



A new genus and three new species of Oraseminae (Hymenoptera: Eucharitidae) from Australia

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Abstract

A new genus and three new species of Oraseminae (Eucharitidae) are described from Australia. *Naumannius* **gen. nov.** (Queensland) includes two species, *N. metallicus* **sp. nov.** and *N. enascens* **sp. nov.**, based on singleton males. *Orasemomorpha grandilaevis* **sp. nov.** (South Australia) is described based on a female and male. Based on other reports, *Orasemomorpha* are known to attack immatures of *Pheidole* (Myrmicinae). *Naumannius enascens* is represented by a teneral adult that was collected at the base of a termite mound occupied by ants. Based on morphology, specifically the first gastral sternite of the male extended under the petiole and the presence of a complete transscutal articulation, *Naumannius* and *Orasemomorpha* are likely sister taxa.

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Introduction

The Oraseminae (Hymenoptera: Eucharitidae) of Australia were revised by Bouček (1988), in which he described the genus *Orasemomorpha* to separate the Australian species from the New World *Eucharomorpha* Girault 1913, and synonymized the latter under *Orasema* Cameron 1884 in the same action. Heraty (1994) revised the Old World Oraseminae and recognized five genera, *Indosema* Husain & Agarwal 1983 (India), *Orasema* (worldwide), *Orasemomorpha* (Australia), and *Timioderus* Waterston 1916 (southern Africa). Based largely on molecular data, Burks *et al.* (2017) restricted *Orasema* to species in the New World and treated the Old World *Orasema* as eight new genera: *Australosema* Heraty & Burks (Australia), *Cymosema* Heraty & Burks (Australia), *Hayatosema* Heraty & Burks (Afrotropical and

Indo-Pacific), *Ibitya* Heraty & Burks (Malagasy), *Ivieosema* Heraty & Burks (Afrotropical and Malagasy), *Leiosema* Heraty & Burks (Afrotropical), *Matantus* Heraty & Burks (New Caledonia), and *Zuparka* Heraty & Burks (Malagasy), with *Losbanus* Ishii 1932 (southeast Asia and Australia) reinstated. The Old World Oraseminae are paraphyletic to the monophyletic New World *Orasema*, with two proposed independent establishments in Australia of *Cymosema* and *Australosema* + *Orasemomorpha* (Baker *et al.*, 2020).

Where known, Oraseminae in the Old World attack only Myrmicinae (Formicidae) in the genera *Pheidole* Westwood (*Australosema*, *Hayatosema*, *Ibitya*, *Ivieosema*, *Orasemomorpha* and *Timioderus*) or *Monomorium* Mayr (*Zuparka*) (Reichensperger, 1913; Das, 1963; Kerrich, 1963; Bouček, 1988; Heraty, 1990, 1994, 2000). *Orase-*

morpha and *Timioderus* oviposit a few eggs into fan-shaped punctures made into the leaves, whereas *Australosema*, *Hayatosema* and *Losbanus* oviposit single eggs into linear egg punctures (Ishii, 1932; Das, 1963; Heraty, 2000). Oviposition habits are unknown in the other Old World genera. Across Eucharitidae, through foraging worker ants, the first-instar larva (planidium) gains access to the ant nest and first attacks the larva of the host ant, and then develops on the ant pupa (Heraty, 2000; Heraty *et al.* 2025). Among other features, the pupae of Oraseminae all have characteristic nodules over the petiole (Heraty, 2000). Residing and emerging from the nest are likely similar across Oraseminae through deception mediated by cuticular hydrocarbons passively acquired from the surrounding ant brood (Vander Meer *et al.*, 1989).

Eucharitidae can be common at some collecting sites, especially if the host plant being used for oviposition can be targeted. However, some species are rarely collected, but offer important insights into the morphological and biological diversity of the family. Herein I describe one new genus and three new species of Oraseminae. One of the species is based on a teneral specimen (wings only partially inflated) that was collected in 1970. It was known to the author at the time of the revision of Old World Oraseminae (Heraty, 1994), but was considered unsuitable for description based on the condition of the specimen. The discovery of a similar male in the Australian National Insect Collection (ANIC) prompted this description of a new genus and another species. The new description of a species of *Orasemorpha* adds to our knowledge of the morphological diversity of the genus, and allows for direct comparison with the new genus, which is considered as a sister taxon.

Methods

Specimens were borrowed from the Australian National Insect Collection (ANIC), the Queensland Department of Plant Industries Insect Collection (QDPC) from the Ross Storey collection, the Queensland Museum (QMBA), and the South Australia Museum (SAMA). Specimens were point- or card-mounted and labeled with a UCRCENT barcode with a prefix indicating the museum of deposition, and a unique specimen identification number. Images were taken using a Leica Imaging System with a Z16 APO A microscope, stacked using Zerene Stacker (version 1.04, © Zerene Systems, LLC), and edited in Photoshop v.22.5.1. The scanning electron microscope image was taken using a Hitachi TM-4000Plus Tabletop. Terminology follows Heraty (1994) and Burks *et al.* (2025). Measurements were taken using an eyepiece micrometer.

Taxonomy

Family Eucharitidae Walker, 1846

Subfamily Oraseminae Burks, 1979

Naumannius gen. nov.

Figs 1–3

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Type species. *Naumannius metallicus* sp. nov.

Etymology. Named after Ian Naumann, a voracious collector of Eucharitidae in Australia. Gender masculine.

Diagnosis. Recognized from *Orasemorpha* by the large size; distinctive metallic bright blue and green coloration (Figs 1, 2); anellus oblique and dorsally narrowed (Fig. 2F); funicular segments of the male lobate (Figs 1E, 2E); head and mesosoma sculpture strongly rugulose-areolate (Figs 1B, 2B); and petiole transverse, not longer than broad (Fig. 2D).

Comments. This genus is most similar to *Orasemorpha* by having a distinct transscutal articulation (fused in *Indosema* and *Timioderus*), and first gastral sternite protruding under the petiole (not protruding in *Australosema*). The fore wing is distinctive with a short marginal vein (2.2–2.7 times fore wing length; greater than 2.7 in *Orasemorpha*), area posterior to parastigma pilose (speculum absent; variable but usually present (bare) in *Orasema* and *Orasemorpha*), and stigmal vein directed posteriorly and parallel to the wing margin (directed more perpendicular to wing margin in *Orasema* and *Orasemorpha* (Fig. 4D), but similar in form to *Timioderus*). There are only the two males to base the generic description upon, but they are very different from any males of *Orasemorpha* (see later description). *Naumannius* has the male antennal flagellum lobate, flagellum 11-segmented, anellus oblique (narrowed dorsally, Fig. 2F; *versus* transverse), head and mesosoma strongly sculptured, mesosoma greatly expanded (globose), scutocutellar sulcus deeply invaginated medially, and petiole transverse. Two species of *Naumannius* are recognized based on singleton males. Notably, *N. metallicus* exhibits an abnormality by having flagellomeres 5–6 of the right antenna fused, and possibly the odd formation of the apical flagellomeres may be a product of mutation in a single individual, but sufficient differentiating characters support the recognition of this form as a different species. Hopefully, the description of these males will lead to the discovery of the unknown females.

Description of Male only. Body distinctively bright blue or green (Figs 1, 2); antennal flagellum dark brown to black, scape and pedicel dark blue; femora basally dark brown with metallic luster, rest of legs yellowish brown; calcar dark brown to black. Wings hyaline, venation pale brown.

Head subcircular (Figs 1D); eyes rounded, inner margins not diverging; occiput broadly emarginate; temples large and broadly rounded behind eyes, sunken lateral to lateral ocelli (Figs 1B,C, 2B,C). Head completely rugulose with a covering of fine short setae; parascrobal areas swollen, scrobal depression broadly rounded with finer sculpture medially, scrobes partially including median ocellus. Gena with broad longitudinal depression. Clypeus with lateral margins deeply impressed (Figs 1D). Labrum 4–6 digitate. Mandibles 3/2 dentate. Antenna with 11 densely pilose flagellomeres; funiculars of male lobate (Figs 1E, 2E); anellus small, oblique and narrowed dorsally (Figs 1F, 2F).

Mesosoma with dorsum evenly and strongly rugulose (Figs 1C, 2C); notauli sharply impressed and narrowly crenulate; axillae subtriangular; scutoscuteellar sulcus broadly impressed medially with few transverse carinae; mesoscutellum as long as broad; frenal line distinct dorsally, frenum rugulose and broadly rounded. Propodeum evenly rounded; callus rounded and slightly swollen. Mesepimeron rugulose. Metepimeron separate. Prepectus broadly triangular, reaching tegula; prepectus and pronotum rugulose. Coxae rugulose; hind leg with tibia and femur densely short-setose. Fore wing broadly subtriangular (Figs 1C, 2C); basal area bare; costal cell pilose dorsally; speculum absent (pilose); marginal vein 0.22–0.27 times fore wing length; wing disc densely short pilose, with short marginal fringe; stigmal vein longer than broad and curving posterior parallel to anterior margin (Fig. 1C); postmarginal vein about 1.5 times stigmal vein length. Hind wing venation complete medially, with 3 hamuli.

Metasoma with petiole transverse, about long as broad; constricted basally where entering into propodeal foramen. Gastral tergum 1 (Gt₁) smooth basally and medially, apically with scattered micropunctations, laterally with fine appressed setae. Gastral sternum 1 (Gs₁) medially with broad strongly impressed, crenulate sulcus; anterior region glabrous and globular, anterior margin extending forward under petiole, posterior half of Gs₁ mostly smooth, but with patch of micropunctations medially; Gs₈ smooth with scattered hairs in apical half. Cerci flattened and circular with few fine erect hairs. Aedeagus subapically expanded, parameres short and blunt; digiti not visible.

Naumannius metallicus sp. nov.

Figs 1, 3A,B

urn:lsid:zoobank.org:act:E99B49B4-260F-44E5-9FBB-FB321FFF4004

Holotype: Australia: QLD: Hann River, 15°06'36"S, 143°31'12"E, 14.i.21.ii.1994, P. Zborowski, G. Turner, Malaise trap [1♂, ANIC: UCRCENT00653705], deposited in ANIC (type# ANIC00014739). Flagellomeres 5–6 of right antenna fused.

Etymology. Latin-derived adjective *metallicus*, referring to the bright colors of the mesosoma.

Diagnosis (male only). Differs from *N. enascens* by the apical nib-like extension of the terminal flagellomere; diagonal articulation of the apical flagellomeres; smooth supraclypeal area, head and eyes distinctly setose, propodeum finely rugulose without a median carina; scutoscuteellar sulcus at transscutal articulation deeply impressed medially but adjacent groove not extending beyond notauli; petiole rugulose, anterodorsally with transverse ridge with dorsal setae along ridge. Female unknown.

Description of male. Length 5.6 mm. Body metallic blue or green, head and mesosoma laterally dark blue, mesosoma dorsally green, petiole and gaster dark blue (Fig. 1A,C); antennal flagellum dark brown to black, scape and pedicel dark blue (Fig. 1E,F).

Head completely rugulose with covering of fine short setae. Eyes with sparse short setae. Supraclypeal area smooth (Fig. 1D). Labrum 6-digitate. Antennal funiculars lobate and apically oriented offset to median line, flagellomere 11 with apical peg-like projection (Fig. 1E).

Mesosoma with axillae separated by their dorsal width and extending medially beyond notauli. Propodeum evenly rounded and rugulose without a distinct median carina; callus rounded and slightly swollen and mostly bare. Fore wing 2.1 x as long as broad.

Metasoma with petiole dorsally rugulose and transverse; constricted basally entering into foramen; anterodorsally with transverse ridge, with several short setae along ridge. Gastral tergum 1 (Gt₁) smooth basally and medially, apically with scattered micropunctations, laterally with fine appressed setae; following tergites smooth anteriorly for portion usually covered by preceding tergite, then micropunctate, then with a fine band of finely rugulose sculpture, and then apically smooth; each following terga with even covering of fine setae. Gastral sternum 1 (Gs₁) medially with broad, strongly impressed, crenulate sulcus; anterior region glabrous and globular, anterior margin extending forward under petiole, posterior half of Gs₁ mostly smooth but with patch of micropunctations medially (Fig. 3A,B); Gs₈ smooth with scattered hairs in apical half. Aedeagus subapically expanded, parameres short and blunt; digiti not visible.

Naumannius enascens sp. nov.

Figs 2, 3C,D

urn:lsid:zoobank.org:act:C006A5C2-4E84-44CE-B351-C91791B103CC

Holotype: Australia: QLD: Mareeba, 22.i.1970, J.H.B, x base of termite hill (ant occupied) [1♂, QDPC (Accession # 0-181196): UCRCENT00238798], deposited in QMBA (type # T262960). Right antenna encased in pupal exuvium, left antenna broken, apical 7 flagellomeres mounted on card under minutien-pin mounted adult; left fore wing missing; remaining wings not fully expanded but features visible.

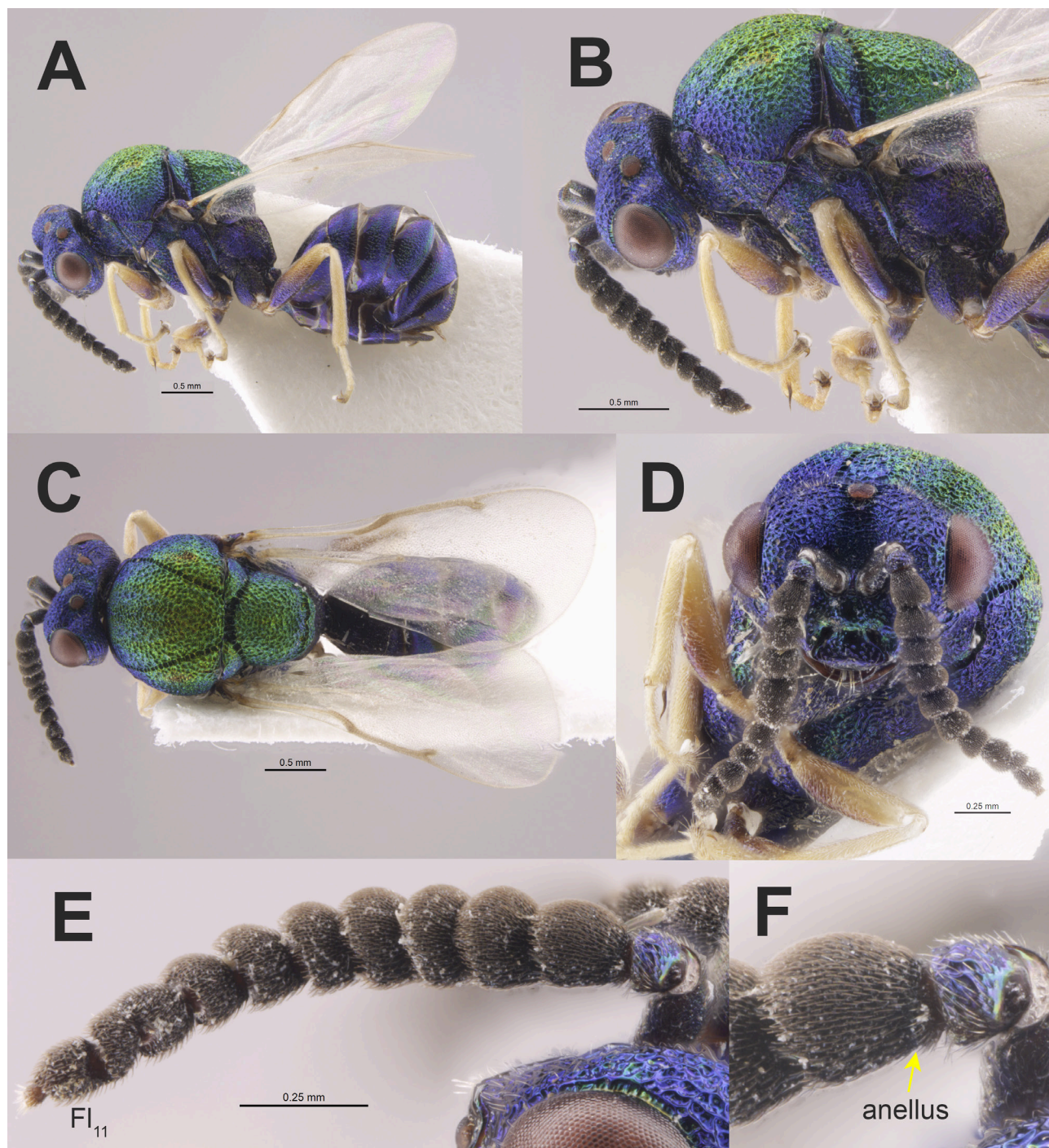


Figure 1. *Naumannius metallicus* sp. nov., holotype ♂: **A**, habitus lateral; **B**, head and mesosoma lateral; **C**, head and mesosoma dorsal; **D**, head frontal; **E**, antenna flagellum lateral; **F**, antennal flagellum, base. Fl₁₁ = flagellomere 11.

Etymology. From the Latin verb *enasci* (to sprout or be born from), formed by the prefix *e-* (out of) and *nasci* (to be born); present participle; referring to the newly emerged condition of the adult.

Diagnosis (male only). Differs from *N. metallicus* by the subconical terminal flagellomere without an apical projection; transverse articulation of the apical flagellomeres; rugose supraclypeal area, head and eyes distinctly sparsely setose, propodeum rugose with a median carina; scutoscutellar sulcus at transscutal articulation deeply impressed medially but adjacent groove extend-

ing beyond notauli; petiole rugose dorsally, anterodorsally without transverse ridge and with no dorsal setae. Female unknown.

Description of male. Length 5.7 mm. Body strong metallic blue or green, head and mesosoma laterally dark blue, mesosoma dorsally green with reddish tints medially, petiole and gaster dark blue (Fig. 2A,C,D); antennal flagellum dark brown to black, scape and pedicel dark blue.

Head with sparse covering of fine short setae. Eyes with very sparse short setae, appearing bare. Supraclypeal

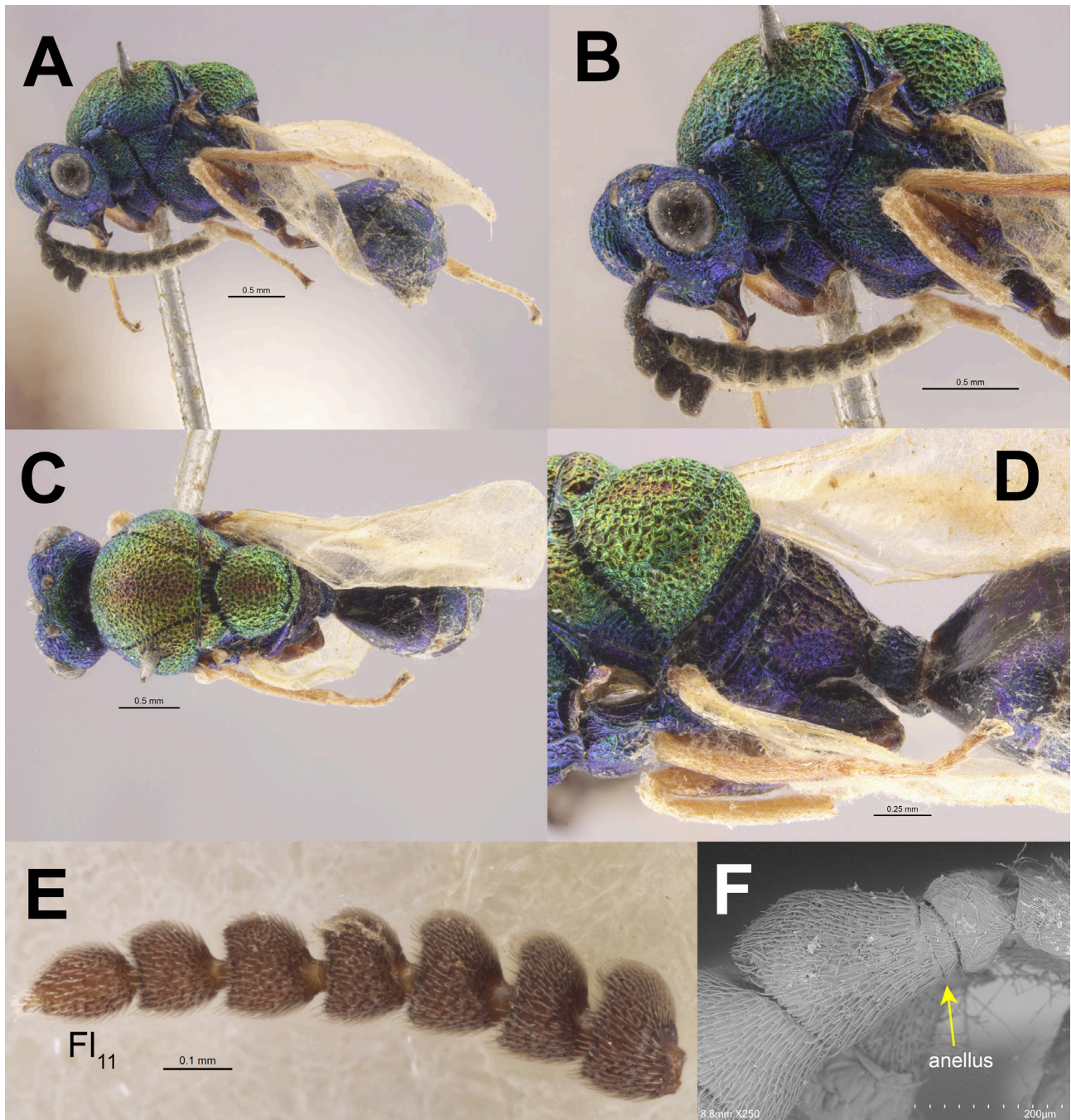


Figure 2. *Naumannius enascens* sp. nov., holotype ♂: **A**, habitus lateral; **B**, head and mesosoma lateral; **C**, head and mesosoma dorsal; **D**, mesosoma and gaster oblique; **E**, apical flagellomeres; **F**, antennal flagellum, base. Fl₁₁ = flagellomere 11.

area rugose. Labrum appearing 4-digitate (difficult to discern). Antennal funiculars with lobes decreasing in size apically, funiculars evenly spaced with apicies transverse; flagellomere 11 subconical, without apical projection (Fig. 2E).

Mesosoma with axillae separated by their dorsal width and not extending to notauli. Propodeum evenly rounded, rugose with pronounced medial longitudinal carina; callus rounded and slightly swollen and evenly sculptured. Fore wing not measured (distorted).

Metasoma with petiole dorsally rugose and transverse; constricted basally entering into foramen; without

transverse ridge and bare. Gastral tergum 1 (Gt₁) smooth basally and medially, apically with scattered micropunctations, laterally with fine appressed setae; following tergites micropunctate; each following terga with even covering of fine setae. Gastral sternum 1 (Gs₁) medially with broad strongly impressed, crenulate sulcus; anterior region glabrous and globular, anterior margin extending forward under petiole, posterior half of Gs₁ mostly smooth but with patch of micropunctations medially (Fig. 3 C,D); Gs₈ smooth with scattered hairs in apical half.

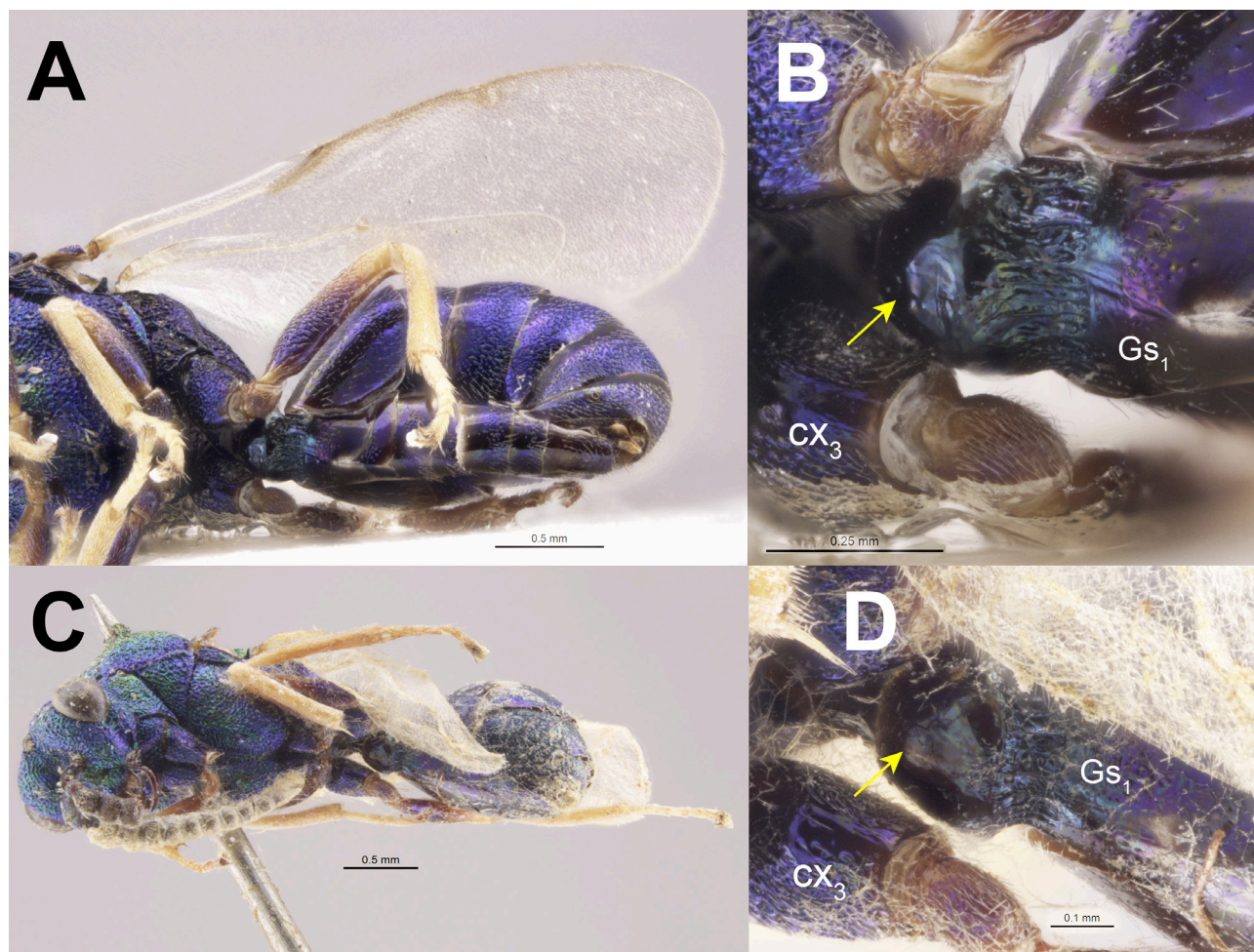


Figure 3. A–B, *Naumannius metallicus* sp. nov., holotype ♂: A, gaster ventral; B, petiole ventral. C–D, *Naumannius enascens* sp. nov., holotype ♂: C, habitus subventral; D, petiole sublateral. Yellow arrow points to anterior margin of first gastral sternite (Gs_1). CX_3 = right metacoxa.

Orasemorpha grandilaevis sp. nov.

Figs 4, 5

urn:lsid:zoobank.org:act:3B27FF8D-6BC8-48D4-8D2B-14CA9DAB6514

Holotype: Australia: SA: Stirling Linear Park: Mt Lofty Ranges: Woonabinda, 36°00'51"S, 138°42'47"E, 27.i.2004, A.R.Deans, sweeping remnant sclerophyll woodland [1♀, SAMA: UCRCENT00654016], deposited in SAMA (type # 32-54152). **Paratype:** same data [1♂, SAMA: UCRCENT00654017; type # 32-54153].

Etymology: From the Latin *grandis* for the large size and *laevis* a Latin-derived adjective for smooth referring to the female mesosoma.

Diagnosis. Features that place this species within *Orasemorpha* include the transverse anellus (Figs 4E, 5C), presence of a transscutal articulation (Figs 4C, 5C; from *Indosema* and *Timioderus*), strongly sculptured head (Figs 4E, 5D), female petiole transverse (Fig. 4B), strongly sculptured face, and male petiole with first gastral sternite extending forward under petiole (Fig. 5B, from *Australosema*). The female differs from other *Orasemorpha* by a combination of having the mesosoma robust and globose (Fig. 4A–C), mesoscutal midlobe very lightly

sculptured with a medial longitudinal groove (Fig. 4C), and mesosoma, gaster and propodeum densely pilose (Fig. 4B). This combination of characters would not allow it to be keyed in the first couplet of Heraty (1994). The male keys to *Orasemorpha didentata* (Girault) in Heraty (1994) by having the midlobe of the mesoscutum rugulose, mesosoma and gastral terga pilose, and dark femora, but *O. didentata* has a pale yellow hind tibia, at most with a medial infuscation (versus almost entirely dark brown), the gaster, especially basally, brown (versus almost black with iridescent reflections), and the propodeum with at most a few scattered setae (versus pilose). The propodeal disc is essentially bare in most other *Orasemorpha*. *Orasemorpha pytallus* (Walker) has a pilose propodeum, but the legs and anellus are yellowish brown, the mesosomal and gastral setae sparser and erect, and the entire fore wing base pilose.

Description of female (Fig. 4) Length 2.5 mm. Head, mesosoma, and gaster, including petiole and coxae aeneous green, mesosoma with faint reddish reflections dorsally (Fig. 4A–C); scape yellowish brown, pedicel and anellus light brown, flagellum dark black (Fig. 4E); mandible dark brown; femora basally dark brown, apex and rest of legs dark yellowish-brown, apical tarsomere

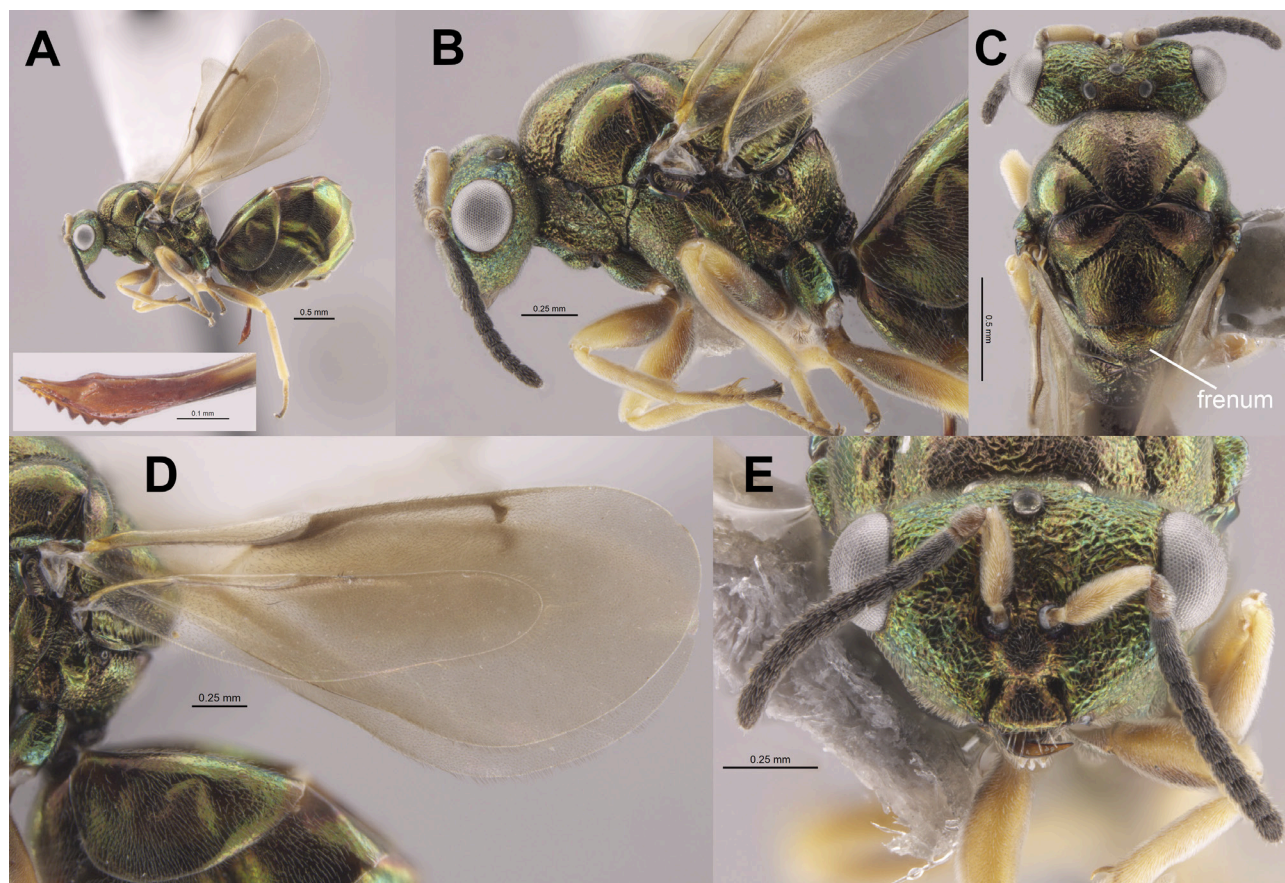


Figure 4. *Orasemorpha grandilaevis* sp. nov., holotype ♀. **A**, habitus lateral, inset ovipositor lateral; **B**, head and mesosoma lateral; **C**, head and mesosoma dorsal; **D**, wings; **E**, head frontal.

brown. Wings weakly infuscate, venation pale brown, parastigmal vein whitish ventrally.

Head subtriangular, occiput broadly emarginate; temples large and abrupt behind eyes in dorsal view (Fig. 4C). Face and occiput rugulose; scrobal depression shallow, partially including median ocellus. Eyes pilose and protuberant, their inner margins slightly diverging. Malar space without linear impression. Clypeal region weakly scabriculous, lateral margins deeply impressed; supraclypeal area bulging. Labrum 5-digitate. Mandibular teeth not visible. Antenna with 10 flagellomeres, anellus transverse (Fig. 4E); scape and funicular segments pilose, flagellomeres with numerous multiporous plate sensilla; clava subcylindrical and shorter than preceding 2 segments.

Mesosoma with midlobe of mesoscutellum scabriculous, with median longitudinal sulcus extending to transscutal articulation (Fig. 4C); lateral lobe glabrous and evenly rounded; notauli sharply and deeply impressed, narrowly crenulate. Mesoscutellum with axilla swollen; scutoscutellar sulcus crenulate; mesoscutellar disc weakly rugulose to scabriculous. Mesoscutellum longer than broad; frenal line a narrow crenulate groove, frenal area weakly rugulose. Propodeum evenly rounded, rugose with radiating carinae and densely pilose (Fig. 4C); callus and metepimeron swollen and glabrous, separated by sharp

metepimeral sulcus; callus rounded, without callar nib (projection). Upper mesepimeron swollen and smooth, lower mesepimeron flat and weakly reticulate, with transepimeral sulcus weak; mesepisternum evenly reticulate, smooth ventrally. Prepectus broadly triangular, rugose with pronounced posterior flange. Pronotum rugulose. Proepisternum reticulate to smooth posteriorly. Coxae smooth to weakly rugulose; femora and tibia with dense decumbent setae, surface smooth. Fore wing 2.5x as long as broad; basal cell bare, area posterior to infuscate cubital vein pilose, speculum absent (pilose); costal cell pilose; disc densely pilose, marginal fringe present along posterior margin apical to retinaculum; stigmal vein subtriangular (Fig. 4D), almost perpendicular to wing margin; postmarginal vein more than twice length of stigmal vein.

Metasoma with petiole broader than long, medially smooth and bare, laterally and ventrally rugose and pilose. Gastral terga smooth and pilose; GS_1 with deeply impressed crenulate constriction, anterior region glabrous and semicircular with sharp margin anterior to crenulate furrow, extending forward under petiole. Hypopygium pilose laterally. Ovipositor typical for genus; first valvula with 3 subapical teeth along lateral line; second valvula with 7 strong lateral teeth (Fig. 4A, inset).

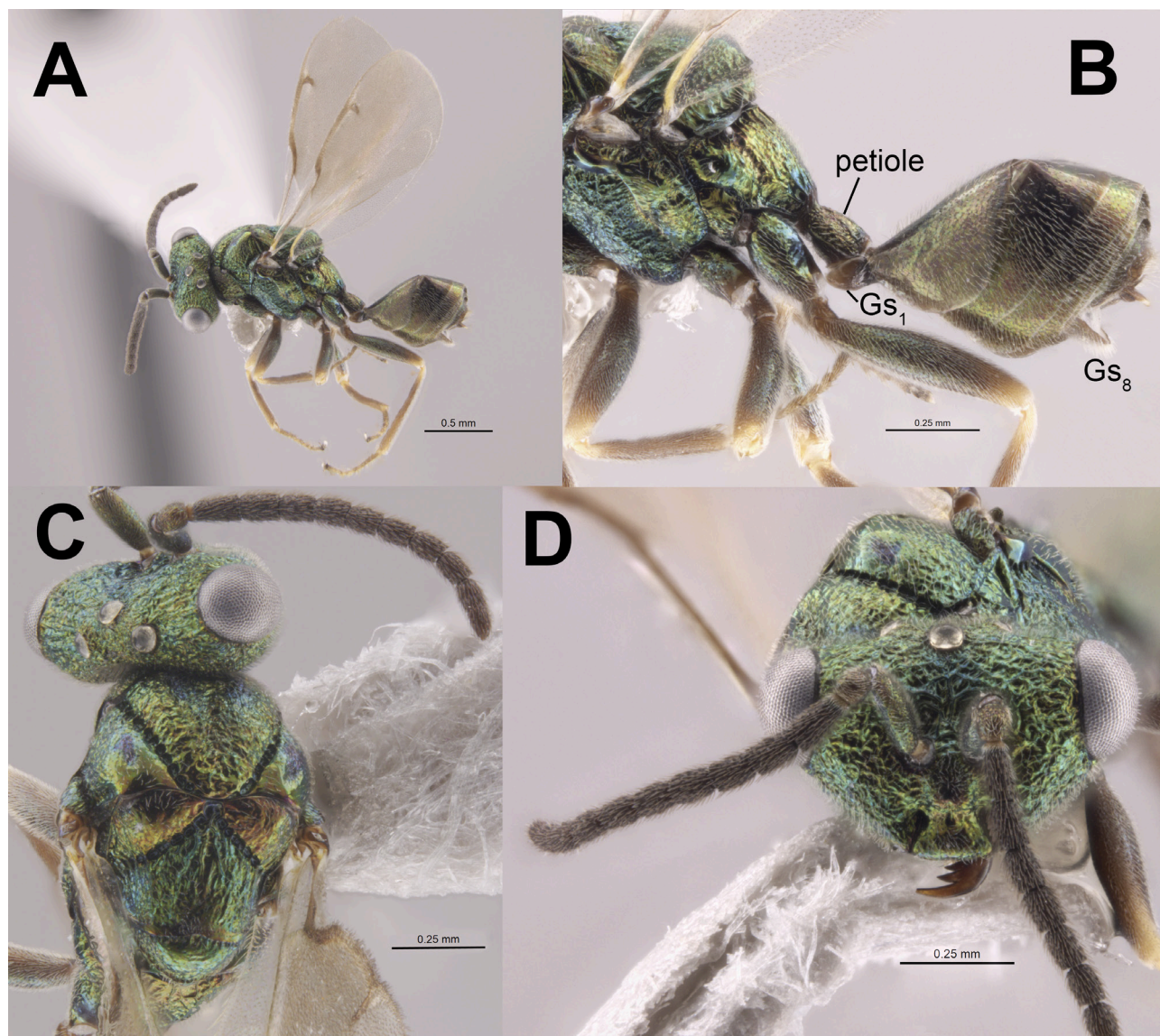


Figure 5. *Orasemorpha grandilaevis* sp. nov., paratype ♂. **A**, habitus lateral; **B**, mesosoma and gaster lateral; **C**, head and mesosoma dorsal; **D**, head frontal. Gs₁ = gastral sternite number.

Description of male (Fig. 5). Length 2.6 mm. As in female, but antenna slight brown to black, scape with faint metallic reflections; legs including tibiae mostly dark brown with faint metallic reflections; gaster evenly dark aeneous green; head and mesosoma more strongly sculptured; mesosomal side lobes, axilla and frenum mostly smooth; hind coxa with dorsal surface smooth and pilose; fore wing 2.1x as long as broad, with basal cell sparse pilose, marginal fringe sort, extending around entire posterior margin; petiole slightly longer than broad and pilose, Gs₁ strongly projecting under apex of petiole and smooth (Fig. 5B).

Disclosures

None.

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