)	*C. lineatus* sp.nov., *C. brevipes* sp.nov. *C. flavicinctus* De Santis
Pachyscelus nigricollis Waterhouse (Buprestidae)	*C. flavicinctus* De Santis
Tachygonus sp. (Curculionidae)	*C. brevipes* sp.nov.
DIPTERA	
Liriomyza sativae Blanchard (Agromyzidae)	*C. flavicinctus* De Santis

Table 1. Host associations for *Closterocerus* species.

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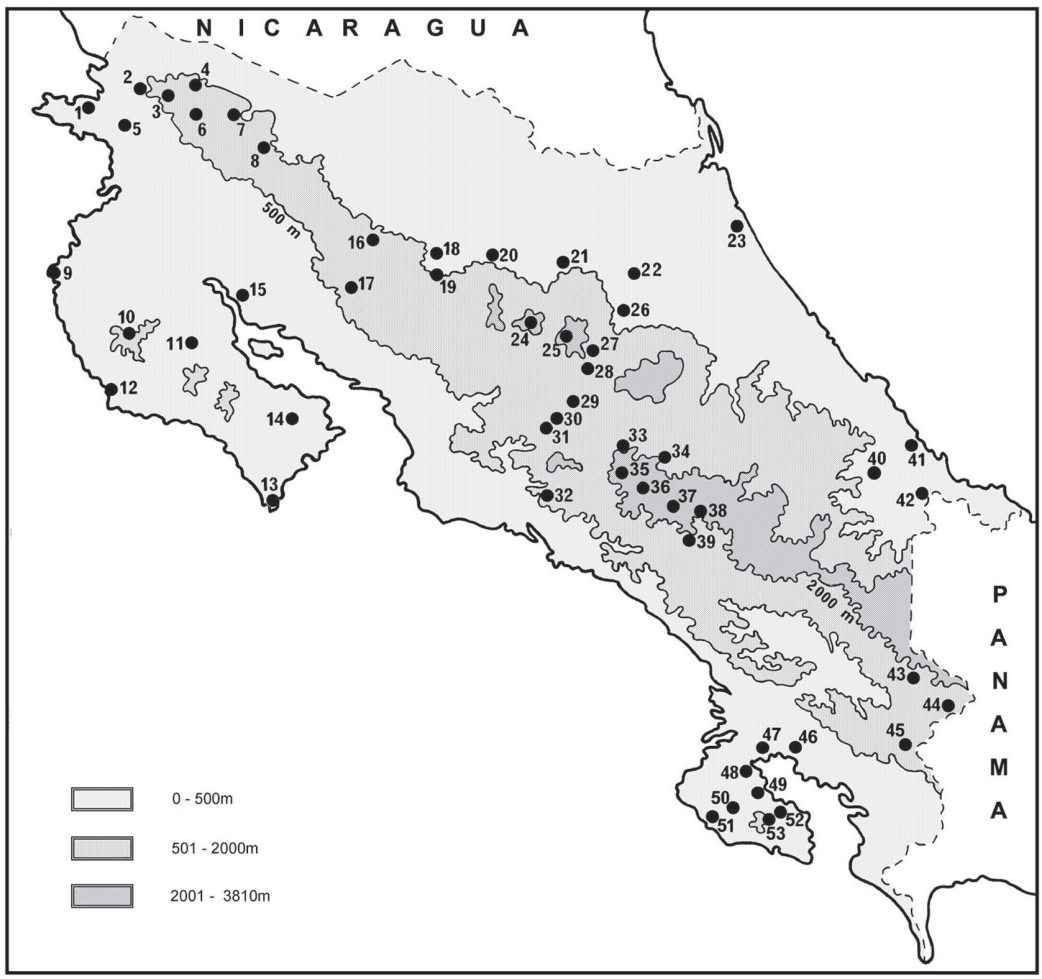


Map 1. Costa Rica showing the localities from which significant Malaise trap, yellow pan trap and sweep-net samples have been collected and processed. These are: 1. Murcielago; 2. Cerro el Hacha; 3. Estación Maritza; 4. Estación Pitilla; 5. P.N. Santa Rosa; 6. Estación Cacao; 7. Finca San Gabriel; 8. Macizo Miravalles; 9. Marino las Baulas; 10. Bosque Nacional Diría; 11. Barra Honda; 12. Z.P. Nosara; 13. Reserva Absoluta Cabo Blanco; 14. Reserva Privada Karen Mogensen; 15. P.N. Palo Verde; 16. Volcán Arenal;. 17. Monteverde; 18. Jabillos; 19. Est. Biol. San Ramón; 20. Aguas Zarcas; 21. Est. Biol. La Selva; 22. Río Frio; 23. Tortuguero; 24. Volcán Poas; 25. Vara Blanca; 26. 16km W Guapiles; 27. El Tunel (Zurqui); 28. Zurqui de Moravia; 29. INBio Parque; 30. San Antonio de Escazú; 31. Cerros de Escazú; 32. Carara; 33. La Cangreja; 34. P.N. Tapantí; 35. Mirador Quetzales; 36. Cerro de la Muerte; 37. Villa Mills; 38. Est. Biol. Cuéricí; 39. 26km N San Isidro; 40. R.B. Hitoy-Cerere; 41. Cahuita; 42. Bribri; 43. Est. Altamira; 44. Las Alturas; 45. San Vito, Wilson Botanical Gardens; 46. 5km W. Peñas Blancas; 47. Golfo Dulce; 48. Rincón de Osa; 49. La Palma; 50. Est. Los Patos; 51. Corcovado; 52. Puerto Jiménez; 53. Est. Agujas. (Modified from Gauld, 2000)

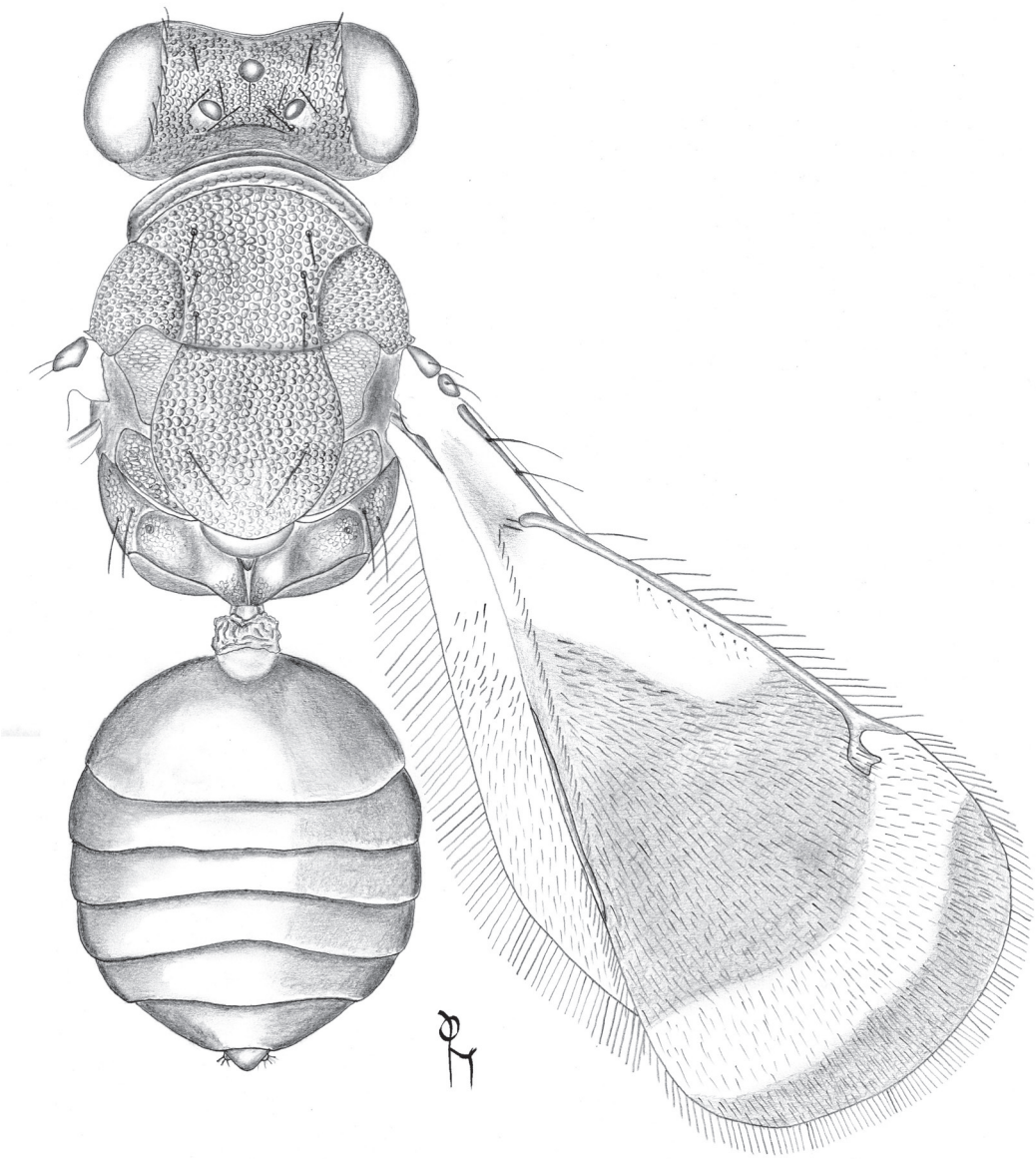


Fig. 1. *Closterocerus coffeellae*, habitus dorsal view, ♀ non-type. Length of specimen 1.5mm.

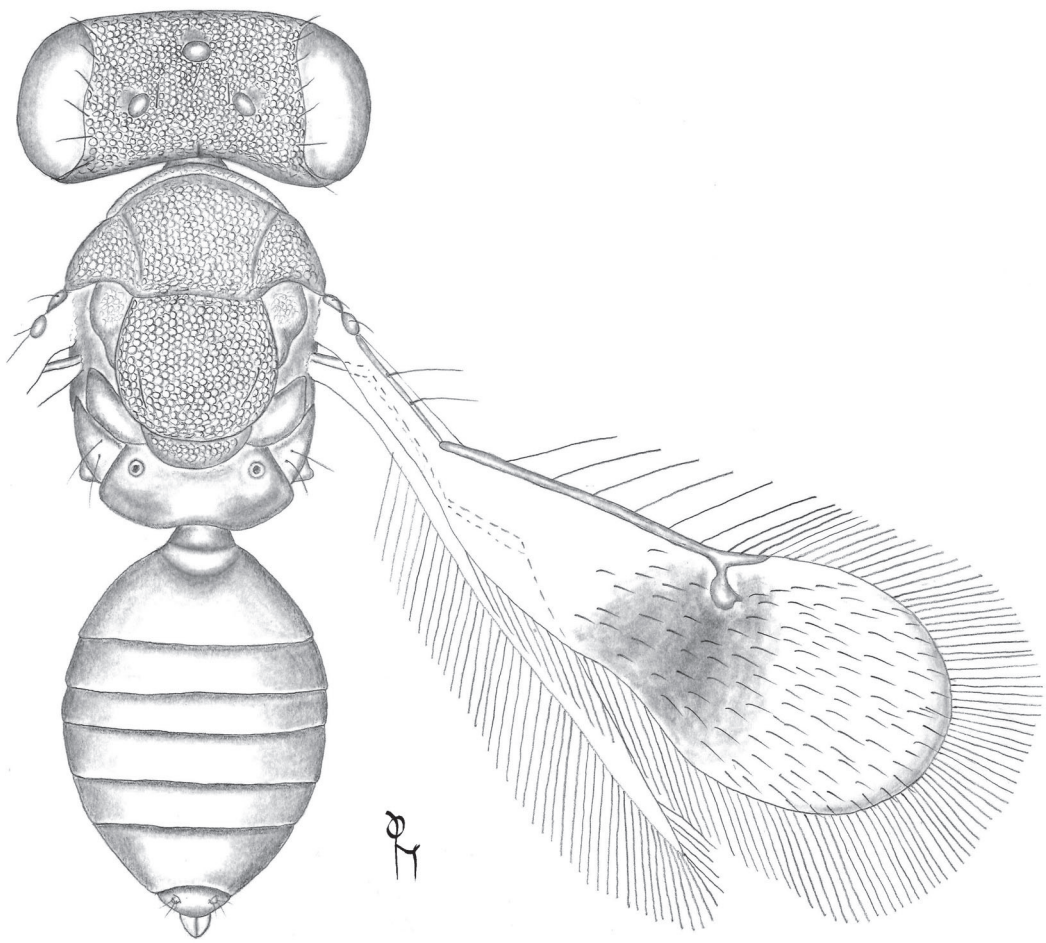


Fig. 2. *Closterocerus angustipennis*, habitus dorsal view, ♀ paratype. Length of specimen 0.7mm.

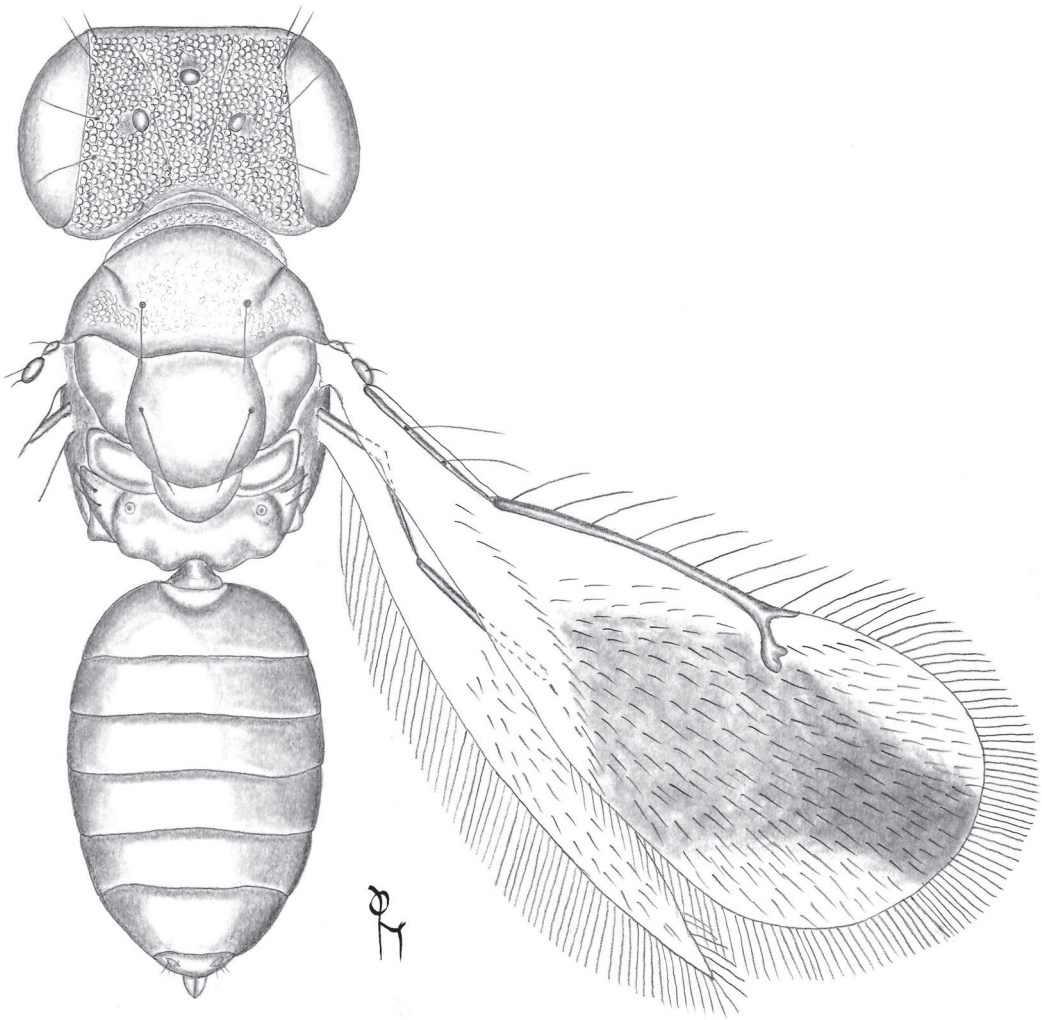


Fig. 3. *Closterocerus deltoides*, habitus dorsal view, ♀ paratype. Length of specimen 1.0mm.

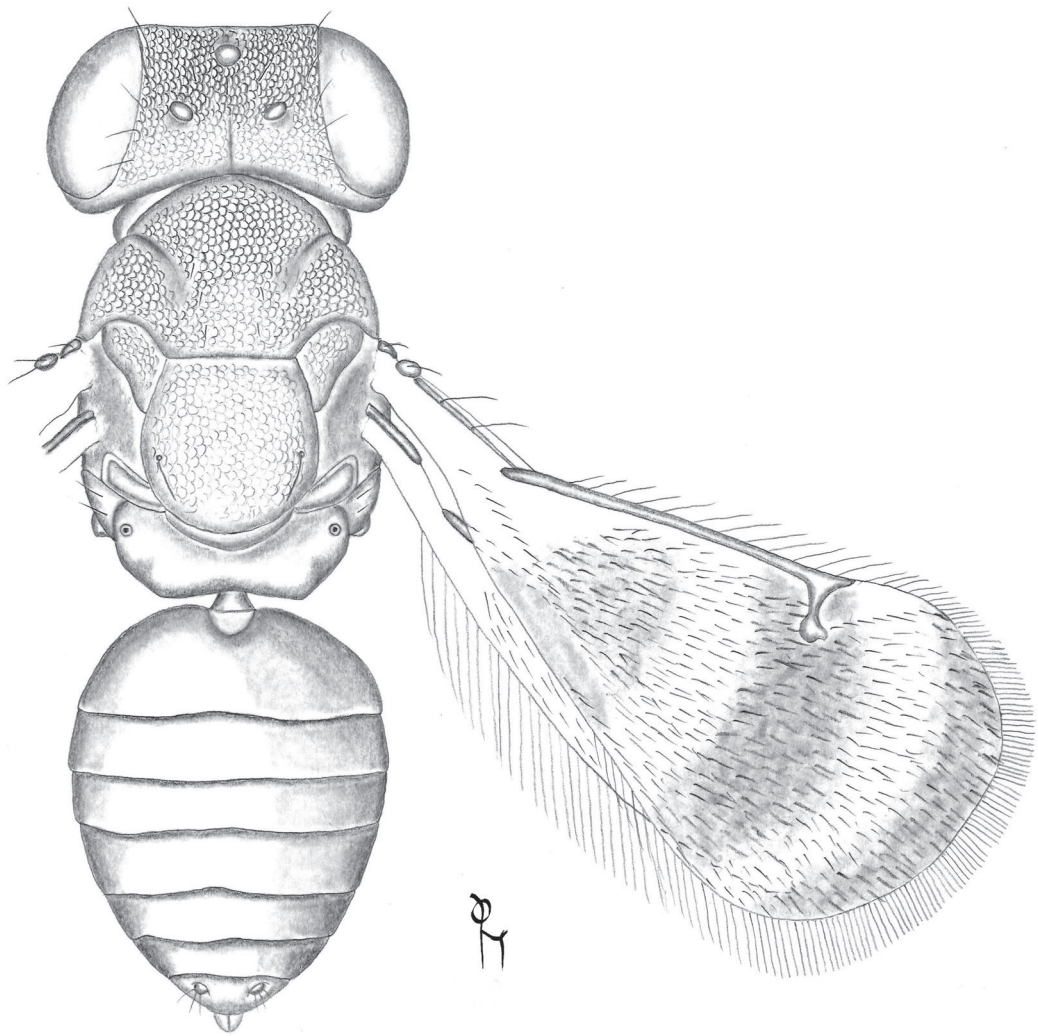


Fig. 4. *Closterocerus flavicinctus*, habitus dorsal view, ♀ non-type. Length of specimen 1.1mm.

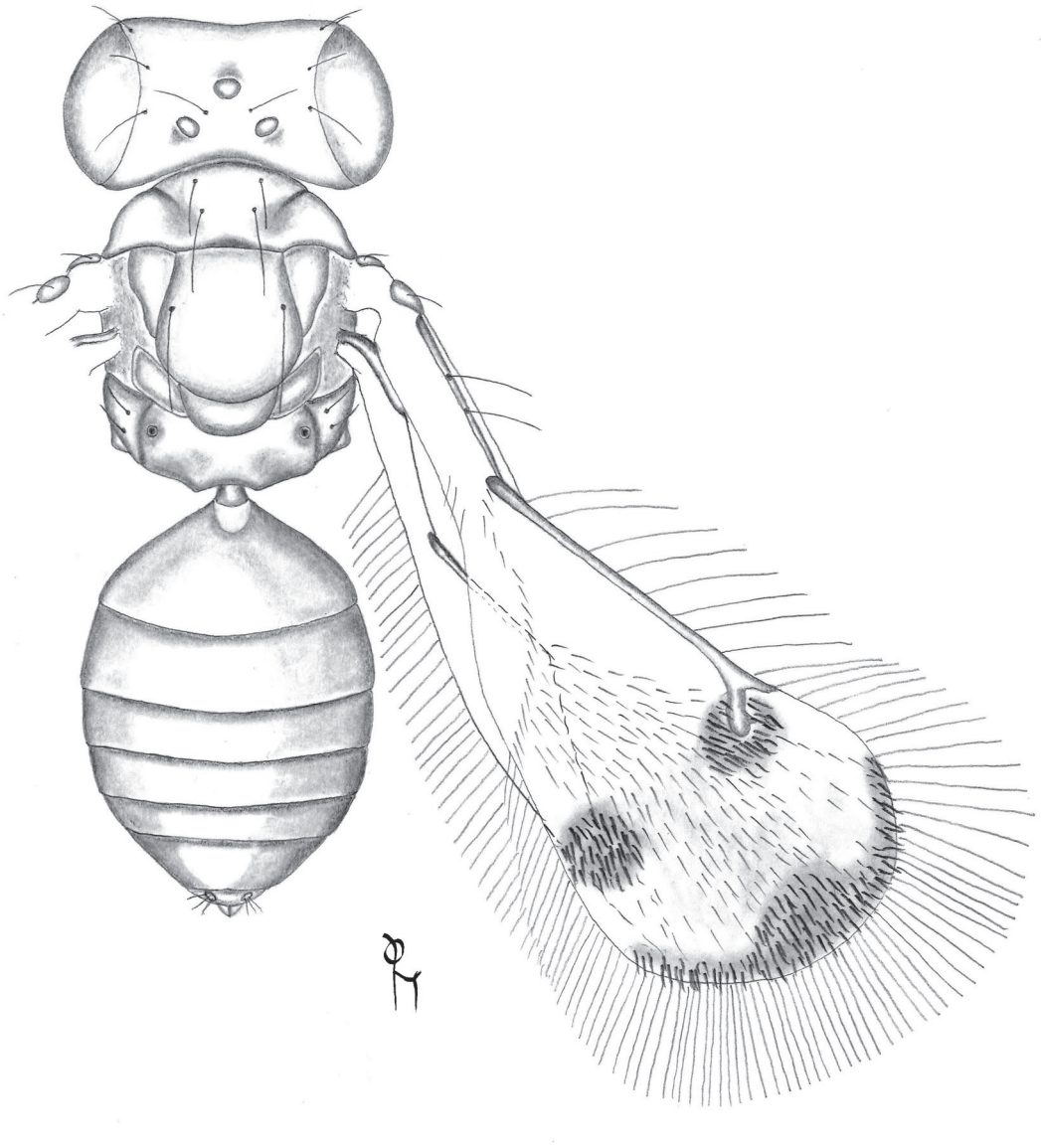
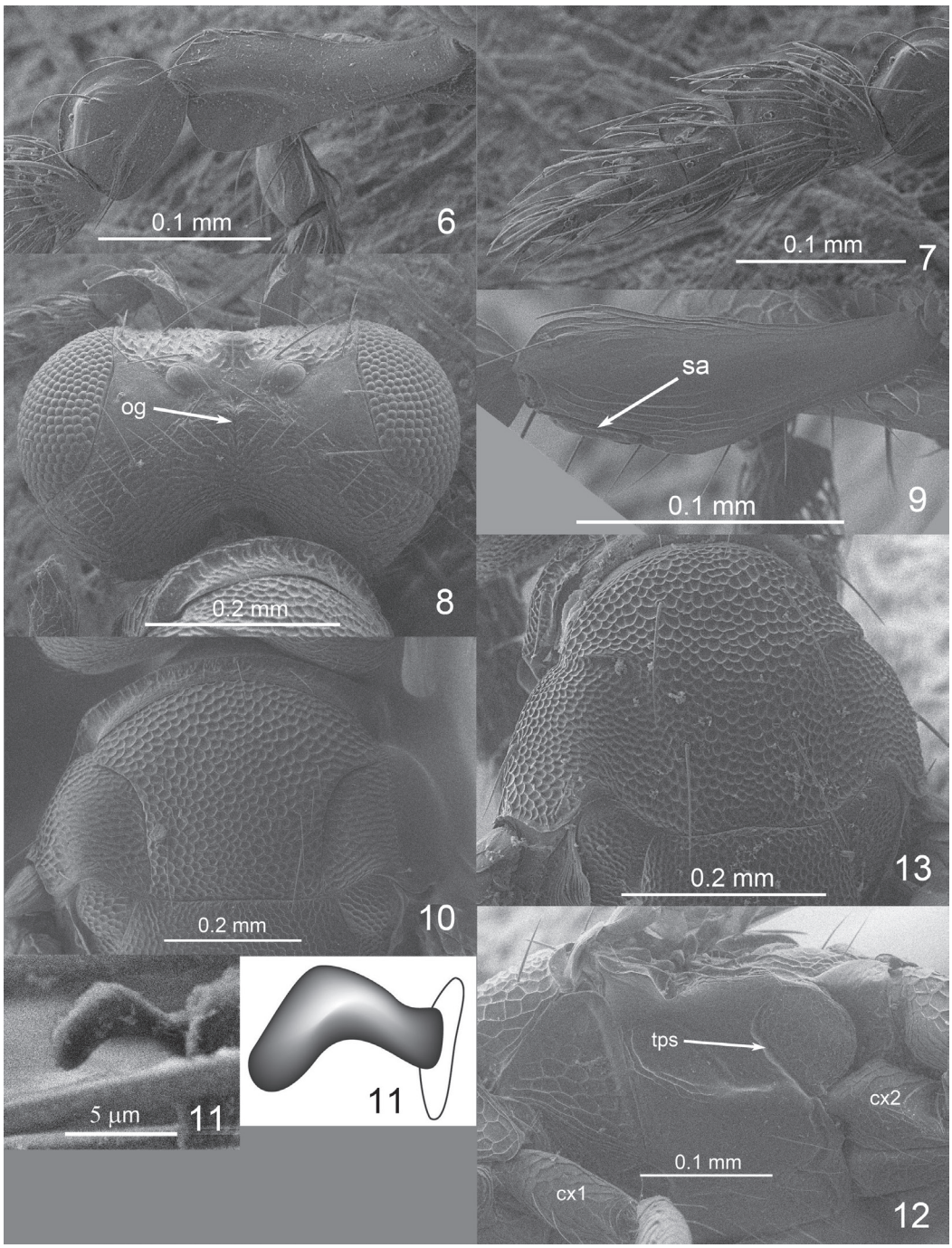
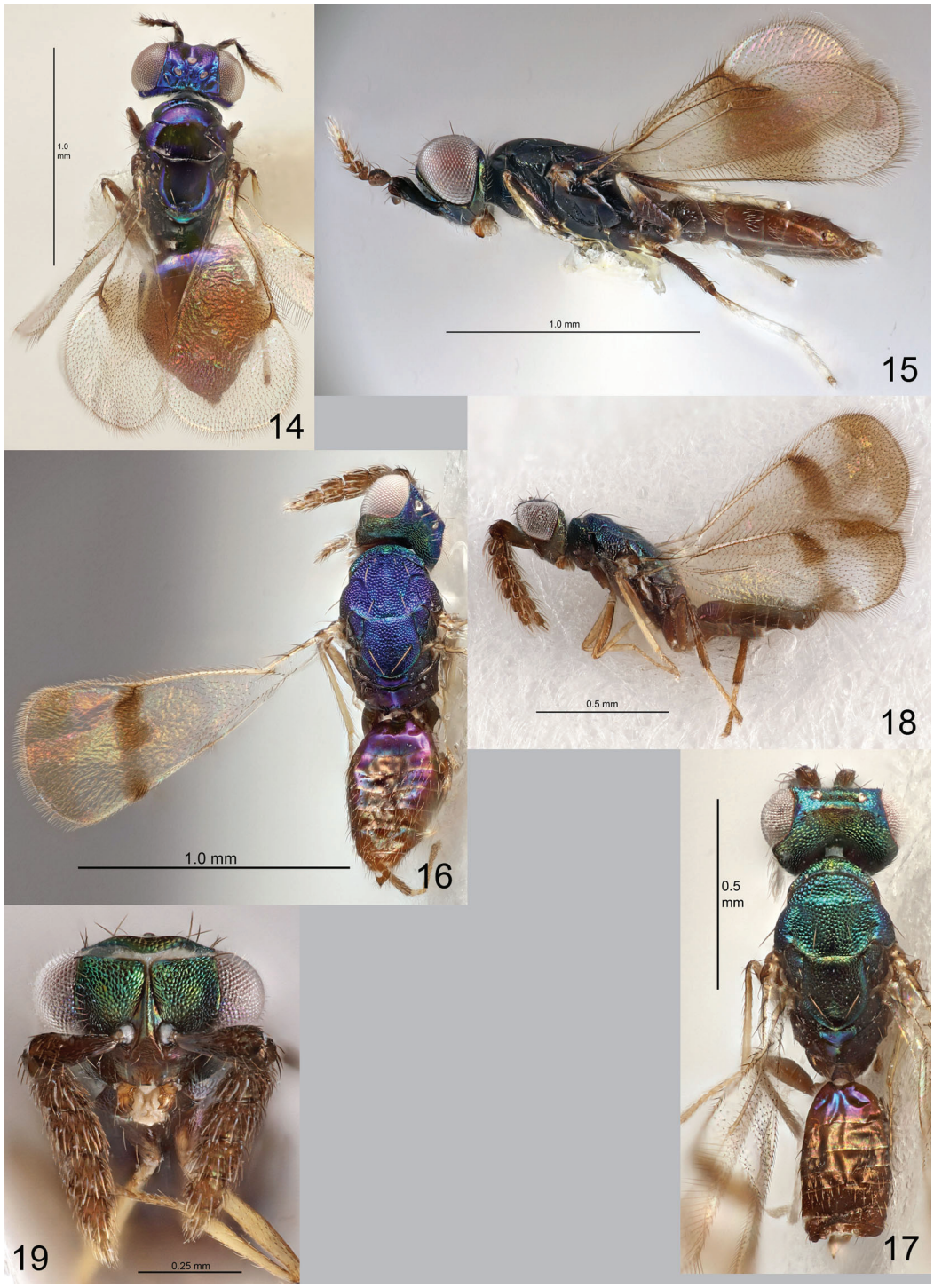


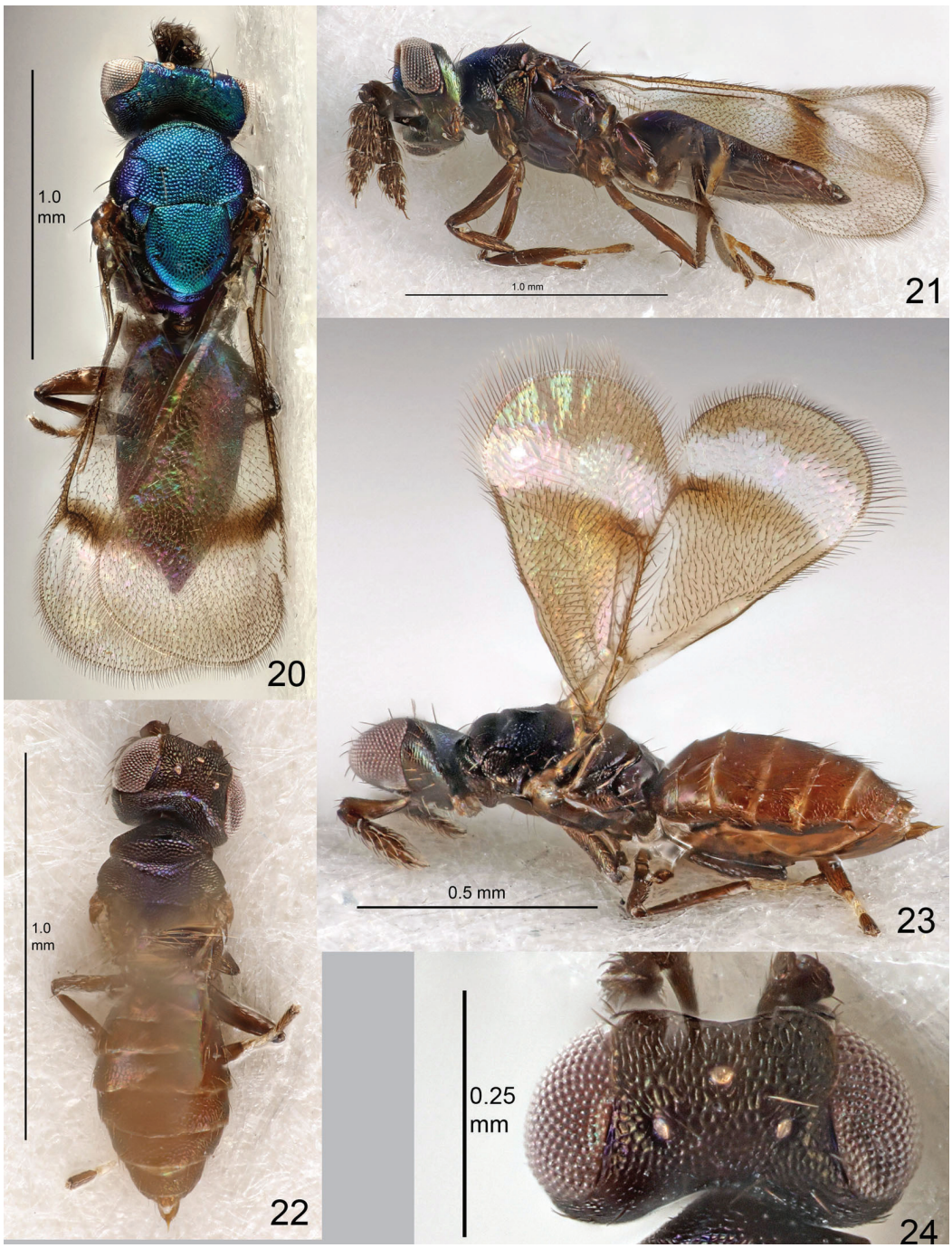
Fig. 5. *Closterocerus trimaculatus*, habitus dorsal view, ♀ paratype. Length of specimen 0.9mm.



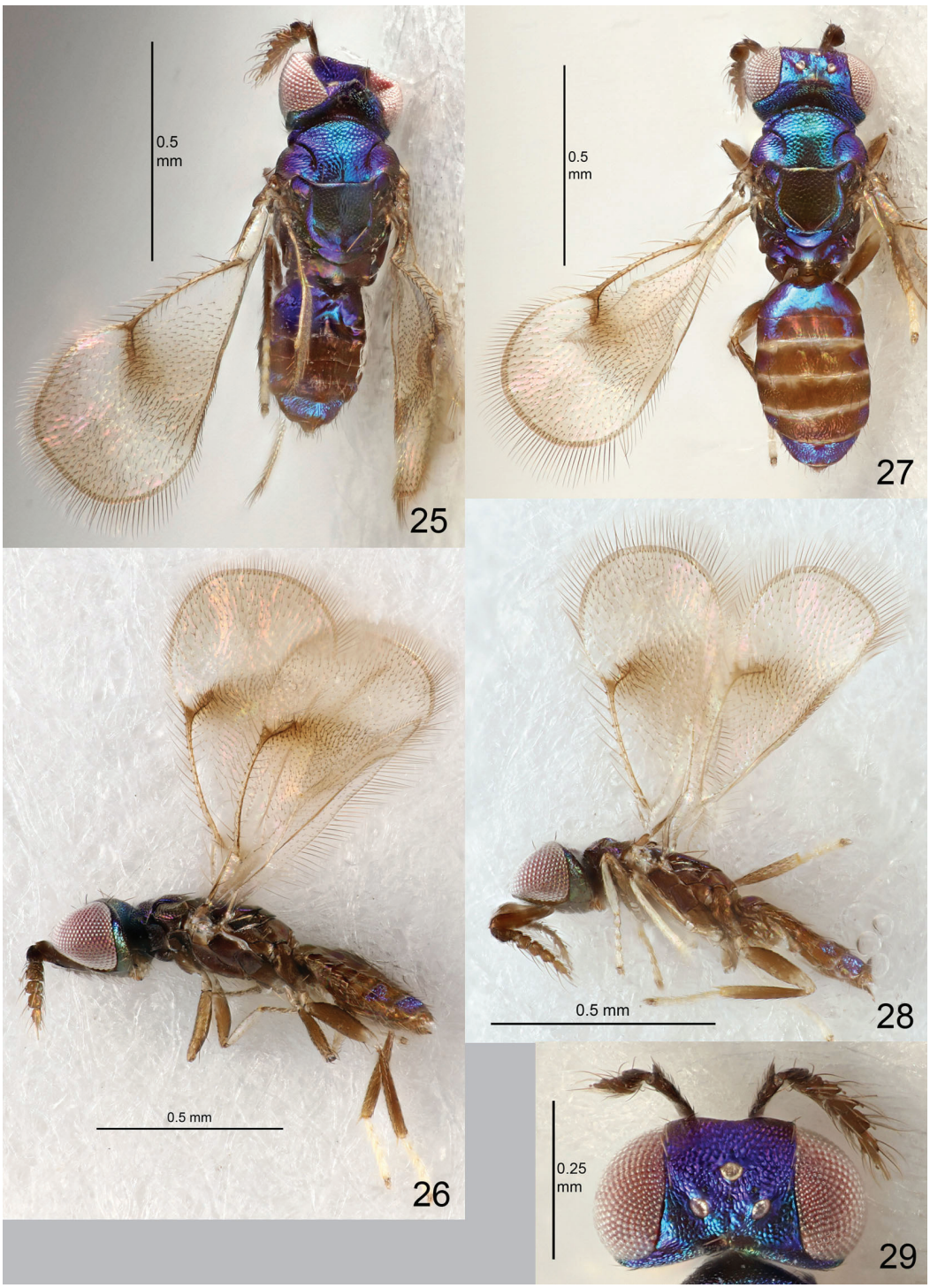
Figs 6–13. *Closterocerus* spp. *C. coffeellae* – (6) scape+pedicel ♀; (7) antennal flagellum ♀; (8) head posterior view ♀; (9) scape ♂; (10) mesoscutum dorsal view ♀; (11) antennal sensillum ♀; (12) thorax lateral view ♀. *C. alas*, paratype ♀ – (13) mesoscutum dorsal view. Abbreviations: **cx1** = fore coxa; **cx2** = mid coxa; **og** = occipital groove; **sa** = sense area; **tps** = transepimeral sulcus.



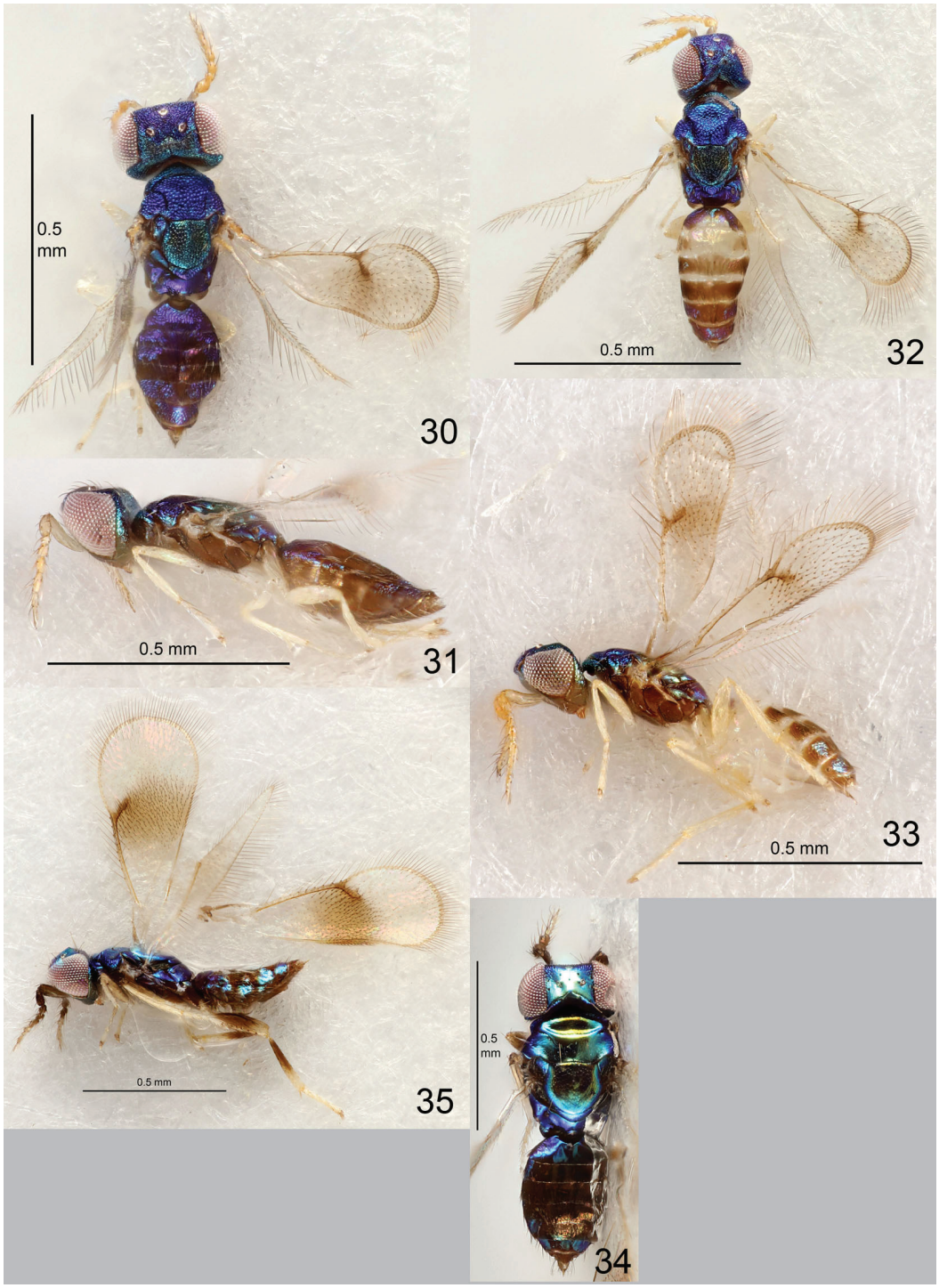
Figs 14–19. *Closterocerus* spp. *C. aglaia*, ♀ – (14) habitus dorsal view, holotype; (15) habitus lateral view, paratype. *C. alas* – (16) habitus dorsal view, holotype ♀; (17) habitus dorsal view, paratype ♂; (18) habitus lateral view, paratype ♂; (19) head frontal view, paratype ♀.



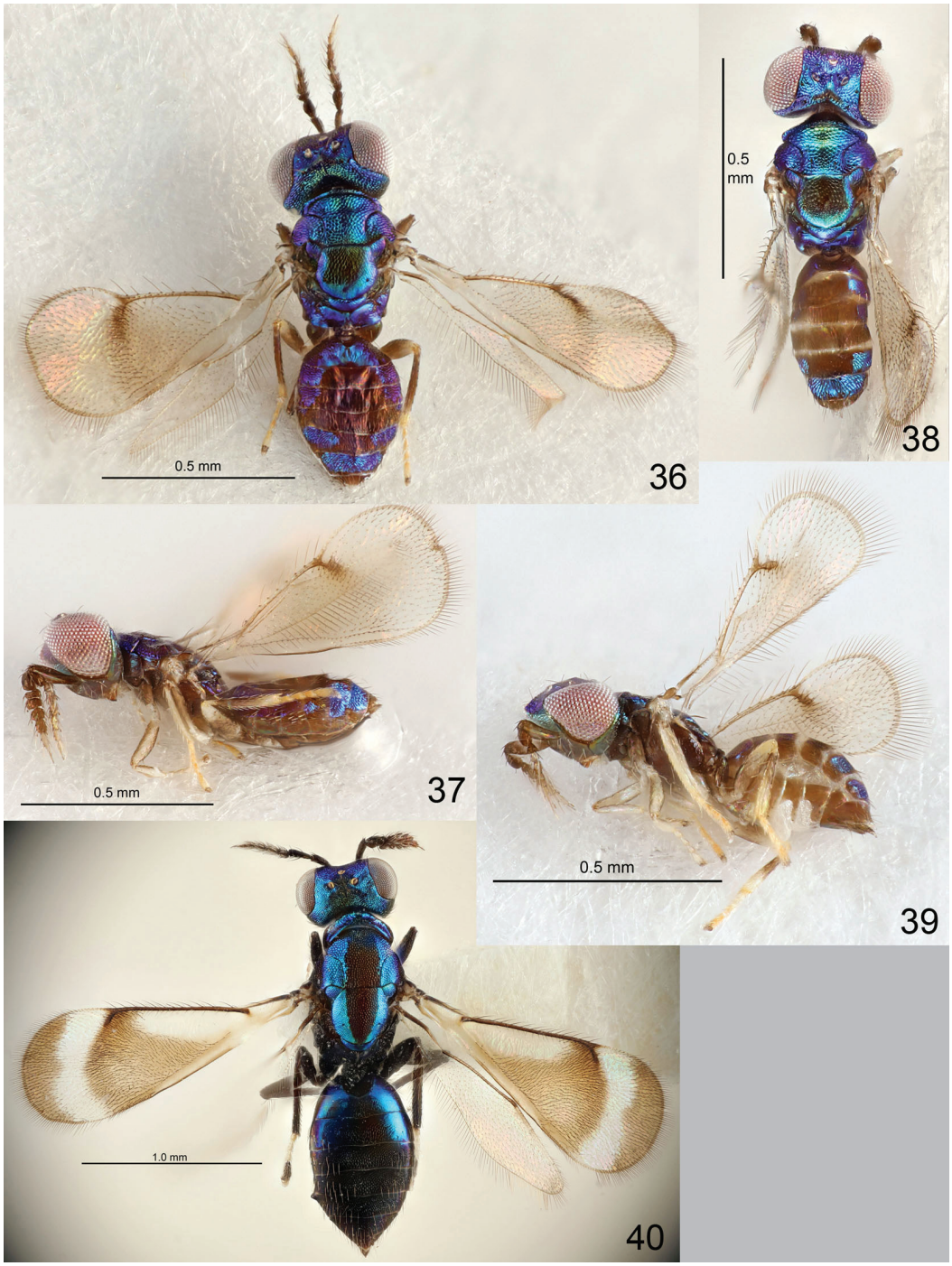
Figs 20–24. *Closterocerus* spp. *C. alpestris*, holotype ♀ – (20) habitus dorsal view; (21) habitus lateral view. *C. amaurus*, holotype ♀ – (22) habitus dorsal view; (23) habitus lateral view; (24) vertex.



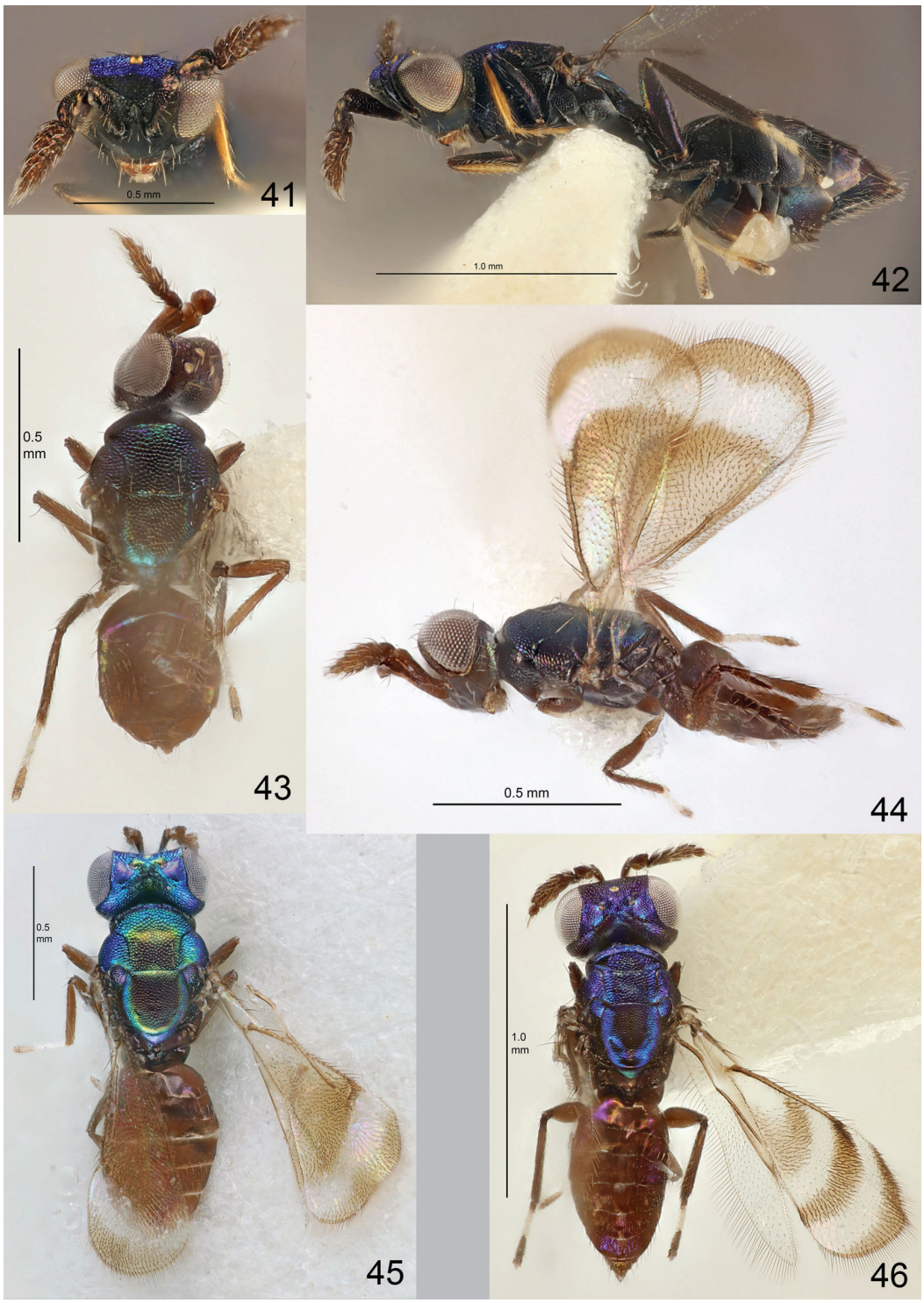
Figs 25–29. *Closterocerus altamiraensis* – (25) habitus dorsal view, paratype ♀; (26) habitus lateral view, holotype ♀; (27) habitus dorsal view, paratype ♂; (28) habitus lateral view, paratype ♂; (29) vertex, paratype ♀.



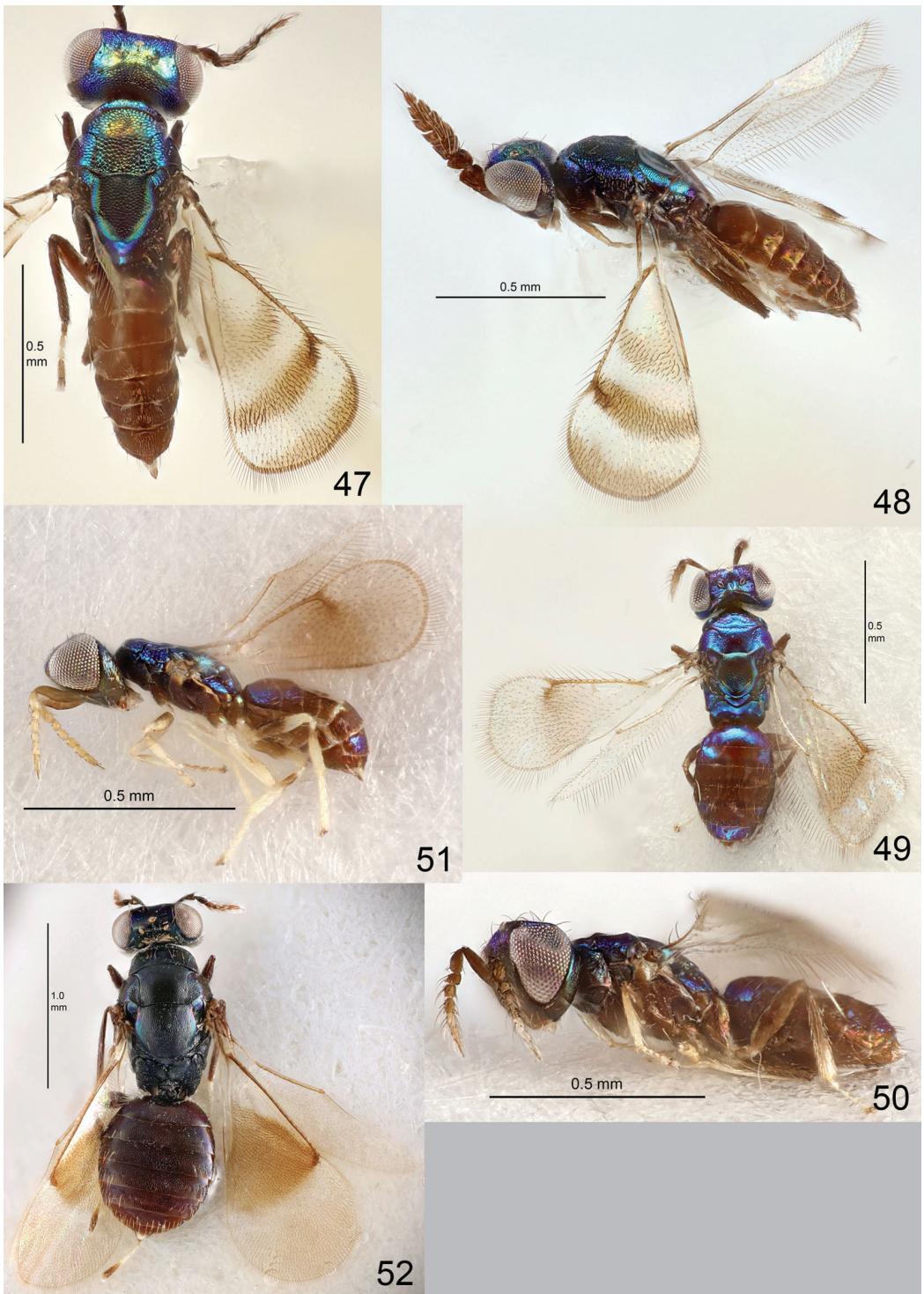
Figs 30–35. *Closterocerus* spp. *C. angustipennis* – (30) habitus dorsal view, paratype ♀; (31) habitus lateral view, holotype ♀; (32) habitus dorsal view, paratype ♂; (33) habitus lateral view, paratype ♂. *C. brillante*, holotype ♀ – (34) habitus dorsal view; (35) habitus lateral view.



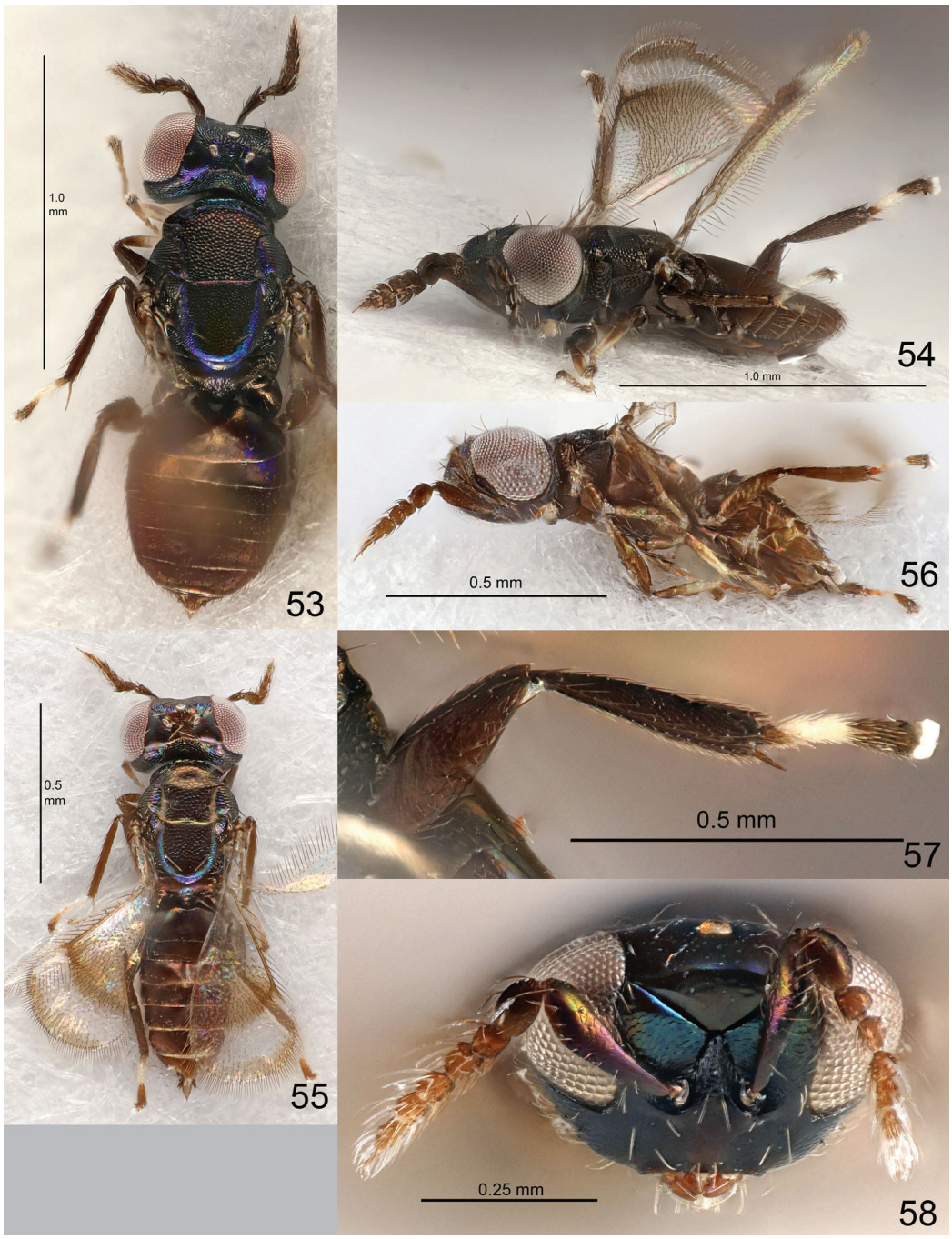
Figs 36–40. *Closterocerus* spp. *C. apiculus* – (36) habitus dorsal view, paratype ♀; (37) habitus lateral view, holotype ♀; (38) habitus dorsal view, paratype ♂; (39) habitus lateral view, paratype ♂. *C. atrifasciatus*, holotype ♀ – (40) habitus dorsal view.



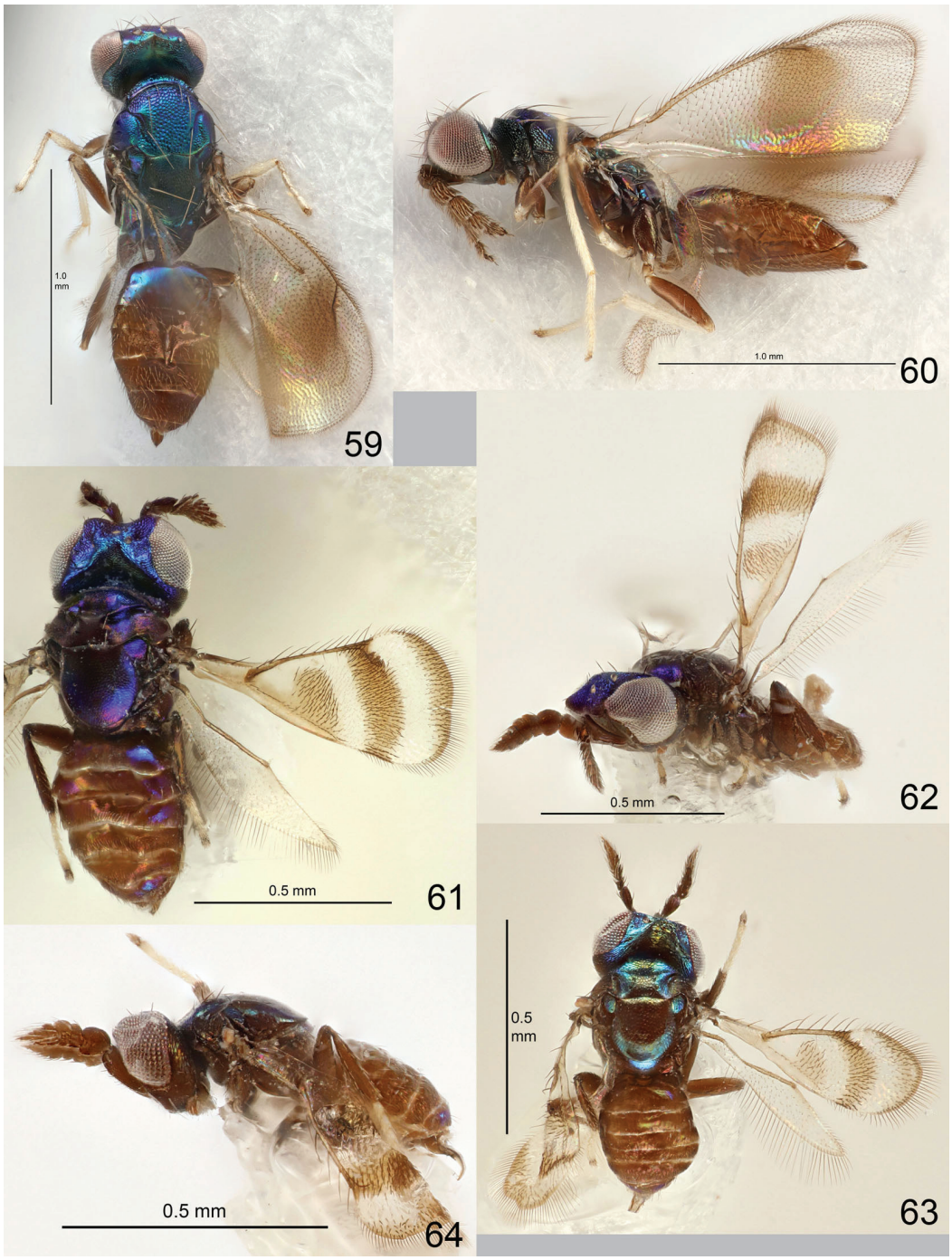
Figs 41–46. *Closterocerus* spp. *C. atrifasciatus*, holotype ♀ – (41) head frontal view; (42) habitus lateral view. *C. aureolus* – (43) habitus dorsal view, holotype ♀; (44) habitus lateral view, holotype ♀; (45) habitus dorsal view, paratype ♂. *C. aureopurpureus*, paratype ♀ – (46) habitus dorsal view.



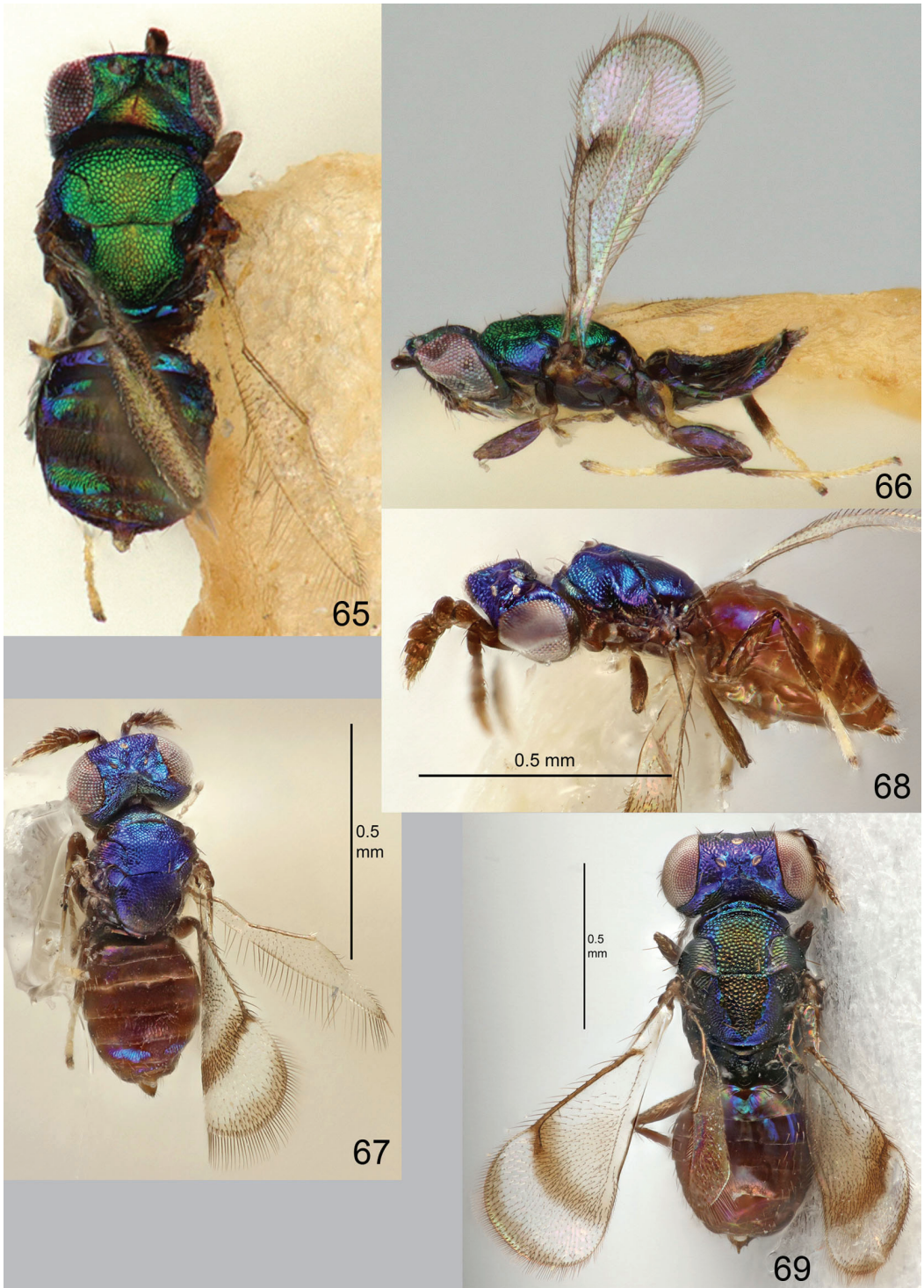
Figs 47–52. *Closterocerus* spp. *C. aureopurpureus*, paratype ♂ – (47) habitus dorsal view; (48) habitus lateral view. *C. azofeifai* – (49) habitus dorsal view, holotype ♀; (50) habitus lateral view, holotype ♀; (51) habitus lateral view, paratype ♂. *C. barbatus*, holotype ♀ – (52) habitus dorsal view.



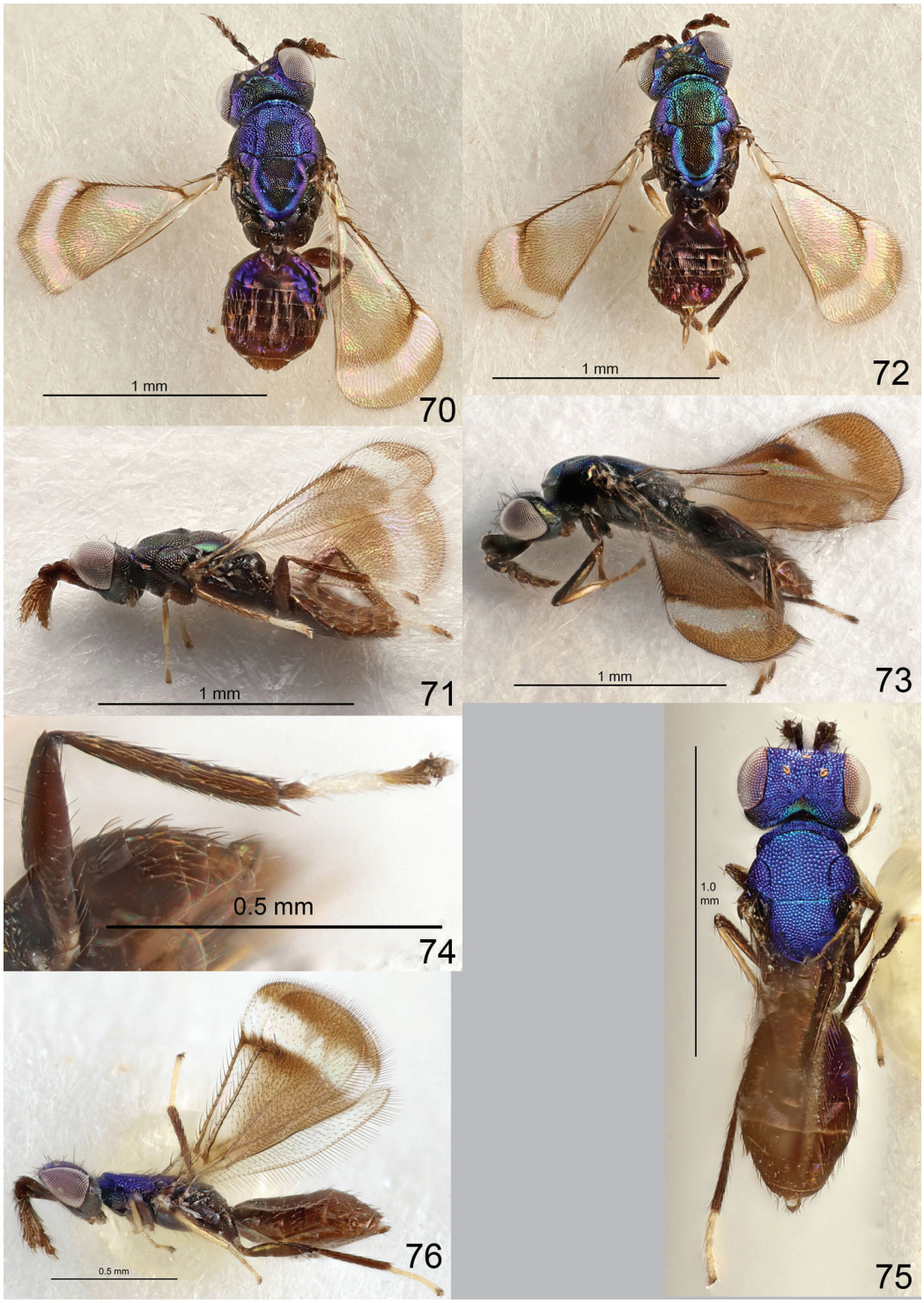
Figs 53–58. *Closterocerus* spp. *C. brevipes* – (53) habitus dorsal view, holotype ♀; (54) habitus lateral view, holotype ♀; (55) habitus dorsal view, paratype ♂; (56) habitus lateral view, paratype ♂; (57) hind leg, holotype ♀. *C. barbatus*, holotype ♀ – (58) head frontal view.



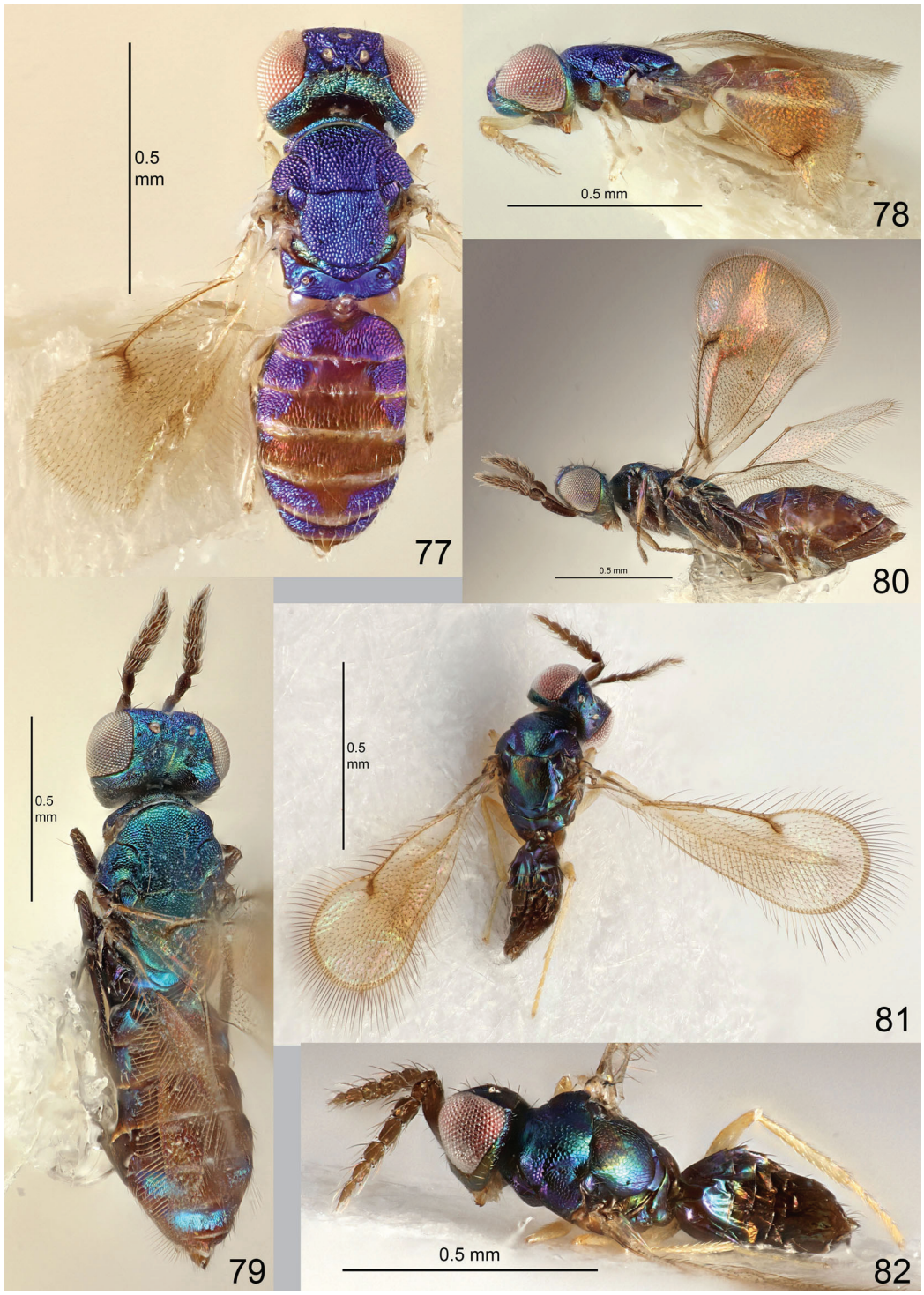
Figs 59–64. *Closterocerus* spp. *C. caelatus*, holotype ♀ – (59) habitus dorsal view; (60) habitus lateral view. *C. cincinnatus*, non-types – (61) habitus dorsal view, ♀; (62) habitus lateral view, ♀; (63) habitus dorsal view, ♂; (64) habitus lateral view, ♂.



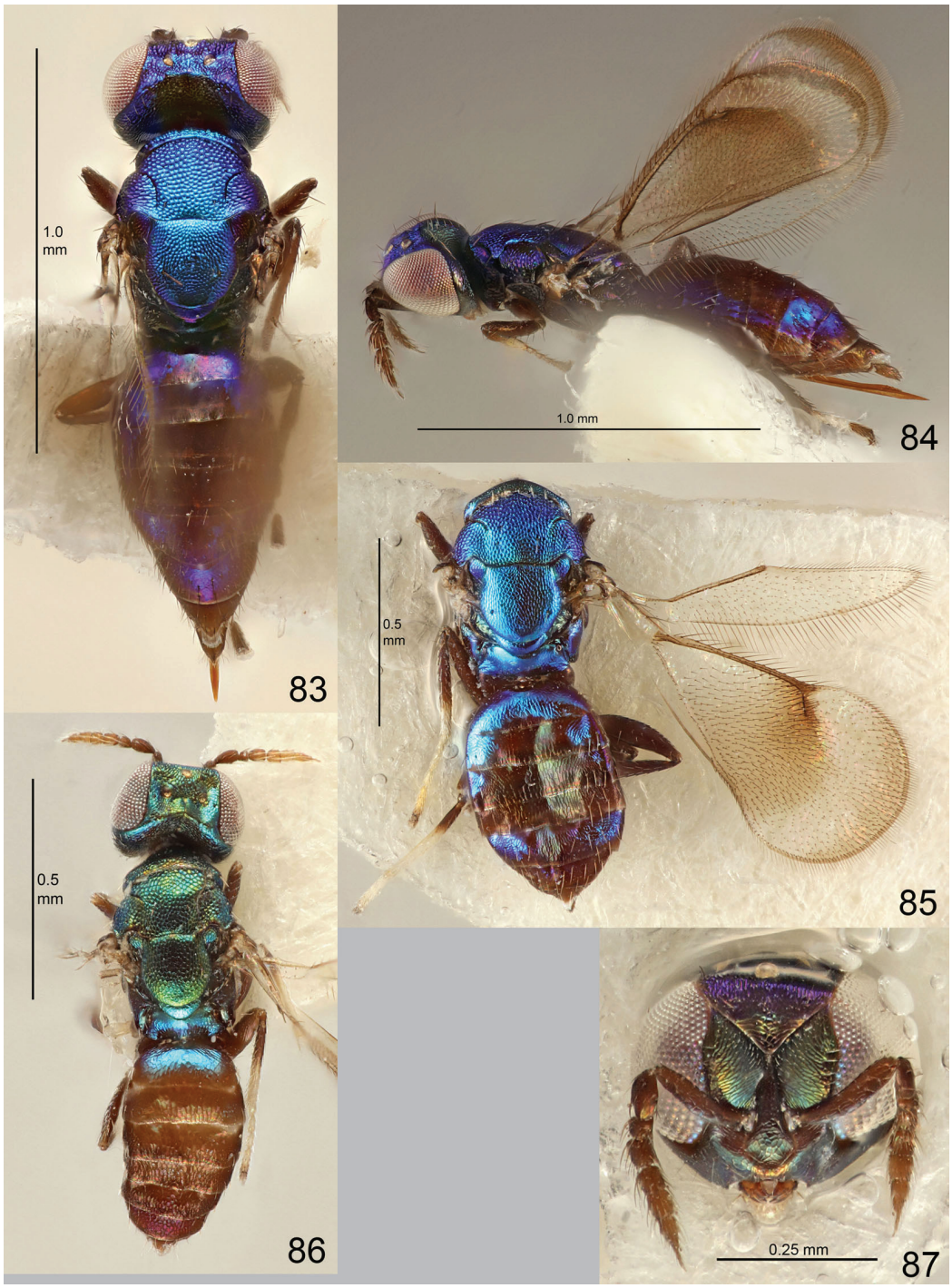
Figs 65–69. *Closterocerus* spp. *C. cinctipennis* – (65) habitus dorsal view, neotype ♀; (66) habitus lateral view, neotype ♀; (67) habitus dorsal view, non-type ♀; (68) habitus lateral view, non-type ♀. *C. clarus*, holotype ♀ – (69) habitus dorsal view. The images of the neotype of *C. cinctipennis* are provided by the CNC, ©Her Majesty The Queen in Right of Canada, as represented by the Minister of Agriculture and Agri-Food, licensed under the Open Government Licence – Canada.



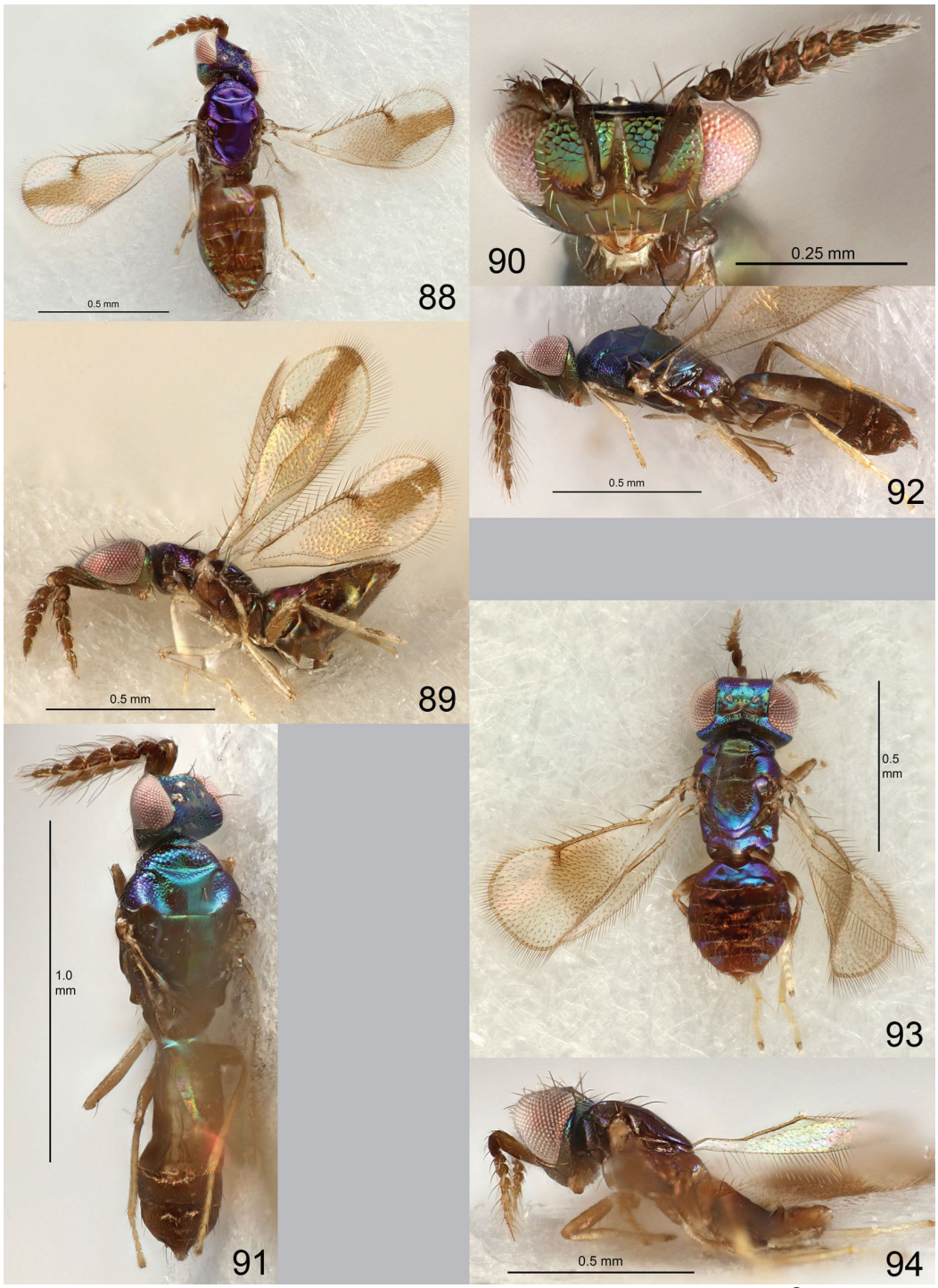
Figs 70–76. *Closterocerus* spp. *C. coffeellae*, non-types – (70) habitus dorsal view, ♀; (71) habitus lateral view, ♀; (72) habitus dorsal view, ♂; (73) habitus lateral view, ♂; (74) hind leg, ♀. *C. complanatus*, holotype ♀ – (75) habitus dorsal view; (76) habitus lateral view.



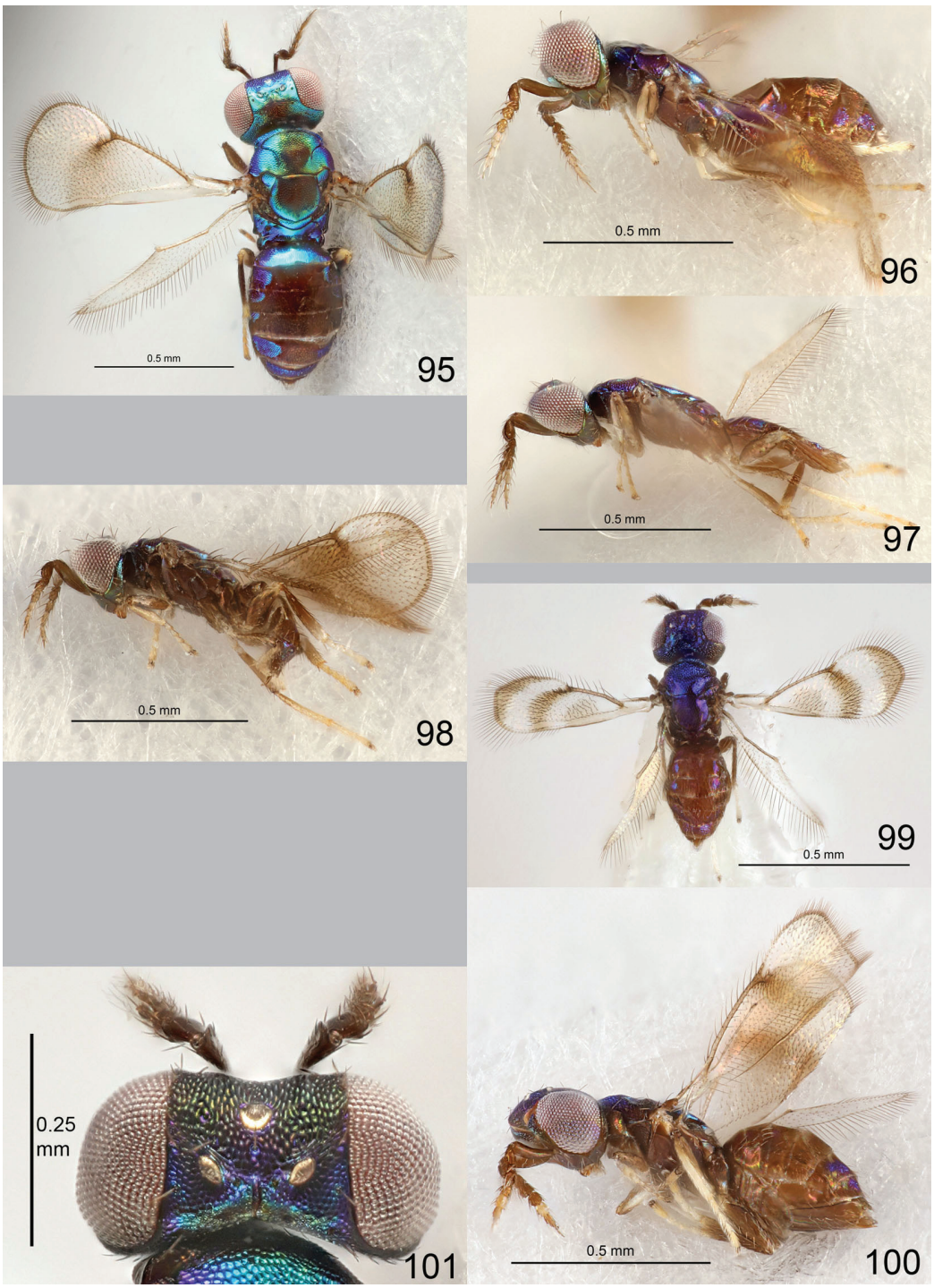
Figs 77–82. *Closterocerus* spp. *C. concinnus* – (77) habitus dorsal view, holotype ♀; (78) habitus lateral view, paratype ♀. *C. crassicornis*, holotype ♀ – (79) habitus dorsal view; (80) habitus lateral view. *C. crinitus*, holotype ♀ – (81) habitus dorsal view; (82) habitus lateral view.



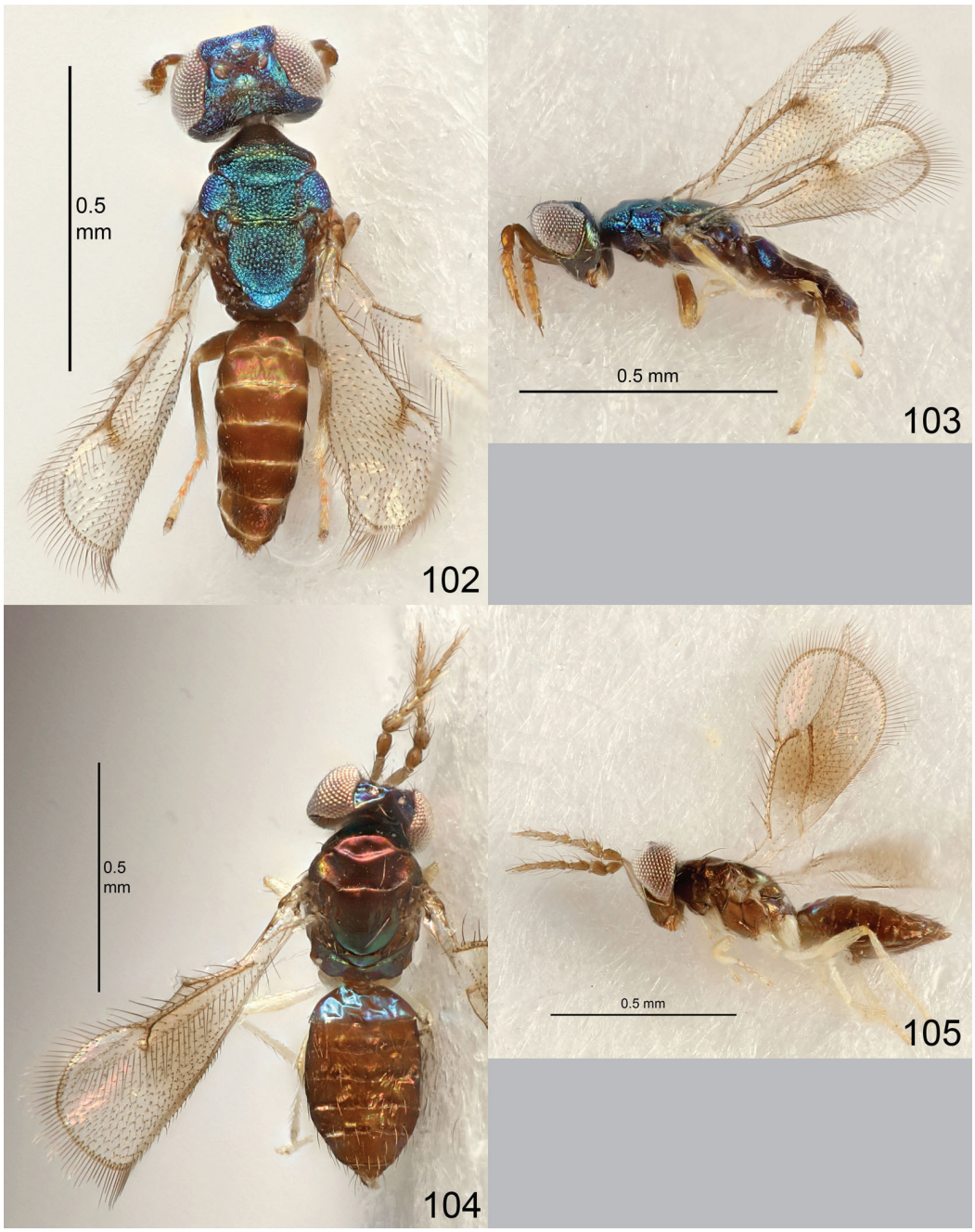
Figs 83–87. *Closterocerus* spp. *C. cuspidis*, holotype ♀ – (83) habitus dorsal view; (84) habitus lateral view. *C. cymatilis* – (85) habitus dorsal view, holotype ♀; (86) habitus dorsal view, paratype ♂; (87) head frontal view, holotype ♀.



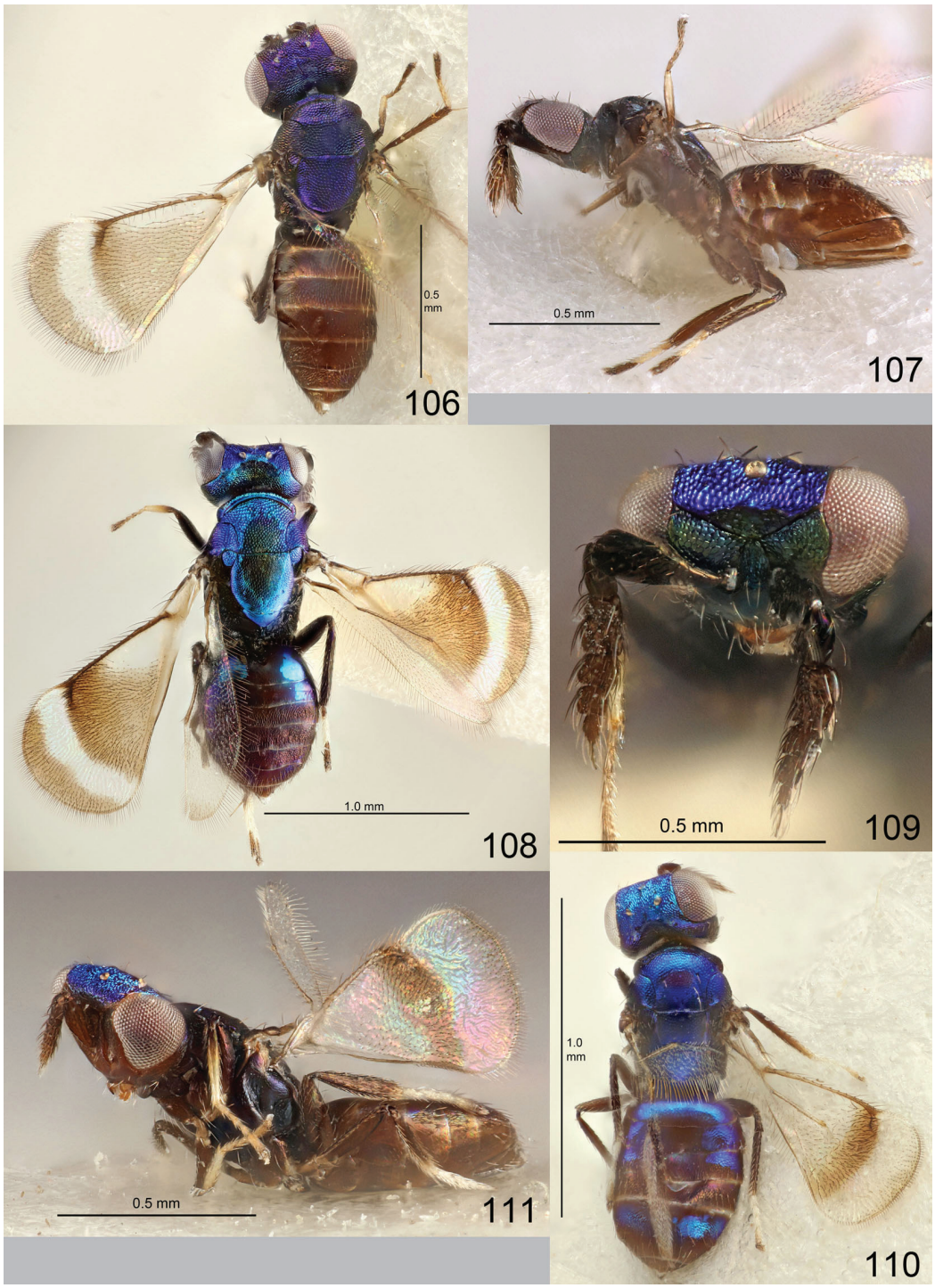
Figs 88–94. *Closterocerus* spp. *C. deltoides* – (88) habitus dorsal view, paratype ♀; (89) habitus lateral view, paratype ♀; (90) head frontal view, paratype ♀; (91) habitus dorsal view, paratype ♂; (92) habitus lateral view, paratype ♂. *C. eulampis* – (93) habitus dorsal view, paratype ♀; (94) habitus lateral view, holotype ♀.



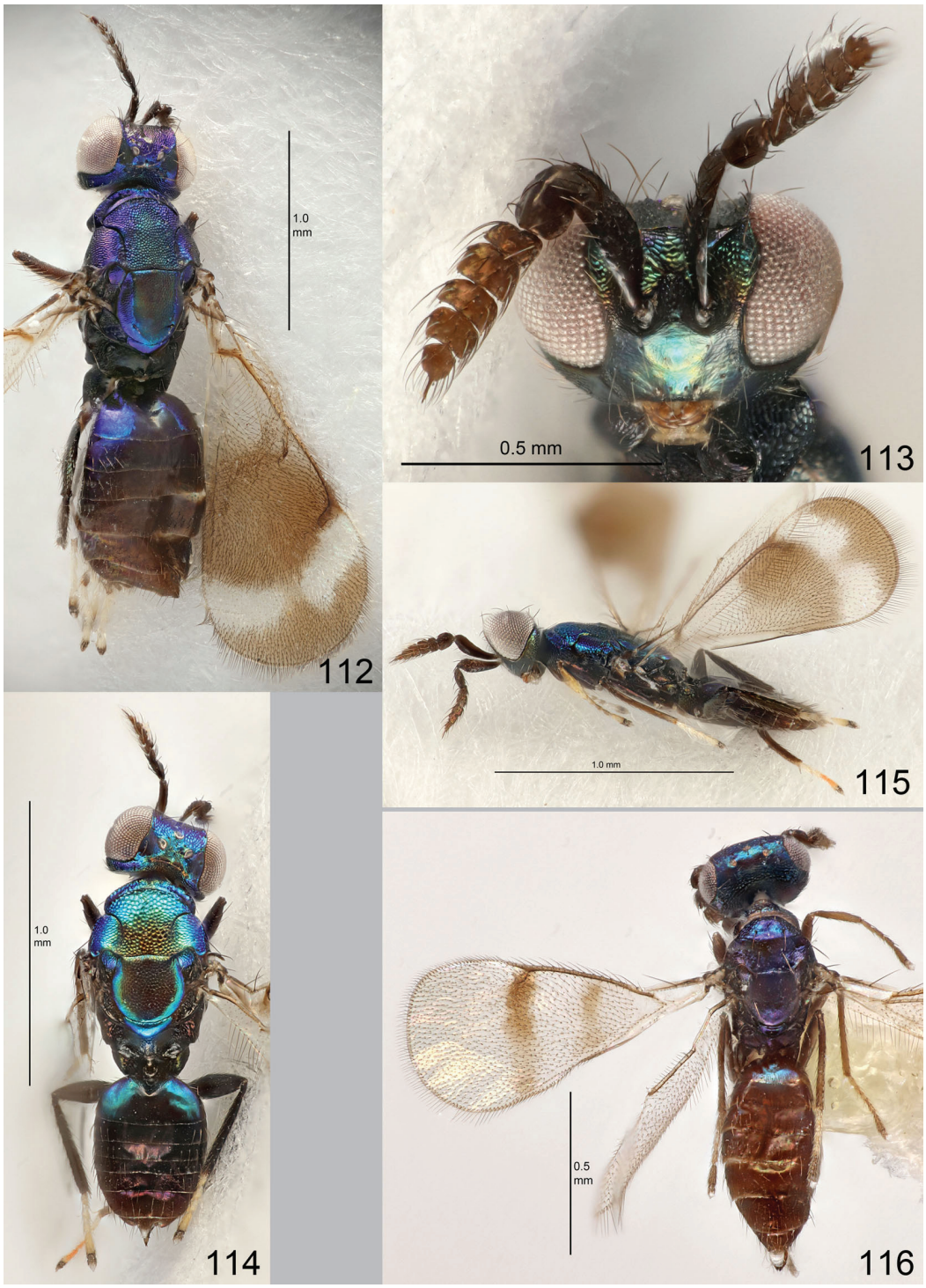
Figs 95–101. *Closterocerus* spp. *C. flammeus* – (95) habitus dorsal view, paratype ♀; (96) habitus lateral view, paratype ♀; (97) habitus lateral view, paratype ♂. *C. eulampis*, paratype ♂ – (98) habitus lateral view. *C. flavicinctus*, non-types – (99) habitus dorsal view, ♀; (100) habitus lateral view, ♀; (101) vertex, ♀.



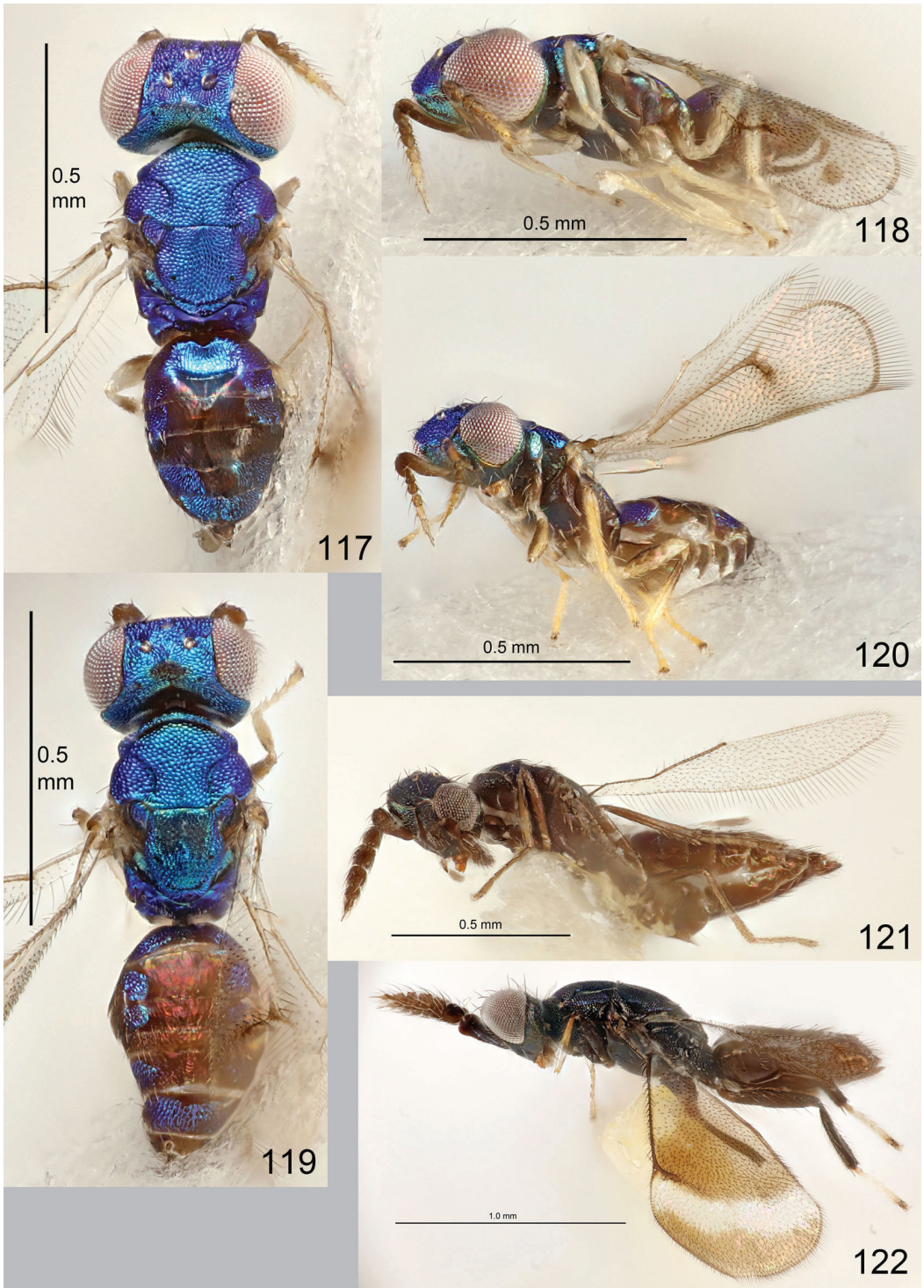
Figs 102–105. *Closterocerus* spp. *C. flavicinctus*, non-types – (102) habitus dorsal view, ♂; (103) habitus lateral view, ♂. *C. fulgens*, holotype ♀ – (104) habitus dorsal view; (105) habitus lateral view.



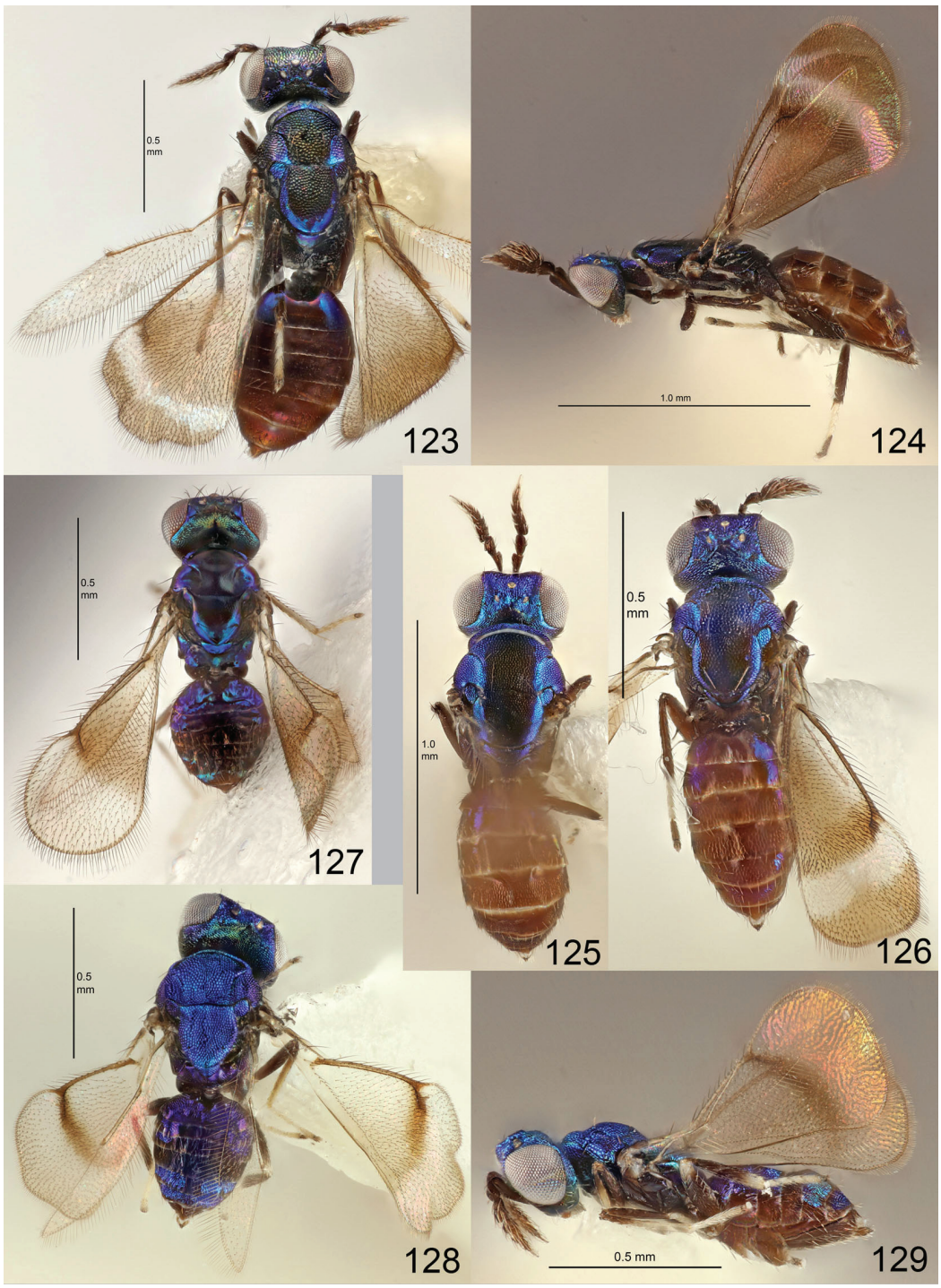
Figs 106–111. *Closterocerus* spp. *C. hansoni*, holotype ♀ – (106) habitus dorsal view; (107) habitus lateral view. *C. hirsutus*, holotype ♀ – (108) habitus dorsal view; (109) head frontal view. *C. huggerti*, holotype ♀ – (110) habitus dorsal view; (111) habitus lateral view.



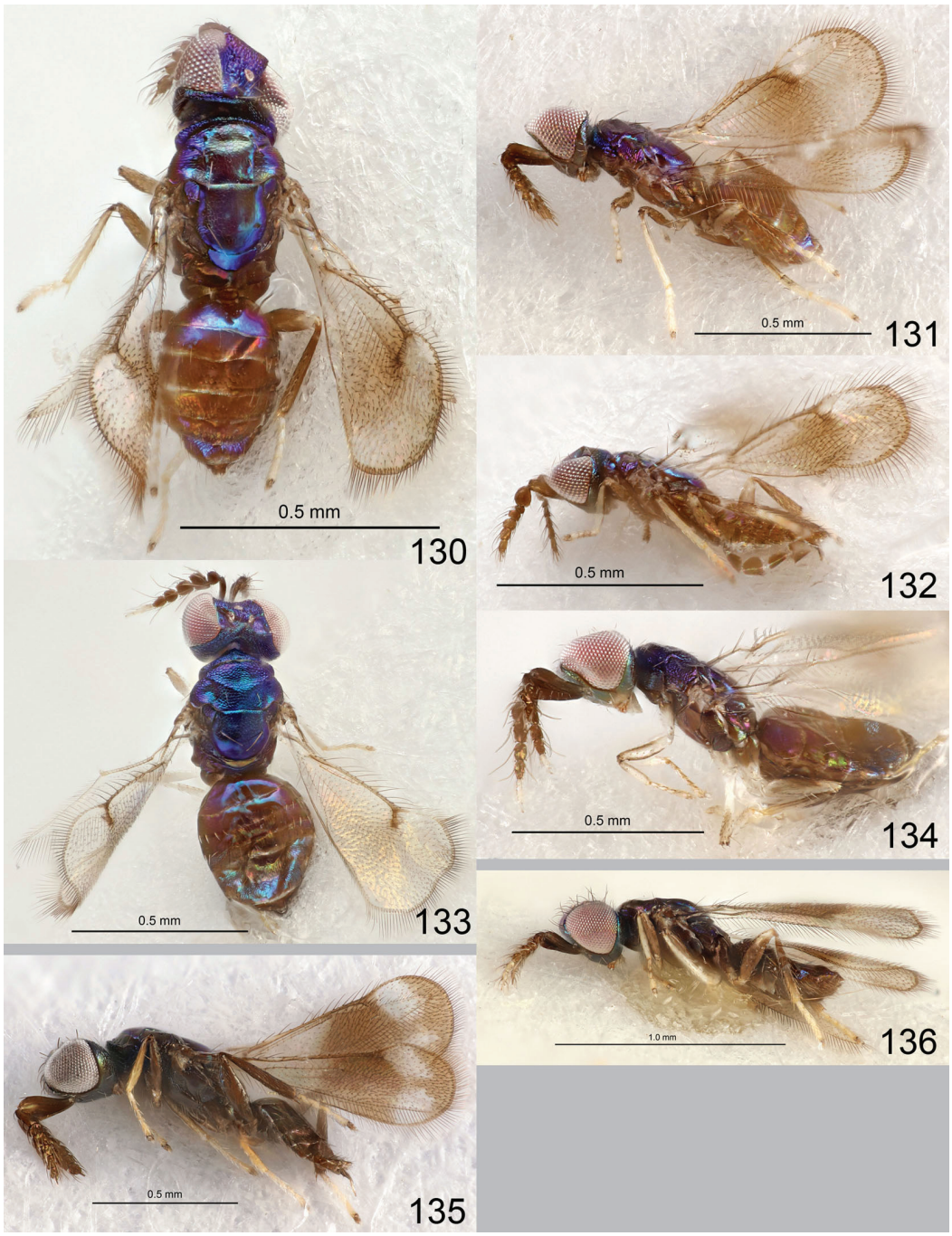
Figs 112–116. *Closterocerus* spp. *C. iomus* – (112) habitus dorsal view, paratype ♀; (113) head frontal view, paratype ♀; (114) habitus dorsal view, paratype ♂; (115) habitus lateral view, paratype ♂. *C. latiscapus*, holotype ♀ – (116) habitus dorsal view.



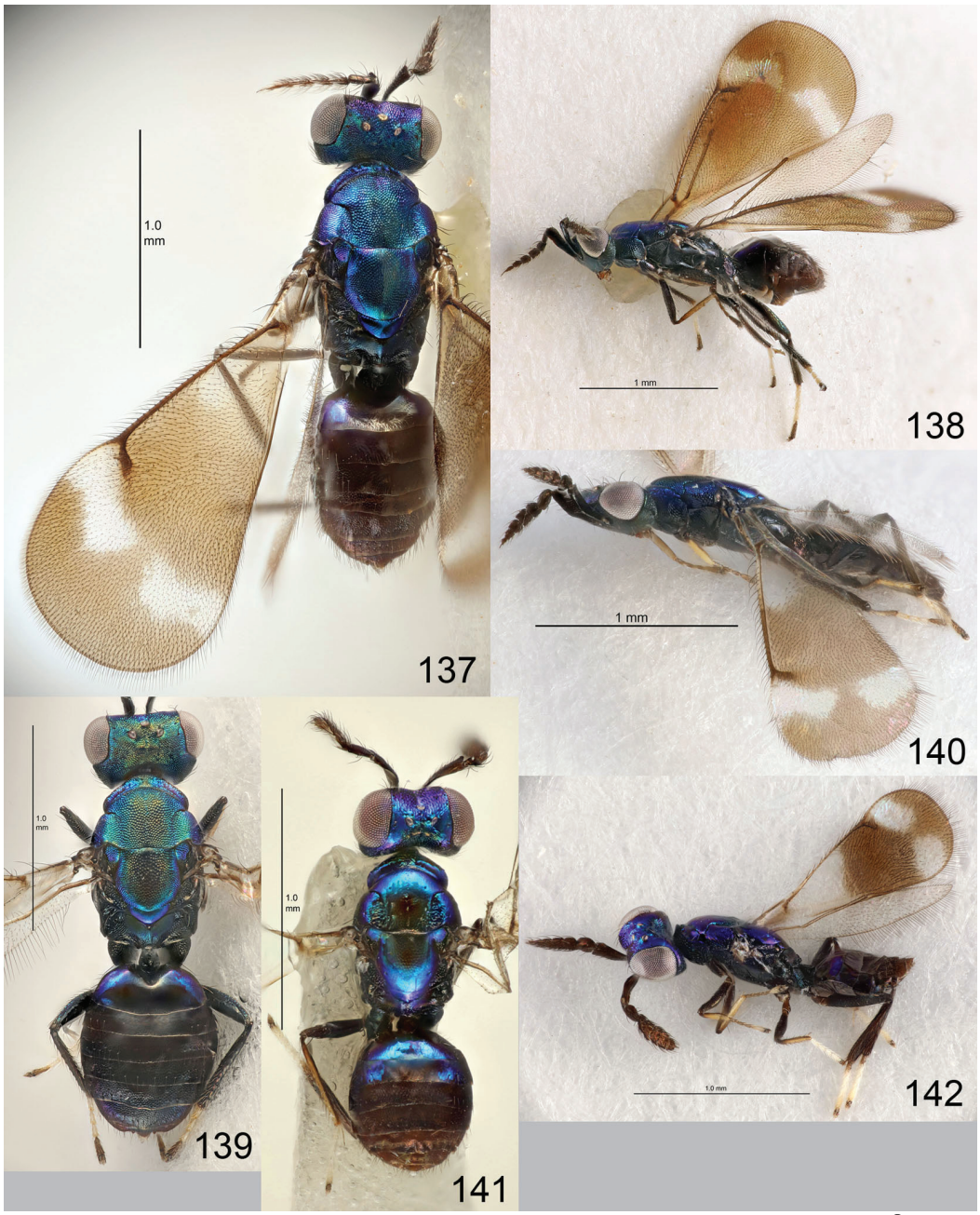
Figs 117–122. *Closterocerus* spp. *C. lineatus* – (117) habitus dorsal view, holotype ♀; (118) habitus lateral view, holotype ♀; (119) habitus dorsal view, paratype ♂; (120) habitus lateral view, paratype ♂. *C. latiscapus*, holotype ♀ – (121) habitus lateral view. *C. masneri*, paratype ♀ – (122) habitus lateral view.



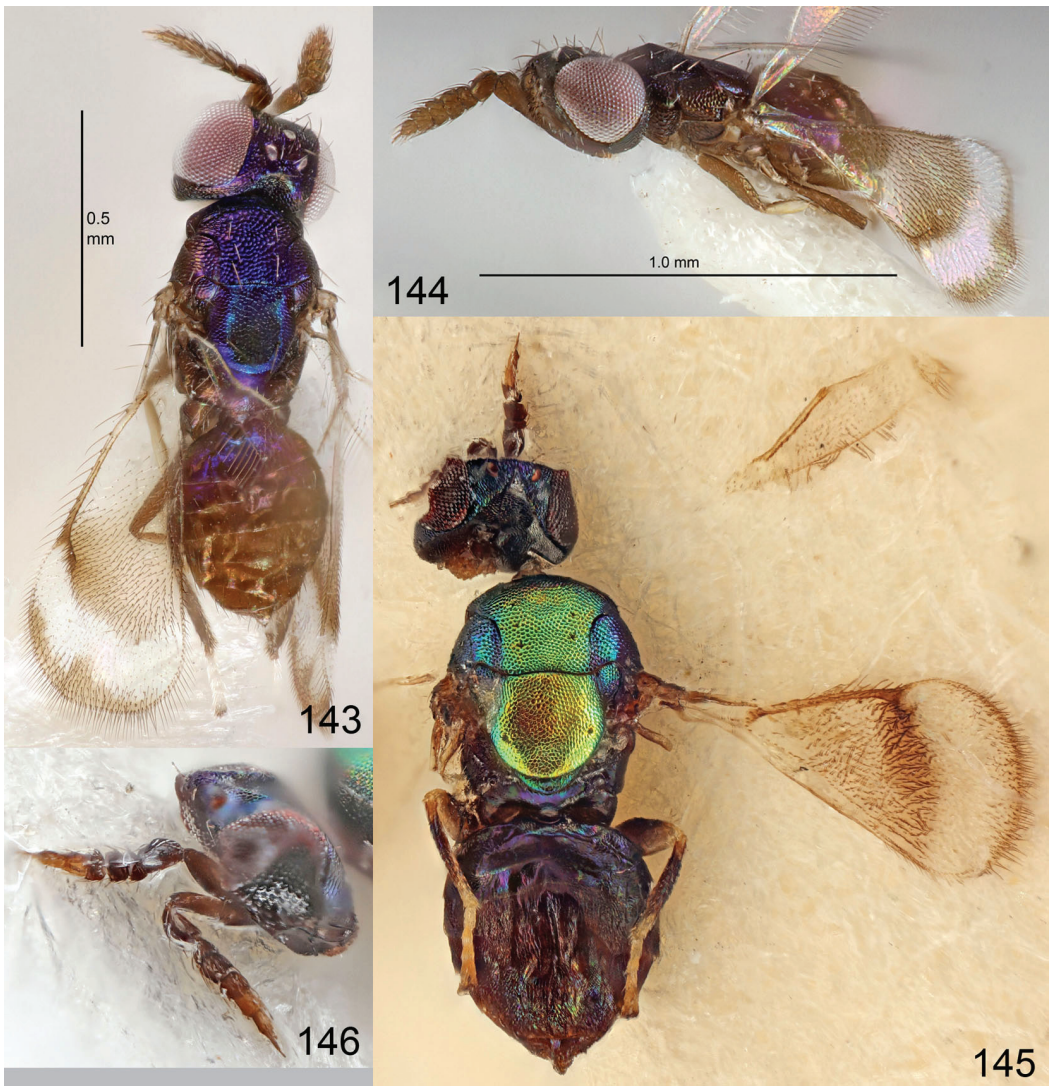
Figs 123–129. *Closterocerus* spp. *C.masneri*, holotype ♀ – (123) habitus dorsal view. *C. melanogrammus* – (124) habitus lateral view, paratype ♀; (125) habitus dorsal view, holotype ♀; (126) habitus dorsal view, paratype ♀. *C. nitidulus*, paratype ♀ – (127) habitus dorsal view. *C. mirandus* – (128) habitus dorsal view, paratype ♀; (129) habitus lateral view, paratype ♀.



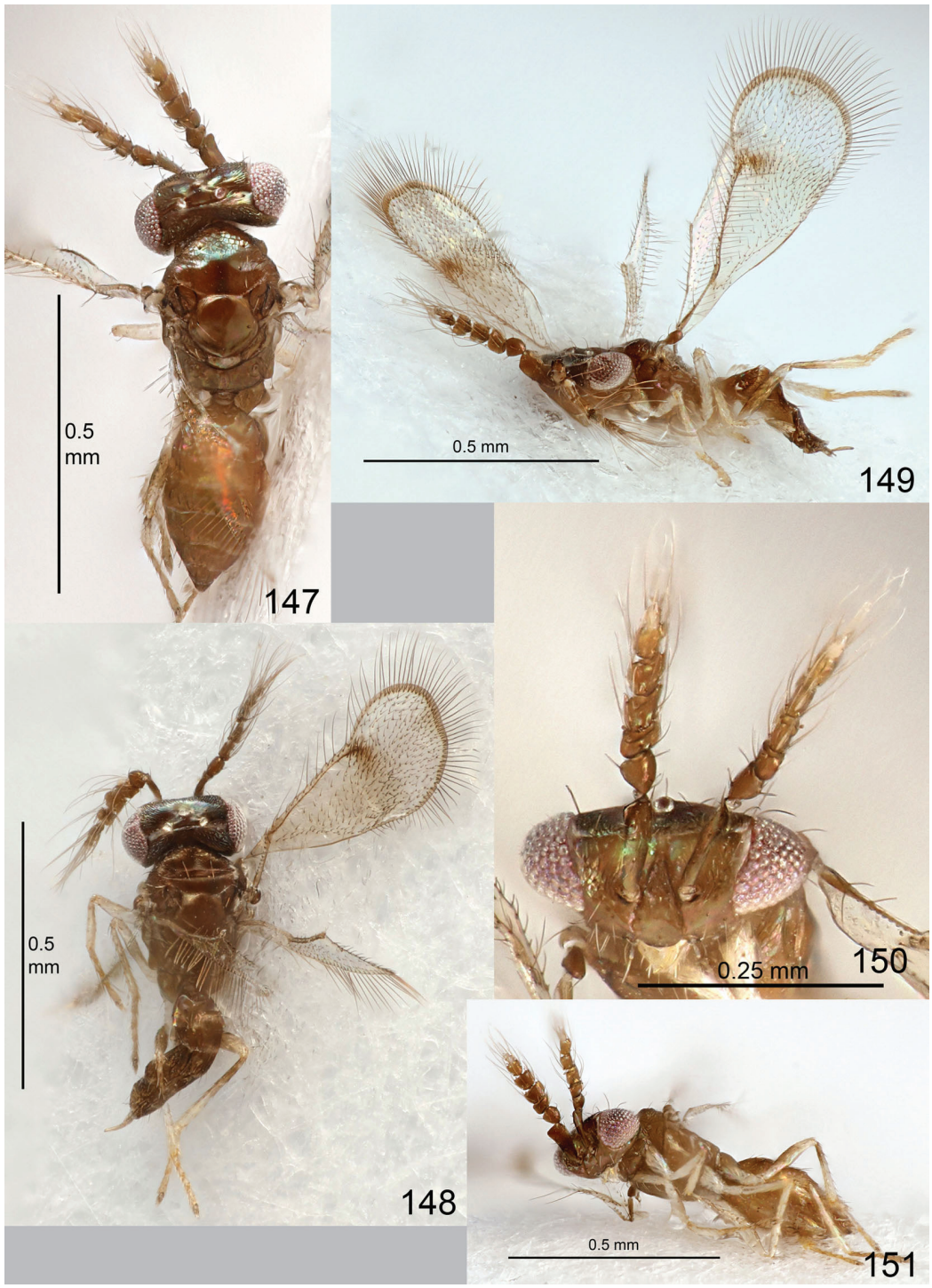
Figs 130–136. *Closterocerus* spp. *C. noyesi* – (130) habitus dorsal view, holotype ♀; (131) habitus lateral view, holotype ♀; (132) habitus lateral view, paratype ♂. *C. oligothrix*, holotype ♀ – (133) habitus dorsal view; (134) habitus lateral view. *C. platycerus*, paratype ♂ – (135) habitus lateral view. *C. nitidulus*, holotype ♀ – (136) habitus lateral view.



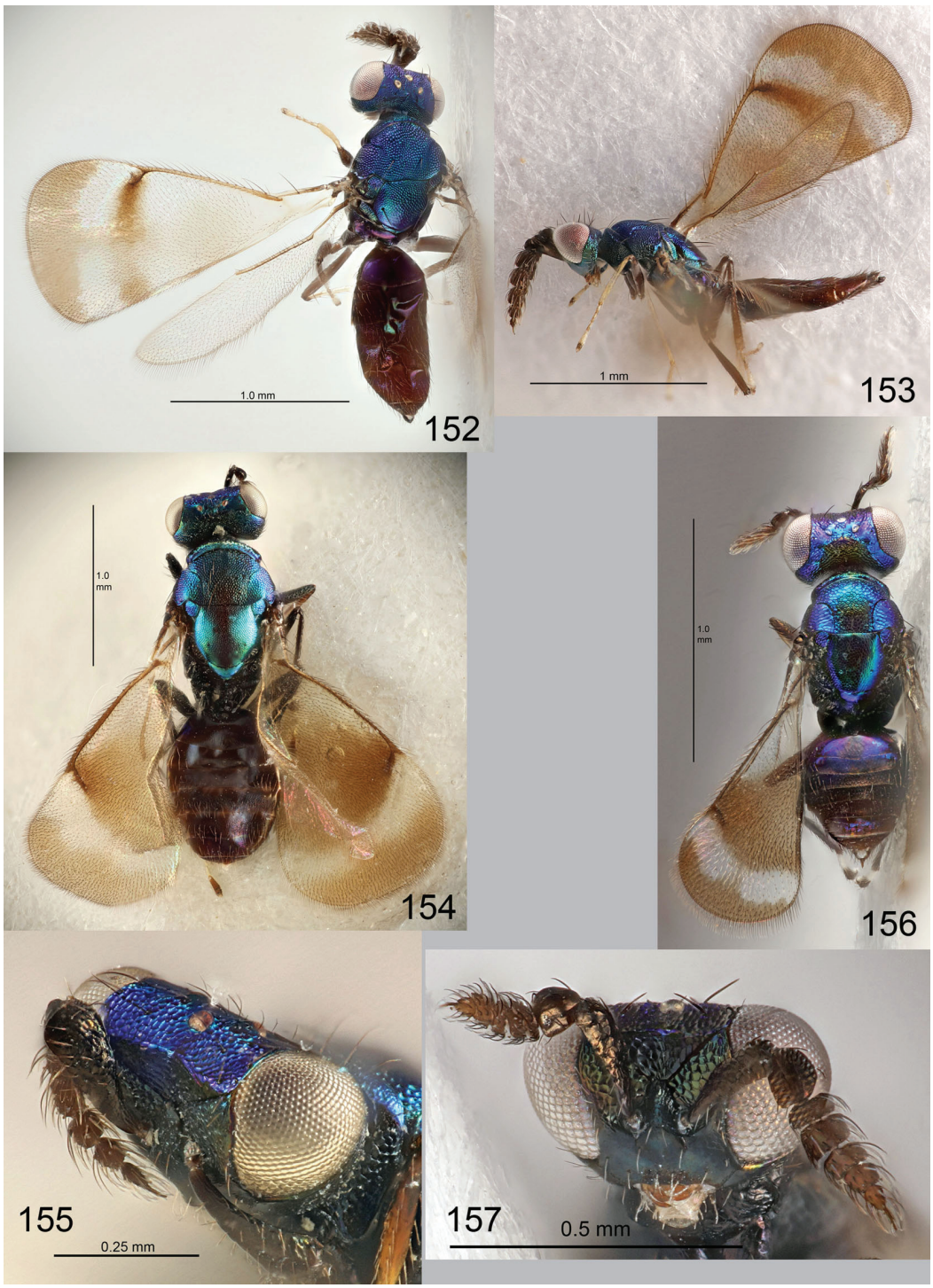
Figs 137–142. *Closterocerus* spp. *C. petiolatus* – (137) habitus dorsal view, paratype ♀; (138) habitus lateral view, paratype ♀; (139) habitus dorsal view, paratype ♂; (140) habitus lateral view, paratype ♂. *C. platycerus* – (141) habitus dorsal view, holotype ♀; (142) habitus lateral view, paratype ♀.



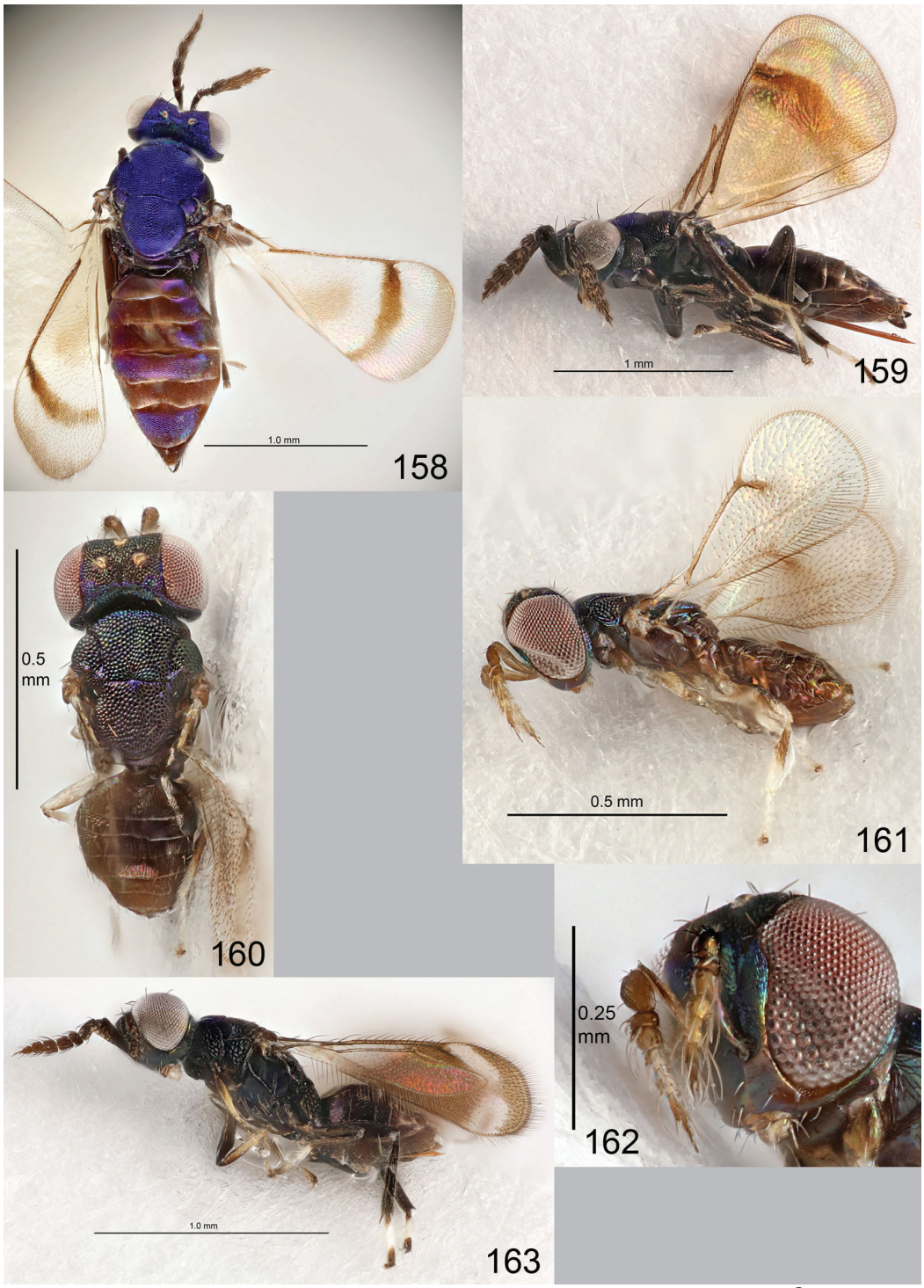
Figs 143–146. *Closterocerus* spp. *C. porphyriops,* holotype ♀ – (143) habitus dorsal view; (144) habitus lateral view. *C. pulcher*, holotype ♀ – (145) habitus dorsal view; (146) antenna lateral view. The images of *C. pulcher* (type no. 5.3575) are ©The Trustees of the Natural History Museum, London, and made available to you under Creative Commons License 4.0 (https://creativecommons.org/licenses/by/4.0/).



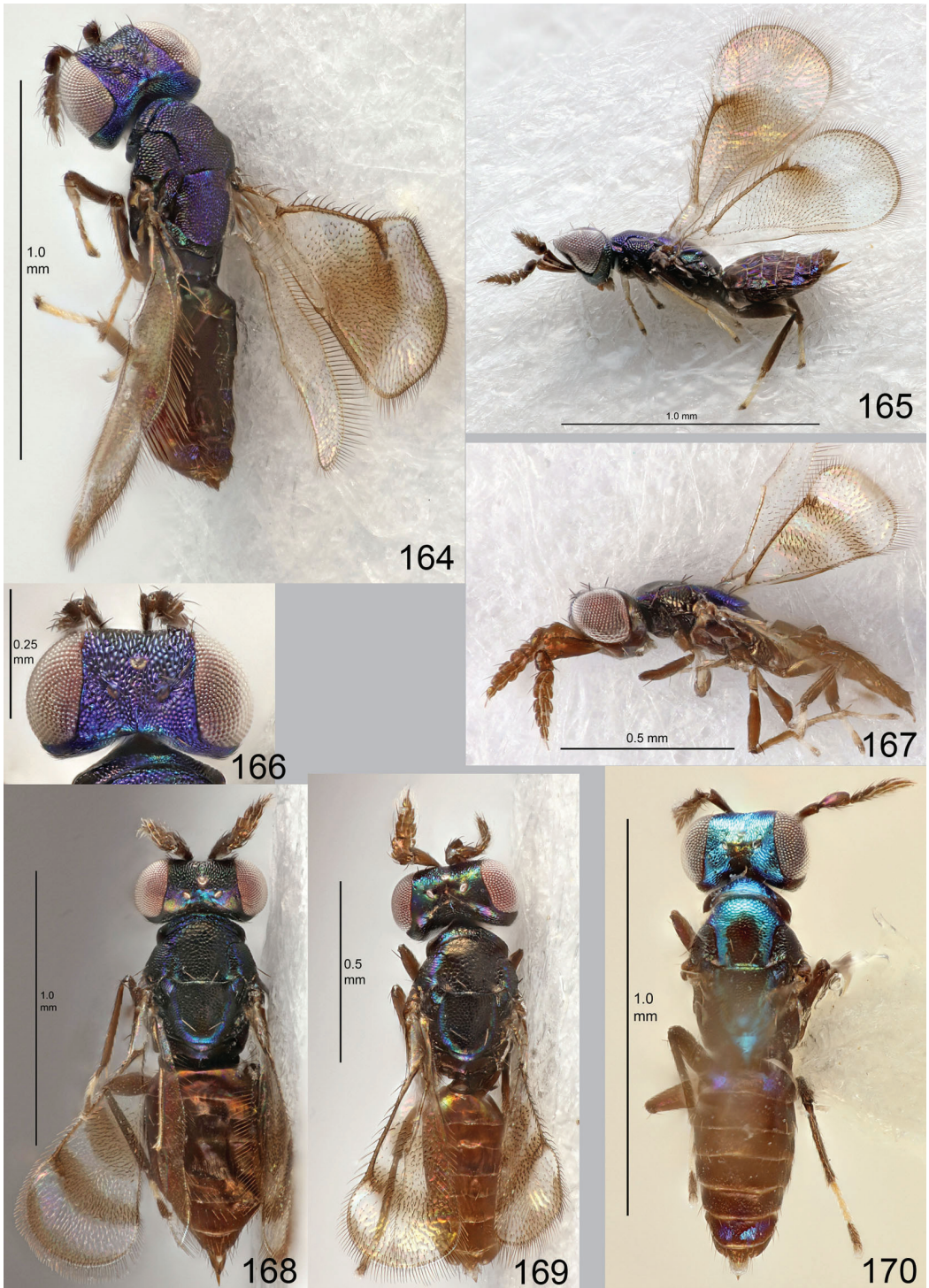
Figs 147–151. *Closterocerus pumilus* – (147) habitus dorsal view, holotype ♀; (148) habitus dorsal view, paratype ♂; (149) habitus frontal-lateral view, paratype ♂; (150) head frontal view, holotype ♀; (151) holotype ♀ habitus lateral view.



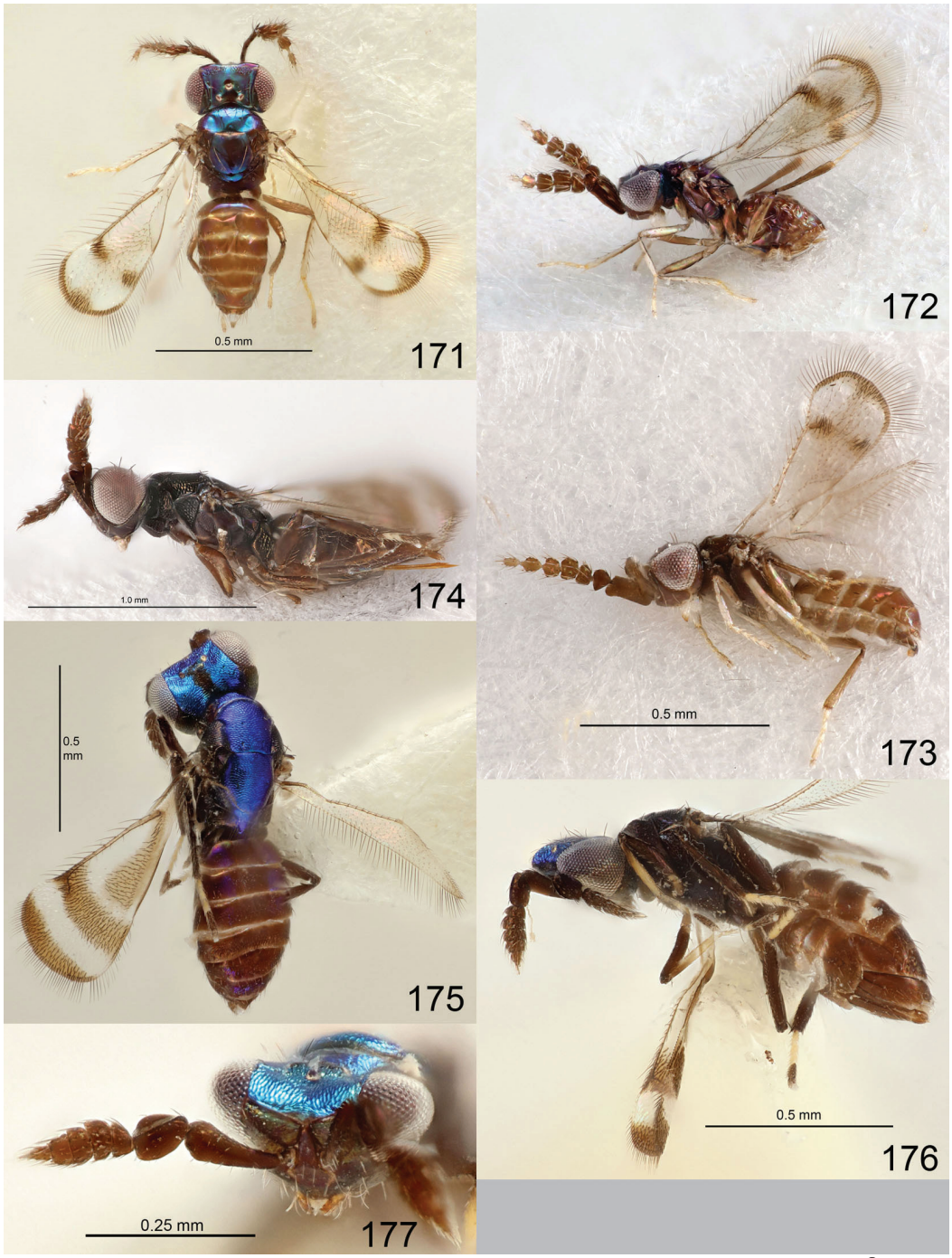
Figs 152–157. *Closterocerus* spp. *C. scitulus*, paratype ♀ – (152) habitus dorsal view; (153) habitus lateral view. *C. setosus*, holotype ♀ – (154) habitus dorsal view; (155) head frontal view. *C. arenalensis*, holotype ♀ – (156) habitus dorsal view; (157) head frontal view.



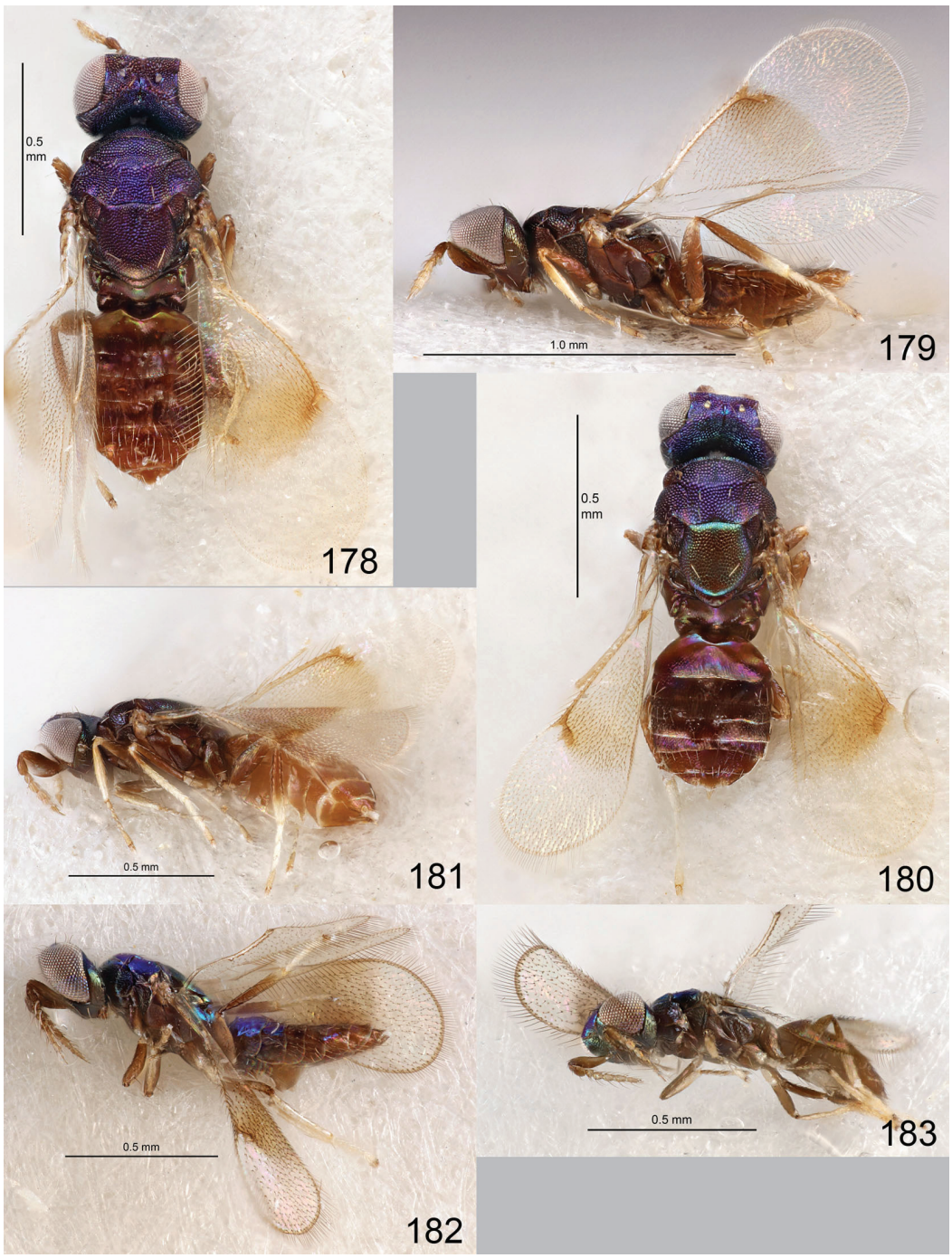
Figs 158–163. *Closterocerus* spp. *C. stigmalis* – (158) habitus dorsal view, paratype ♀; (159) habitus lateral view, holotype ♀. *C. sulcatus*, holotype ♀ – (160) habitus dorsal view; (161) habitus lateral view; (162) head lateral view. *C. arenalensis*, holotype ♀ – (163) habitus lateral view.



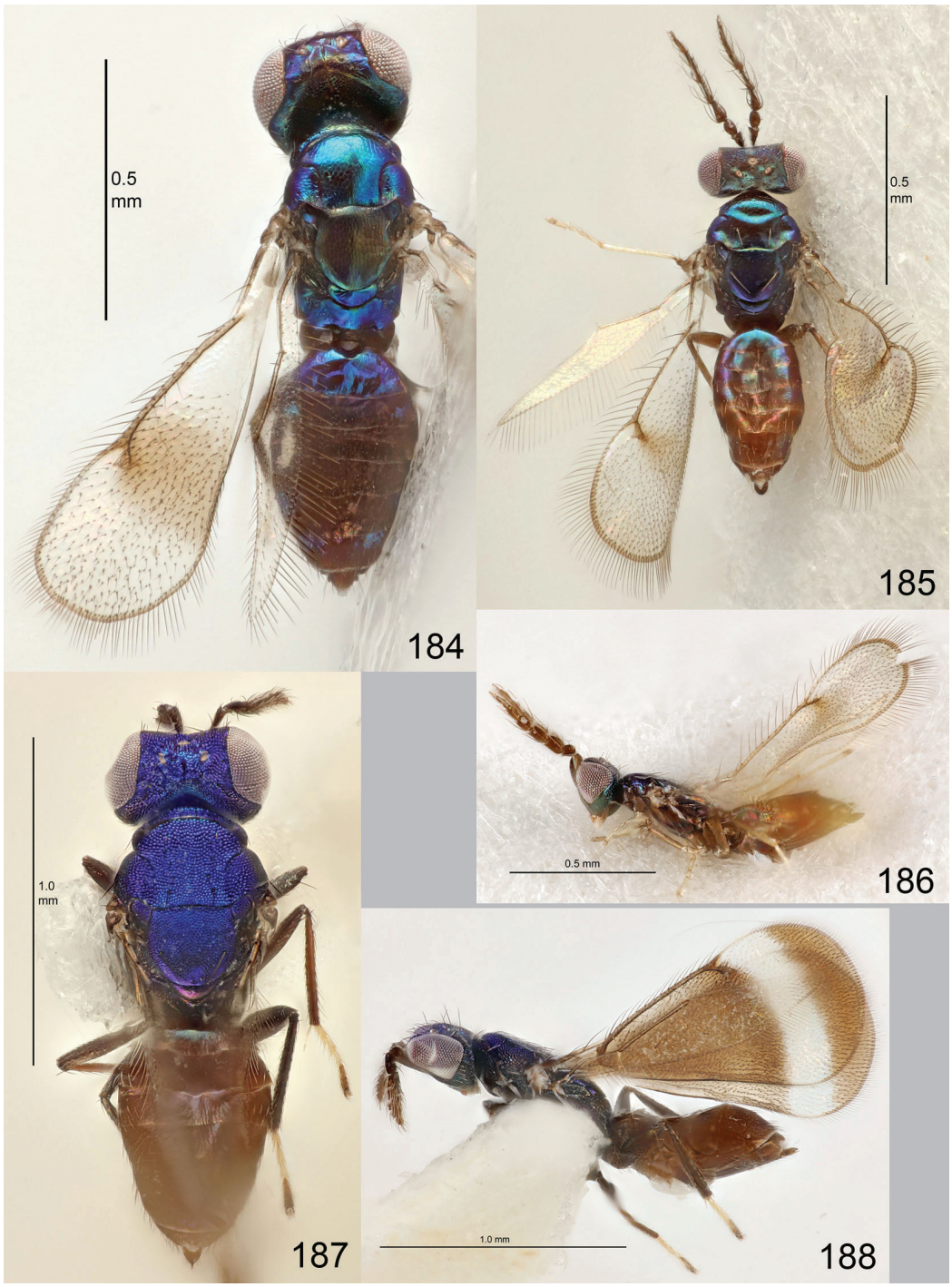
Figs 164–170. *Closterocerus* spp. *C. tapantibius*, ♀ – (164) habitus dorsal view, holotype; (165) habitus lateral view, paratype; (166) vertex, holotype. *C. tischeriae* – (167) habitus lateral view, paratype ♂; (168) habitus dorsal view, paratype ♀; (169) habitus dorsal view, paratype ♂. *C. triquetrus*, paratype ♂ – (170) habitus dorsal view.



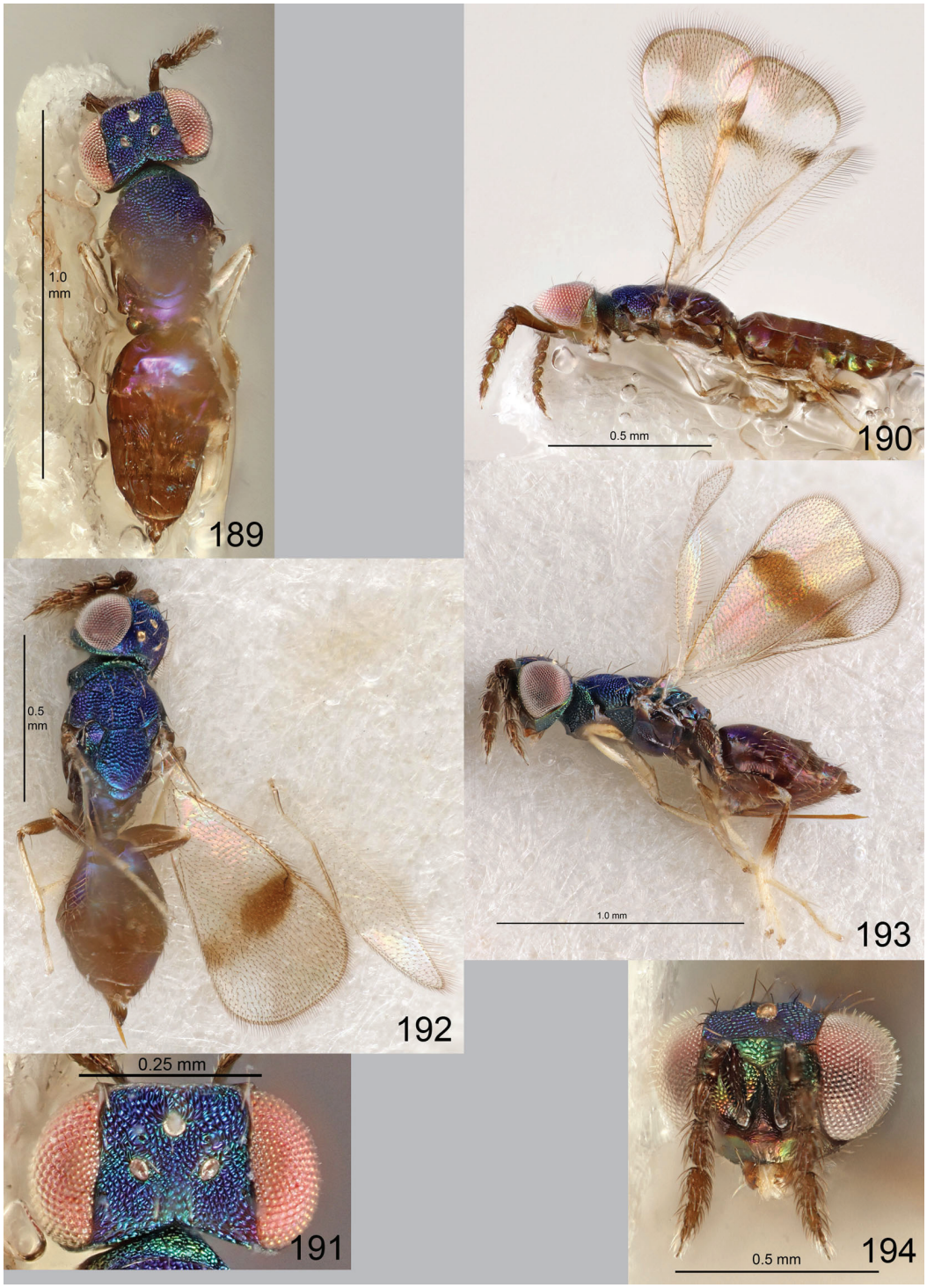
Figs 171–177. *Closterocerus* spp. *C. trimaculatus* – (171) habitus dorsal view, paratype ♀; (172) habitus lateral view, paratype ♀; (173) habitus lateral view, paratype ♂. *C. tischeriae*, holotype ♀ – (174) habitus lateral view. *C. triquetrus* – (175) habitus dorsal view, holotype ♀; (176) habitus lateral view, holotype ♀; (177) head frontal view, paratype ♂.



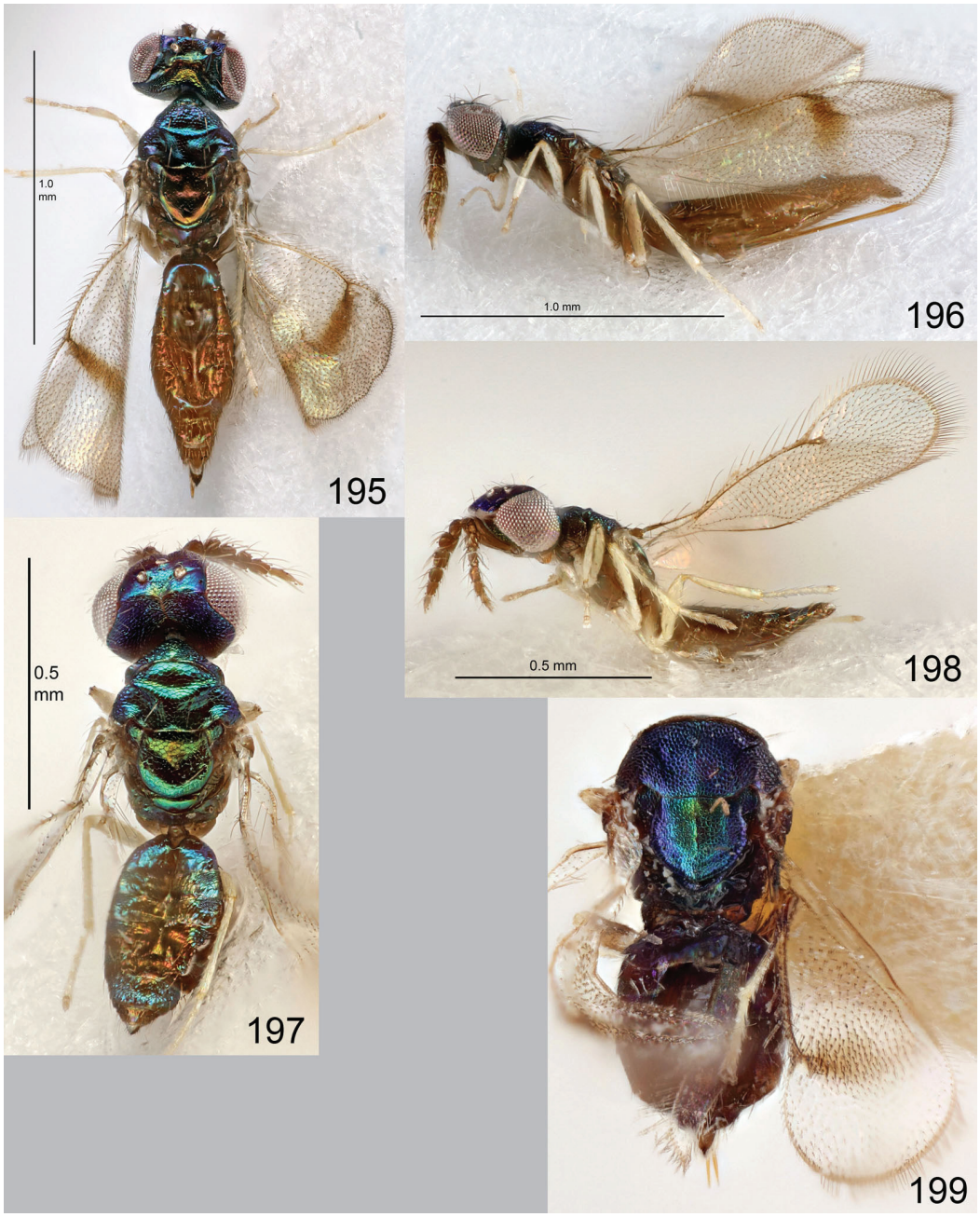
Figs 178–183. *Closterocerus* spp. *C. tumidus* – (178) habitus dorsal view, holotype ♀; (179) habitus lateral view, holotype ♀; (180) habitus dorsal view, paratype ♂; (181) habitus lateral view, paratype ♂. *C. variotinctus* – (182) habitus lateral view, paratype ♀; (183) habitus lateral view, paratype ♂.



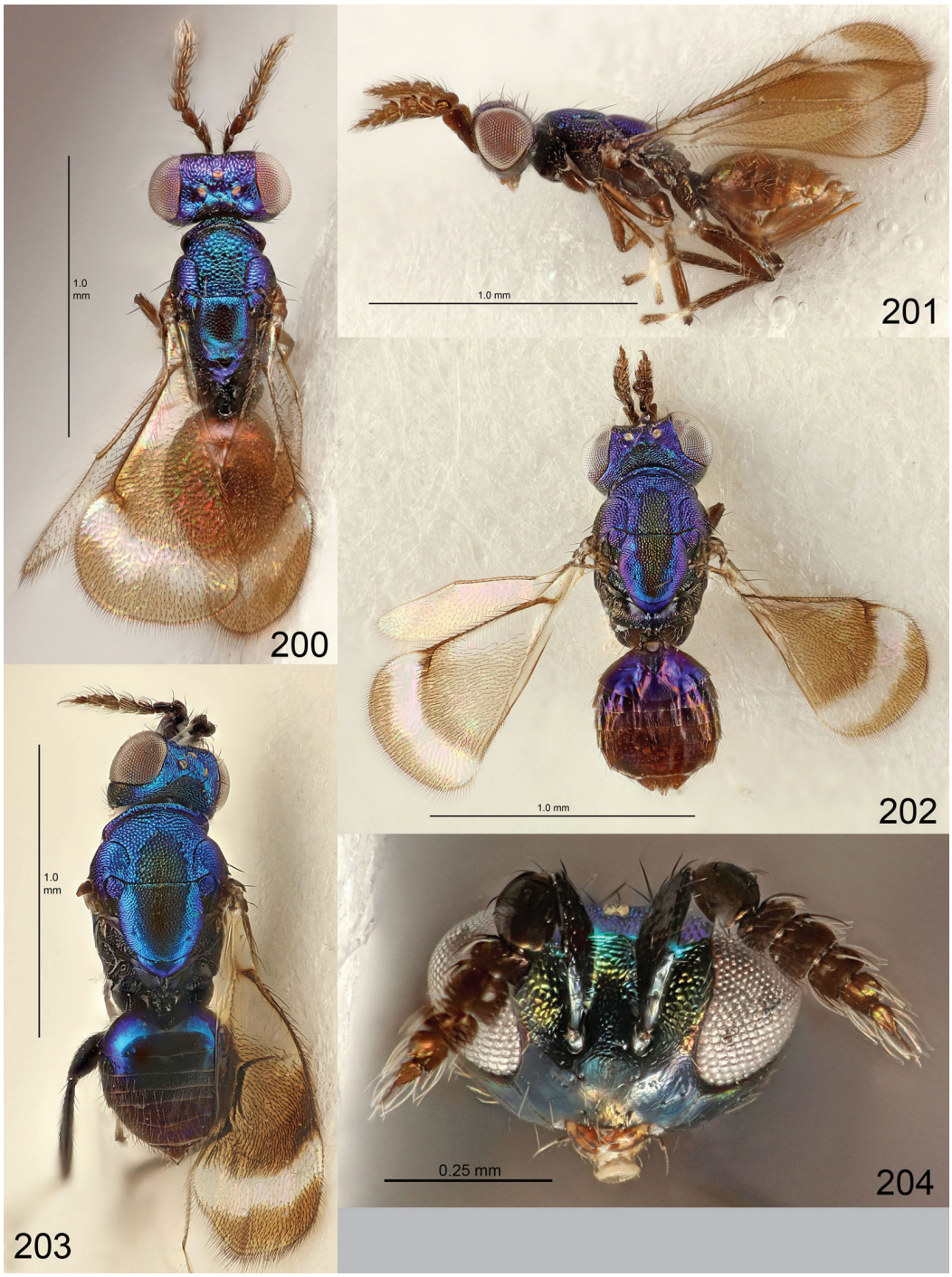
Figs 184–188. *Closterocerus* spp. *C. variotinctus*, paratype ♀ – (184) habitus dorsal view. *C. verticillus*, ♀ – (185) habitus dorsal view, paratype; (186) habitus lateral view, holotype. *C. whartoni*, ♀ – (187) habitus dorsal view, holotype; (188) habitus lateral view, holotype.



Figs 189–194. *Closterocerus* spp. *C. woolleyi*, holotype ♀ – (189) habitus dorsal view; (190) habitus lateral view; (191) vertex. *C. zurquiensis*, ♀ – (192) habitus dorsal view, paratype; (193) habitus lateral view, holotype; (194) head frontal view, paratype.



Figs 195–199. *Closterocerus* spp. *C. byrrus*, holotype ♀ – (195) habitus dorsal view; (196) habitus lateral view. *C. albicrus*, holotype ♀ – (197) habitus dorsal view; (198) habitus lateral view. *C. purpureus*, holotype ♀ – (199) habitus dorsal view (excluding head). The image of *C. purpureus* (type no. 5.1299) are ©The Trustees of the Natural History Museum, London, and made available to you under Creative Commons License 4.0 (https://creativecommons.org/licenses/by/4.0/).



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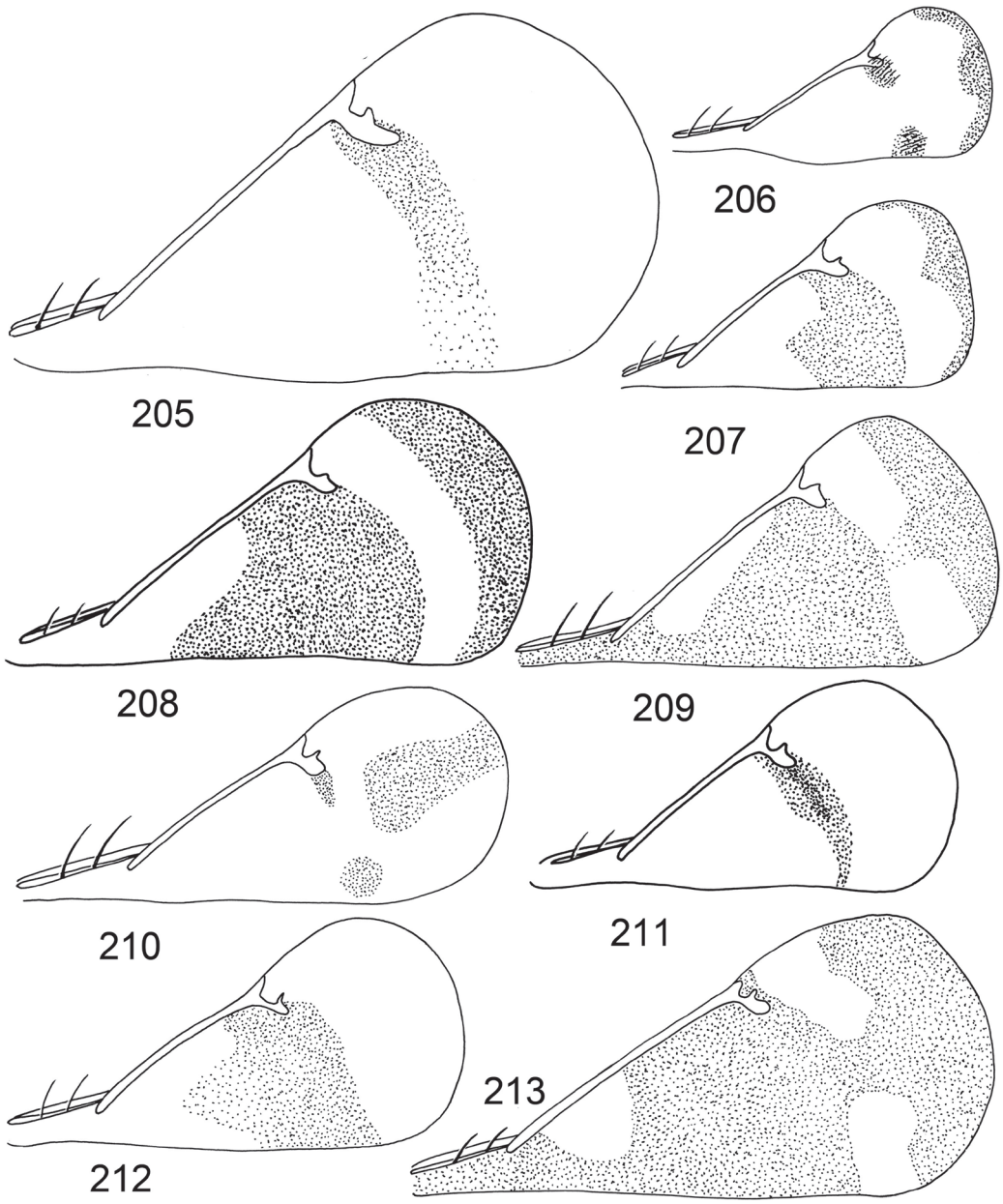

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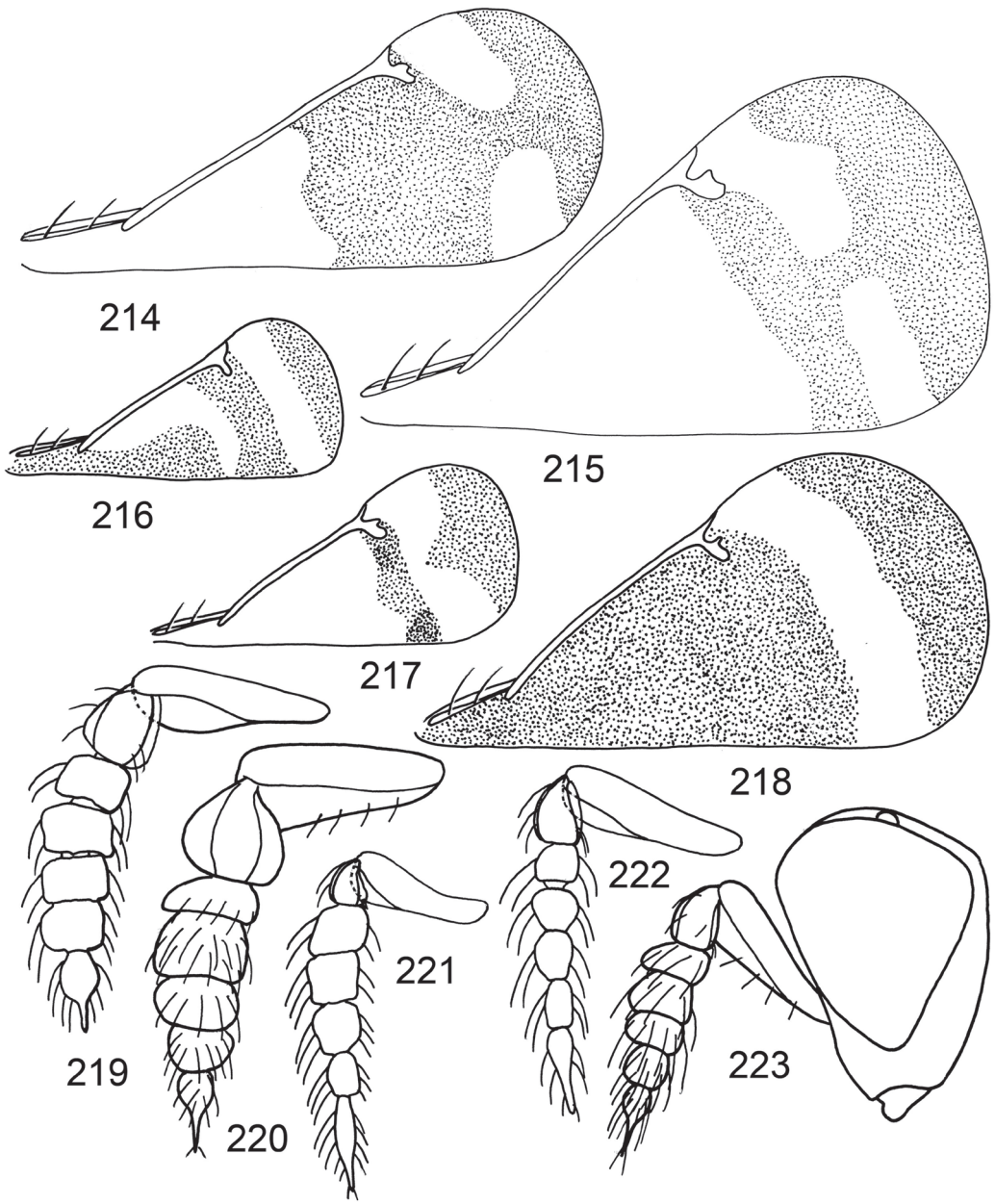

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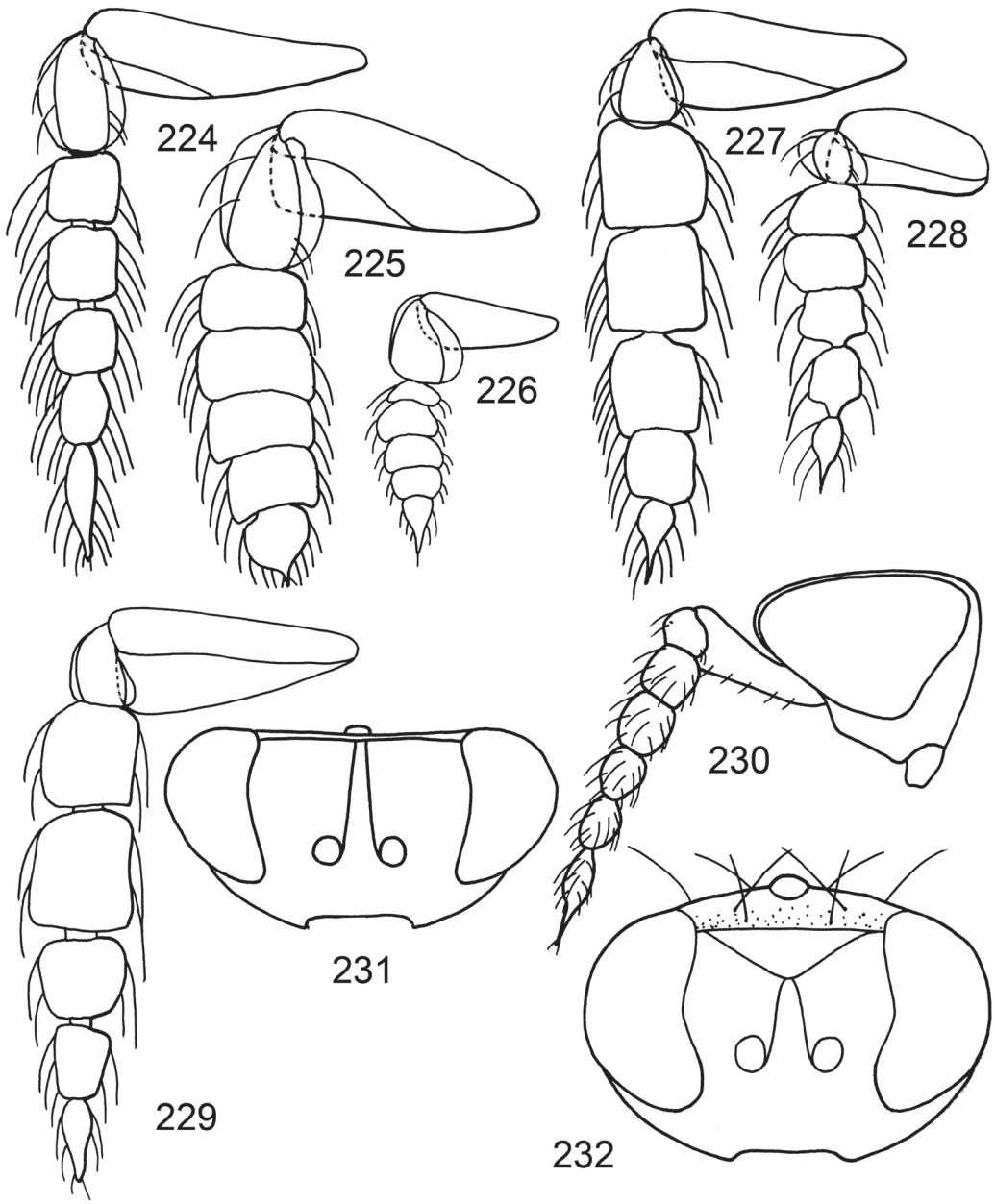

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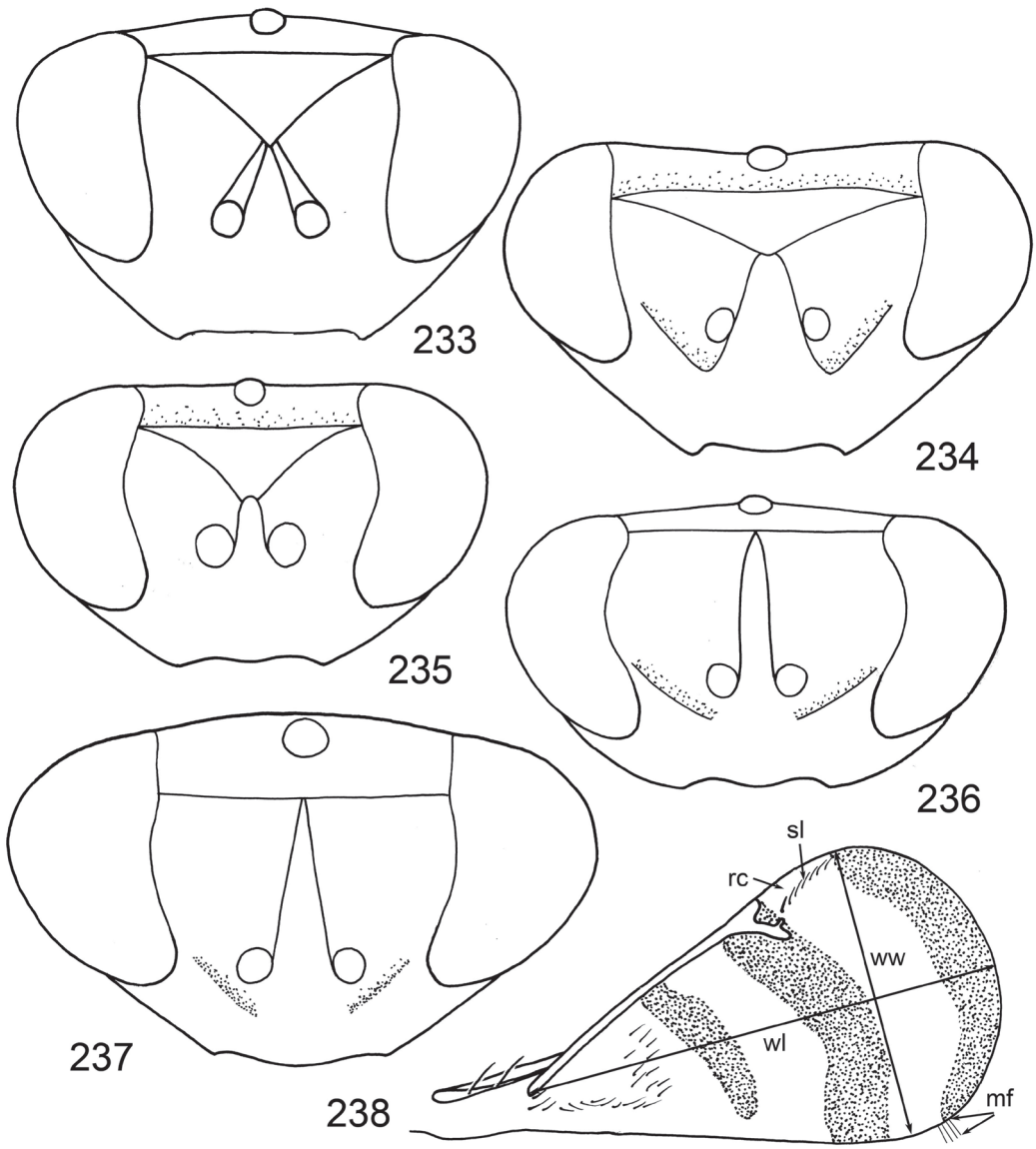

Figs 233–238. *Closterocerus* spp. ♀ – 233–237. Head frontal view – (233) *C. coffeellae*; (234) *C. petiolatus*; (235) *C. platycerus*; (236) *C. scitulus*; (237) *C. stigmalis*. – 238. *C. trifasciatus*, fore wing. Abbreviations: **mf** = marginal fringe length; **rc** = radial cell; **sl** = stigmal hair line; **wl** = wing length; **ww** = wing width.

INDEX OF SCIENTIFIC NAMES

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