

**A NEW CTENOPLECTRINE BEE FROM SULAWESI
(HYMENOPTERA: APIDAE)**

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Abstract – A new species of the bee genus *Ctenoplectra* Kirby (Apinae: Euceriti: Ctenoplectrini) is described and figured from a series of males and females collected in central and northeastern Sulawesi (Indonesia). *Ctenoplectra elsei* sp. n. is most superficially similar to *C. chalybea* Smith (a largely mainland species with which many metallic blue species are confused) but differs in integumental sculpturing and structure of the terminalic sclerites, among other features. The species has been collected from *Momordica cochinchinensis* (Lour.) Spreng. (Cucurbitaceae: Cucurbitoideae: Joliffieae: Thladianthinae). The available information on nesting biology in *Ctenoplectra* is briefly reviewed along with flower visitation by Southeast Asian species.

KEY WORDS: Anthophila, Apoidea, Euceriti, Ctenoplectrini, *Ctenoplectra*, Indonesia, Sulawesi, Southeast Asia, new species, taxonomy.

Izveček – NOVA VRSTA PLEMENA CTENOPLECTRINI S SULAVEZIJA
(HYMENOPTERA: APIDAE)

Nova vrsta čebele iz rodu *Ctenoplectra* Kirby (Apinae: Euceriti: Ctenoplectrini) je opisana in prikazana po vrsti samcev in samic, zbranih v osrednjem in severovzhodnem Sulaveziju (Indonezija). *Ctenoplectra elsei* sp. n. je površno podobna vrsti *C. chalybea* Smith (v glavnem celinska vrsta, s katero se zamenjujejo mnoge kovinsko modre vrste), vendar se razlikuje po površinski strukturi in zgradbi končnih skleritov, poleg drugih značilnosti. Vrsta je bila nabrana na rastlini

Momordica cochinchinensis (Lour.) Spreng. (Cucurbitaceae: Cucurbitioideae: Joliffieae: Thladianthinae). Na kratko so povzeti dostopni podatki o gnezditvenem vedenju v rodu *Ctenoplectra*, poleg cvetja, ki ga obiskujejo vrste iz jugovzhodne Azije.

KLJUČNE BESEDE: Anthophila, Apoidea, Euceriti, Ctenoplectrini, *Ctenoplectra*, Indonezija, Sulavezi, Jugovzhodna Azija, nova vrsta, taksonomija.

Introduction

Bees of the apine tribe Ctenoplectrini (Apinae: Euceriti) are enigmatic species exhibiting various modifications for the collection of oils from Cucurbitaceae. At various times in the past the group has been considered a subfamily of short-tongued Anthophila in the Melittidae, a family sister to the long-tongued Anthophila (a.k.a., Tanyglossata Engel), and eventually as a tribe of the apine supertribe Euceriti (e.g., Michener, 1944, 2000; Rozen, 1978; Michener & Greenberg, 1980; Silveira, 1993; Roig-Alsina & Michener, 1993; Engel, 2001, 2005). The tribe comprises two genera, *Ctenoplectra* Kirby (presently 24 species) and the cleptoparasitic *Ctenoplectrina* Cockerell (two species), the latter of which likely renders the former paraphyletic, occurring in the Afrotropical, Oriental, and Australian regions. The Afrotropical fauna was revised by Eardley (2003) and the Australian fauna consists of a single species, *Ctenoplectra australica* Cockerell. The majority of species occur in the Oriental Region but these have not been comprehensively studied and much confusion about their identity persists, particularly in regard to the commonly cited *C. chalybea* Smith. The oriental species of *Ctenoplectra* fall into two groups: smaller, black, more or less coarsely punctate species confined to the mainland, offshore islands and Greater Sunda Islands, and chiefly larger, finely punctate species, often with the metasoma deep metallic blue (sometimes purplish or greenish), ranging from Bangladesh eastwards to the Philippines, Sulawesi, New Guinea, and northern Queensland. The latter group comprises species with the ocelli normally developed and a single species, *C. vagans* Cockerell from the Philippines, with the ocelli somewhat atrophied.

Herein I provide the description of a new species of *Ctenoplectra* (Figs. 1–2, 12–13) collected by Mr. George R. Else in Sulawesi during his work there in 1985. The name is being made available for phylogenetic studies of Ctenoplectrini presently underway by Dr. Hanno Schäfer and colleagues. Morphological terminology is based on that of Michener (2000) and Engel (2001). Scanning electron microscopy was done by the author using a Hitachi 4700 Field Emission Scanning Electron Microscope. Specimens were relaxed, disarticulated, genitalic sclerites cleared in a weak solution of sodium hydroxide and dried in hexamethyldisilizane, and then all components were mounted on microscopy stubs and coated with gold-palladium. Measurements are for the holotype male, with ranges given for paratypes.

Systematics

Ctenoplectra elsei sp. n.

(Figs. 1–18)

“*Ctenoplectra chalybea* Smith”; Smith, 1860: 91 [misidentification].

“*Ctenoplectra chalybea* Smith”; Cockerell, 1904: 205 [misidentification].

“*Ctenoplectra chalybea* Smith”; Cockerell, 1926: 514 [misidentification, specimen from “Celebes”].

Holotype: ♂, labeled “N.E. Sulawesi, 49 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, 5.v.1985 [5 May 1985] // Project Wallace, G.R. Else, B.M. 1985-10 // B.M. Type Hym 17a3148 // Holotype, *Ctenoplectra elsei*, Michael S. Engel”. Deposited in the Department of Entomology, Natural History Museum, London.

Paratypes: 2♂♂, 2♀♀, “N.E. Sulawesi, 49 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, 5.v.1985 [5 May 1985] // Project Wallace, G.R. Else, B.M. 1985-10”, in the Department of Entomology, Natural History Museum, London. 2♂♂, same data except “7.v.1985 [7 May 1985]”, in the Department of Entomology, Natural History Museum, London. 2♀♀, same data except “8.v.1985 [8 May 1985]”, in the Department of Entomology, Natural History Museum, London. 2♂♂, same data except “9.vi.1985 [9 June 1985]”, in the Department of Entomology, Natural History Museum, London. 13♂♂, 5♀♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, April 1985”, in the Department of Entomology, Natural History Museum, London. 29♂♂, 24♀♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, May 1985”, in the Department of Entomology, Natural History Museum, London. 18♂♂, 22♀♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (base camp), 211 m, June 1985”, in the Department of Entomology, Natural History Museum, London. 9♂♂, 9♀♀, same data except “49 km SW Kotamobagu, c. 5 km N. Malibagu (forest edge, c. 254 m), 20.v.1985 [20 May 1985]”, in the Department of Entomology, Natural History Museum, London. ♂♀, same data except “49 km SW Kotamobagu, c. 5 km N. Malibagu (forest edge, c. 254 m), 15.vi.1985 [15 June 1985]”, in the Department of Entomology, Natural History Museum, London. ♀, “Centr. [Central] Sulawesi, Lore-Lindu Natl. Pk. [National Park], 60 km Palu, 10.xii.1998 [10 December 1998], A. Klein”, in the Department of Entomology, Natural History Museum, London. 2♂♂, 2♀♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, May 1985”, in the Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA. ♂♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (base camp), 211 m, June 1985”, in the Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA. ♂♀, same data except “47 km SW Kotamobagu,

Dumoga-Bone N. Pk. [National Park], Toraut (base camp), 211 m, June 1985”, in the Division of Invertebrate Zoölogy, American Museum of Natural History, New York, New York, USA. ♂♀, same data except “47 km SW Kotamobagu, Dumoga-Bone N. Pk. [National Park], Toraut (forest edge), 211 m, April 1985”, in the Bee Biology and Systematics Laboratory, Utah State University, Logan, Utah, USA.

Additional material: ♀, “Mak [Sulawesi, Makassar, July–November 1857, A.R. Wallace] // *Ctenoplectra chalybea* Smith [in Smith’s handwriting on blue paper]”, in the Oxford University Museum, Oxford (formerly of the Saunders Collection) [This is the specimen recorded by Smith (1860, p. 91) from “Celebes (Makassar)” as *C. chalybea*, misidentified by him with his Malacca species]. ♀, “Celebes, Mus. Drewsen, ex Mus. Copenhagen // Celebes Mus. Drews[en] ♀ // *Ctenoplectra chalybea* Smith, det. M.A. Lieftinck 1957”, in the Riksmuseum van Natuurlijke Historie, Leiden. 2♀♀, “C. Celebes, Lake-Poso, Pendolo, 650 m, ii 1950 [February 1950], C.J.H. Franssen”, in the Riksmuseum van Natuurlijke Historie, Leiden. ♀♂, disarticulated and mounted on four scanning electron microscopy stubs (coated with gold-palladium), preserved with paratypes in the Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA.

Diagnosis: Both sexes with ill-defined or absent narrow, impunctate line on base of clypeus; labrum with distinct, basal, paramedian tubercles (those of female more pronounced than those of male); ocelli not atrophied; mesoscutum and mesoscutellum sculptured the same (in some species the punctation of the mesoscutellum is distinctly more coarse relative to the mesoscutum; e.g., *C. chalybea*); metasomal terga dark metallic blue; and punctures of metasomal terga fine and separated by less than a puncture width (except narrow, apical impunctate zones as noted). Male with mesosternal apophysis, apophysis with ventral surface impunctate; impunctate, marginal zone of first metasomal tergum occupying distal third to quarter of dorsal surface; lateral protuberances of seventh metasomal tergum greatly pronounced and expanded (relative to *C. chalybea*); hidden sterna and genitalia as depicted in figures 9–11. Female impunctate, marginal zone of first metasomal tergum occupying distal half of dorsal surface; rows of waxy and wavy sternal setal patches arranged on third through fifth metasomal sterna as depicted in figure 18.

Description: ♂ Total body length 14.2 mm (8.9–16.7 mm); forewing length 9.4 mm (6.9–10.8 mm). Head wider than long, length as measured from vertex to apical margin of clypeus 2.9 mm (2.2–3.4 mm), width 3.8 mm (3.1–4.2 mm). Mandible with sharp subapical tooth. Labrum with two basal paramedian tubercles bordering faint mediolongitudinal depression, tubercles relatively flattened (Fig. 4). Malar space linear, mandibular base abutting lower margin of compound eye. Scape short, not reaching level of median ocellus; pedicel about as long as first flagellar article; first flagellar article trapezoidal, slightly longer than combined lengths of second and third flagellar articles (Fig. 3), second and third flagellar articles transverse; remaining flagellar articles roughly quadrate. Inner margins of compound eyes

nearly straight except slightly curved inward in uppermost portion of eye, margins slightly converging below. Ocelli not atrophied. Gena narrower than compound eye. Mesosoma elongate, robust (rather than the more circular mesosomal shapes seen in species such as *C. florissomnis* v.d. Vecht). Mesoscutum with median line present in apical third, parapsidal lines faint; intertegular distance, as measured between inner rims of tegulae, 3.3 mm (2.4–3.8 mm). Metabasitibial plate distinct, with well-defined margins, surface with appressed, fuscous setae; metatibial spurs simple; metabasitarsus nearly twice as long as wide; pretarsal ungue (claws) cleft, cleft not extending to base of ungue, inner ramus shorter than outer ramus. Basal area of propodeum declivitous. Mesosternum with massive, median tubercle occupying its whole length; mesosternal tubercle presenting a well-defined, broad, flattened, impunctate, glossy, ventral surface, which anteriorly narrows to a vanishing point (Fig. 5) [Note: in smaller males the tubercle is less pronounced and more laterally compressed such that its ventral surface forms more of a narrow, glossy, impunctate line, there is a complete intergradation between the smallest of males, with these less protruded tubercle to the massive, wide tubercles seen in the largest of males], in lateral aspect tubercle slightly overhanging posteriorly, rather resembling a camel's hump; laterally rather coarsely, subreticulately punctate (Fig. 5); metasternum posteriorly emarginate. Forewing with basal vein separated from cu-a by 3–5 times vein width; two submarginal cells (*i.e.*, 1rs-m absent), first slightly longer than second; r-rs straight; 2rs-m gently arcuate, gently arching apically in posterior half; hind wing with 10–12 hamuli arranged in a tight, regular series. Seventh metasomal tergum with apical third depressed and relatively flattened, with pronounced lateral extensions (Fig. 8), medioapical margin not emarginate; first metasomal sternum with apical median cleft; apical margin of second and third metasomal sterna straight; apical margins of fourth through sixth metasomal sterna as depicted in figures 6–7; hidden metasomal sterna and genitalia as depicted in figures 9–11.

Face above antennal toruli with well-defined, dense punctures, punctures nearly contiguous, with small impunctate zones immediately anterior to median ocellus, border outer lateral margins of lateral ocelli, punctures more separated in ocellular space but nearly contiguous again above compound eye and on gena; punctures below face more shallow and less well-defined; punctures of supraclypeal area separated by less than a puncture width; clypeus with ill-defined, mediolongitudinal impunctate line from basal margin extending one-third median clypeal length, remainder of clypeal surface with punctures separated by less than a puncture width except apicolateral areas where punctures separated by a puncture width or less and extreme apical margin impunctate; labrum with scattered, coarse, weak punctures separated by less than a puncture width. Mesoscutum dull, very finely and nearly contiguously punctured [punctures so fine that they are largely not discernable in figure 15 (from female but applies to male as well) except when viewed at slight angle such as in the portions of mesoscutum and mesoscutellum that are gently arching away from view in the right side of the image], punctures nearly unnoticeable beneath setae, with exceedingly faint, shallow, larger punctures widely scattered. Mesoscutellum

sculptured as on mesoscutum. Metanotum with punctures similar to those of face, separated by less than a puncture width. Pleura with deep, contiguous punctures, punctures gradually becoming separated by less than a puncture width in ventral third and by 1.75x a puncture width or less ventrally. Basal area of propodeum shining, with fine, small punctures separated by a puncture width or less. Anterior-facing surface of first metasomal tergum impunctate; first (dorsal-facing surface) through third metasomal terga with small, fine punctures separated by less than a puncture width, integument between punctures smooth and shining, except medioapical margins impunctate and shining, largest on first metasomal tergum (occupying about distal third to quarter of tergal surface), impunctate area distinctly narrower and shorter on succeeding terga (occupying just marginal area); punctures of tergal discs slightly shallower and more separated on fourth through sixth metasomal terga; disc and lateral protuberances of seventh metasomal tergum irregular, separated by 1–3 times a puncture width in most areas, becoming sparser just before apical margin and on protuberances (Fig. 8); metasomal sterna faintly imbricate except laterally around setal patches with shallow punctures separated by a puncture width or less.

Integument black except antenna dark brown, labiomaxillary complex amber, and distal tarsomeres dark reddish brown; metasomal terga with strong metallic blue coloration and highlight (Figs. 1–2). Wing veins dark brown to black, membrane very slightly infuscated, with faint opalescence.

Setae darkly fuscous except on labrum scattered setae amber; dense, elongate, amber setae on basal two-thirds of ventral margin of mandible; setae of face and gena white, intermixed with appressed, short, plumose setae around antennal toruli and on gena; and white on pronotum. Setae of mesosoma generally scattered except dense and shaggy, obscuring integumental surface on lateral surfaces of propodeum. Setae of legs dense and relatively stout, with distinctly, elongate, dense combs of setae arising from outer margins of basitarsi. Metasomal tergal setae black; sparse on anterior-facing surface and dorsal-facing disc of first metasomal tergum, laterally with more dense areas of setae; setae similarly distributed on second metasomal tergum, although slightly more numerous on disc; setae of discs progressively denser and elongate on third through sixth metasomal terga; seventh metasomal tergum scattered and shorter than those of sixth metasomal tergum; setae of sterna fuscous and as depicted in figures 6–7.

♀ As described for male except in typical sex differences and as follows: Total body length 8.5–10.6 mm; forewing length 5.9–7.6 mm. Head wider than long, length 2.4–2.8 mm, width 3.1–3.7 mm. Labral tubercles more well defined and pronounced (Fig. 14). Clypeus with impunctate, mediolongitudinal line absent or scarcely evident. Intertegular distance 2.3–3.4 mm. Mesosternal tubercle absent. Scopa formed of dense, elongate, black setae on outer surface of metatibia and metabasitarsus (Fig. 16); inner metatibial spur elongate, densely ciliate (Fig. 17); metabasitarsus about as long as wide, with outer margin bearing stout, asetose, apical spine (Fig. 17). Dorsal-facing surface of first metasomal tergum with apical impunctate region occupying distal half of dorsal segment length, impunctate areas progressively shorter on second metasomal tergum and succeeding terga; second metasomal sternum with a few, scattered, elongate, wavy setae; third through fifth metasomal sterna with oblique, lateral rows of

dense, reddish brown, elongate, wavy, waxy setae (Fig. 18); sixth metasomal sternum with scattered, long setae on either side of asetose midline.

Derivatio nominis: The specific epithet is a patronymic honoring Mr. George R. Else, collector of the type series as well as many other fascinating bees from the Old World.

Comments: The new species is, like several metallic blue, Southeast Asian species, superficially similar to *C. chalybea*, a species largely confined to the mainland. The female holotype of *C. chalybea* (in the Oxford University Museum) comes from Mt. Ophir (Malacca, Malaysia) and is in poor condition, with crudely repaired breakage from some time in the past. The clypeus is strongly and irregularly punctate, with the punctures separated by about a puncture diameter medially. Basally the clypeus bears a small, raised, narrowly triangular, glossy area offset from the remainder of the otherwise dull and punctured surface. The supraclypeal area is densely, coarsely, and sub-reticulately punctate. The disc of the mesoscutum is dull and densely, uniformly, and minutely punctate, with scattered slightly larger punctures. The mesoscutellum is sculptured similarly but rather more coarsely punctate and weakly glossy, the larger punctures more evident. Regardless, the sculpturing between the two surfaces (mesoscutum versus mesoscutellum) is noticeably different. The marginal area of the first metasomal tergum is ill-defined except laterally, the area is impunctate and occupying medially about one-half of the dorsal length of the segment. The length of the specimen is about 12 mm. Females of *C. elsei* can most readily be differentiated from females of *C. chalybea* by the near absence of the distinct, triangular glossy zone basally on the clypeus, the less coarsely punctured clypeus, and the uniformly sculptured mesoscutal and mesoscutellar surfaces, and in males by the same features as well as the distinctly more pronounced protuberances on the seventh metasomal tergum and the structure of the genitalic sclerites.

Biology: Mr. Else wrote that he collected the *Ctenoplectra* on an almost daily basis throughout the period he was in Sulawesi [April-June 1985]. The bees were found solely at a white-flowered cucurbit [*Momordica cochinchinensis* (Lour.) Spreng.], where they roosted deep within the flowers, and chiefly at a single straggling plant on the forest edge. The flowers lasted only a day, but fresh flowers were produced every day throughout the period of observation: on some days there might be only one or two flowers, on others about twenty. Mr. Else did not discover any evidence of nesting, and, so far as he later recalled [June 2002], saw no bees on the wing.

Both sexes of *Ctenoplectra* use members of the Cucurbitaceae as a source of nectar while the females are apparently entirely dependent on them as a source of pollen and floral oils. Oil appears mixed with pollen in the pollen masses borne on the scopae of female *Ctenoplectra* and must form part of cell provisions; nectar may also be present but this has not been confirmed by examination of cell contents. Whether use of the oil is confined to nest provisioning or whether it serves also some other purpose, such as in nest construction, appears not to have been satisfactorily established. Published records of flower visiting by Southeast Asian *Ctenoplectra*

species are few. In South Sumatra, van der Vecht (1941) found *C. thladianthae* Vecht and *C. florissomnis* Vecht visiting, and resting overnight in, the flowers of *Thladiantha* cf. *cordifolia* Cogn. (*vide etiam* Lieftinck, 1941). In Sabah, Vogel (1990) observed the species he treated as *C. chalybea* Smith visiting the flowers of *Momordica cochinchinensis* (Lour.) Spreng., the same species upon which *C. elsei* was found by Mr. Else (*vide supra*). Wu (2000) recorded *C. cornuta* Gribodo as visiting *Thladiantha pustulata* (Lévl.) C. Jeffrey ex A.M. Lu & Zhi Y. Zhang [misprinted as “*pusulata*”], *Th. cordifolia* Cogn., and *Th. hookeri* C.B. Clarke.

The nesting biology of *Ctenoplectra* has been similarly understudied, with only a few, largely anecdotal, accounts available. Bingham (1897) recorded: “I found *C. chalybea*, Smith, collecting clay at muddy pools in the road, and once or twice saw it conveying pieces of circularly cut leaves to a hole in the wooden walls of a house in the Tenasserim forests”. There is no reason to believe that Bingham’s *specimens* (he collected *C. chalybea* also in the Pegu Hills, Burma [today Myanmar]) were wrongly identified, but the “...saw it conveying pieces of circularly cut leaves” suggests observation of a *Megachile*: the mandible in *Ctenoplectra* is not that of a leaf-cutter! Friese (1909), recording *Ctenoplectra* collected in New Guinea (all under the name *C. chalybea*), reproduced a communication received from Biró which included the information that the bee collected by him excavated holes in soft wood and that its supposed parasite (“*vermütlichen Schmarotzer*”) was *Coelioxys albiceps* Friese [It is not clear whether these observations related solely to the material obtained by the collector at “Simbang am Huon Gulf, N.G.” or also to the material obtained at “Erima und Stephansort (Astrolabe Bai)”]. The supposition that the *Ctenoplectra* was the host of the *Coelioxys* is unlikely: *Coelioxys albiceps* [a synonym of *Coelioxys (Torridapis) weinlandi* (Schulz)] is a known parasite of megachiline bees, particularly species of *Chalicodoma* s. lato, and it seems probable that some megachiline was nesting in the same substrate as the *Ctenoplectra* (cf. the peculiar observations of Williams, 1928, *infra*). Williams (1928) gave a superficial description of nest construction by *C. vagans*, observed nesting in the deserted galleries of *Castalia obsoleta* Chevrolat (Coleoptera: Buprestidae) in a corner post (*arigue*) of a *nipa* house in Luzon [Note: the folded leaves of the nipa palm (*Nipa fruticans* Thunb., Palmaceae) were used as shingles in roof-covering for older Filipino houses. The *arigue*, or house-post, in which the *Ctenoplectra* was observed nesting apparently came from *tamayuan* (*Strombosia philippinensis* Vidal, Olacaceae), a valuable forest tree in the Philippines.]. While most of Williams’ observations certainly apply to *Ctenoplectra*, there are inaccuracies in his account and some of his statements are open to considerable doubt. Williams referred to the *Ctenoplectra* as “a thickset bee about 20 millimetres long” and asserted both that the species he referred to as *Parevaspis abdominalis* Smith [presumably he meant *Euaspis polynesia* Vachal since *Euaspis abdominalis* (Fabricius) is an Ethiopian species] was its “undoubted parasite” and that the two bees were “much alike in size and general shape”. It may be remarked that a length of 20 mm would be excessive for any regional *Ctenoplectra* or *Euaspis* species; that *Euaspis*, an anthidiine, is a known parasite of other megachilid bees, such as *Megachile* (especially *Callomegachile*) species (one must wonder

whether some megachiline bee was not also present in the timber from which Williams obtained his *Ctenoplectra*: the hosts of cleptoparasitic bees are, with few exceptions, members of the same tribe, subfamily, or family); and that *Ctenoplectra* and *Euaspis* are very much unlike in their general morphology. Williams (op. cit.) further stated that he suspected the orange pollen collected by *Ctenoplectra* to be that of *Hibiscus*, which also calls for substantiation in view of the known, apparently exclusive, association of the Ctenoplectrini with Cucurbitaceae. Cockerell (1930) recorded data-label information that in the Congo (at Burunga and Lesse) *C. fuscipes* Friese was found nesting in wooden poles, and the same author later (Cockerell, 1933) recorded data-label information that in Uganda (at Sipi) *C. fuscipes* var. *rufescens* Cockerell nested in “holes bored in timber”. Arnold (1947) reported that *C. armata* Magretti [probably observed in southern Rhodesia, today Zimbabwe] nested in holes in old timber made by bostrychid beetles. Lastly, Rozen (1978) found in Namibia a nest of *C. armata* Magretti built into an old mud-and-resin nest presumed to be that of a *Chalicodoma* species (Megachilidae).

The consensus of the above observations must be that *Ctenoplectra* uses or adapts (e.g., observations of Williams) existing cavities. The structure of the female mandible does not suggest any capacity for excavating nests in any hard medium and females of *Ctenoplectra* are oligolectic on Cucurbitaceae.

Acknowledgements

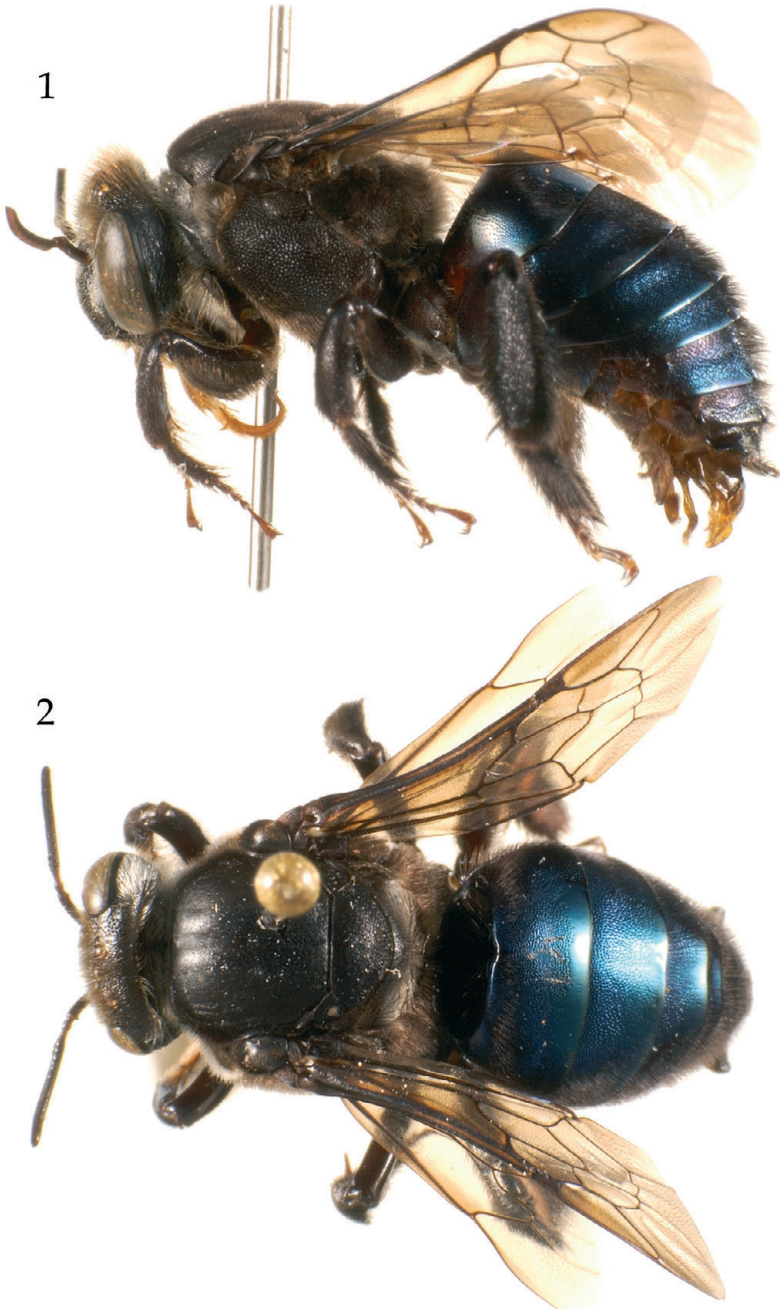
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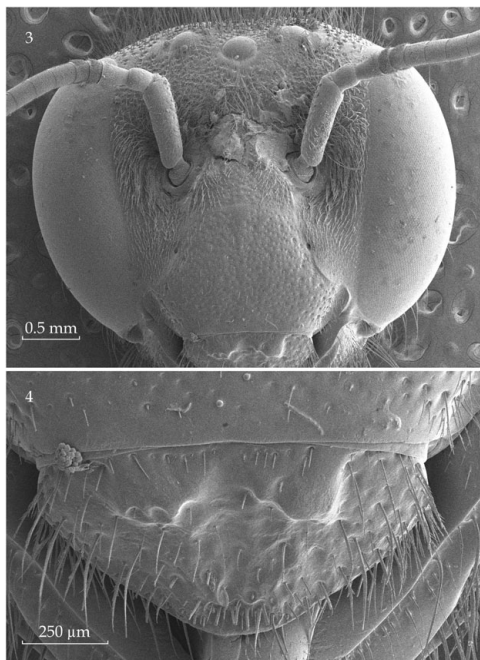
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Figs. 1–2: Photomicrographs of paratype male of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 1) Lateral habitus; 2) Dorsal habitus.



Figs. 3–4: Scanning electron micrographs of male of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 3) Facial aspect; 4) Detail of labrum.

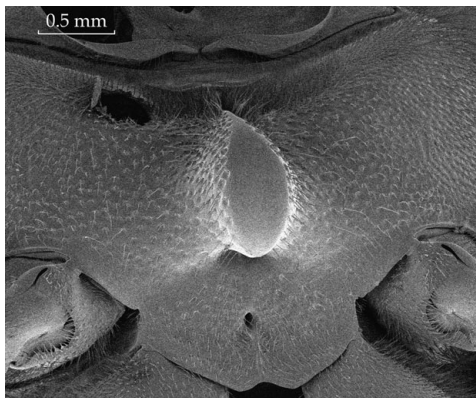
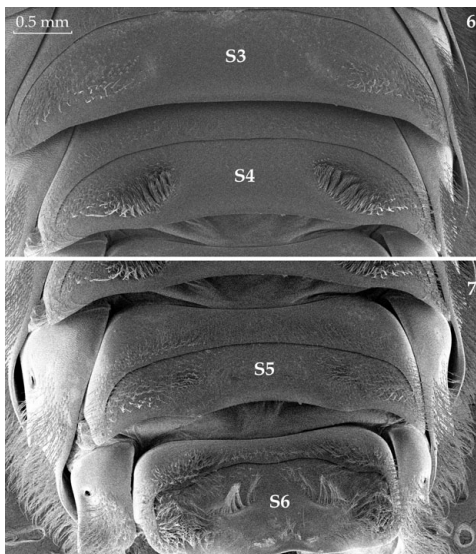
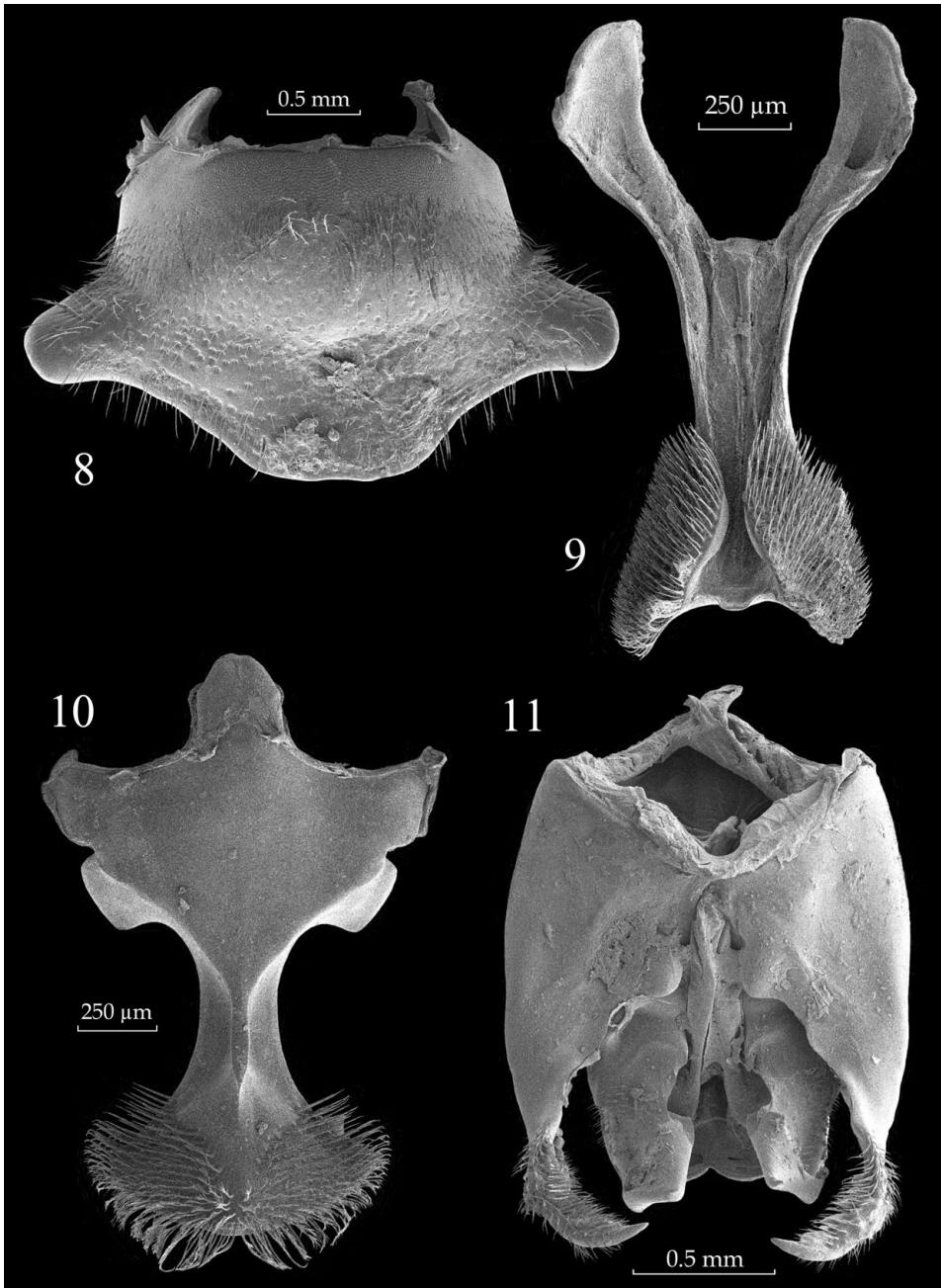


Fig. 5: Scanning electron micrograph of male ventral mesosomal protuberance between and anterior to mesocoxae of *Ctenoplectra elsei* Engel sp. n. from Sulawesi.



Figs. 6–7: Scanning electron micrographs of male metasomal sterna of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 6) Third and fourth metasomal sterna; 7) Fifth and sixth metasomal sterna. Scale bar identical for both images.



Figs. 8–11: Scanning electron micrographs of male terminalic sclerites of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 8) Seventh metasomal tergum; 9) Seventh hidden sternum; 10) Eighth hidden sternum; 11) Genital capsule, ventral aspect.



Figs. 12–13: Photomicrographs of paratype female of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 12) Lateral habitus; 13) Dorsal habitus.

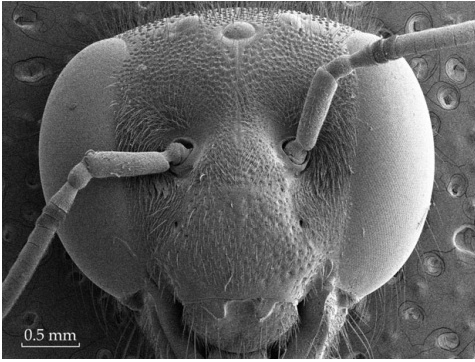


Fig. 14: Scanning electron micrograph of female face of *Ctenoplectra elsei* Engel sp. n. from Sulawesi.

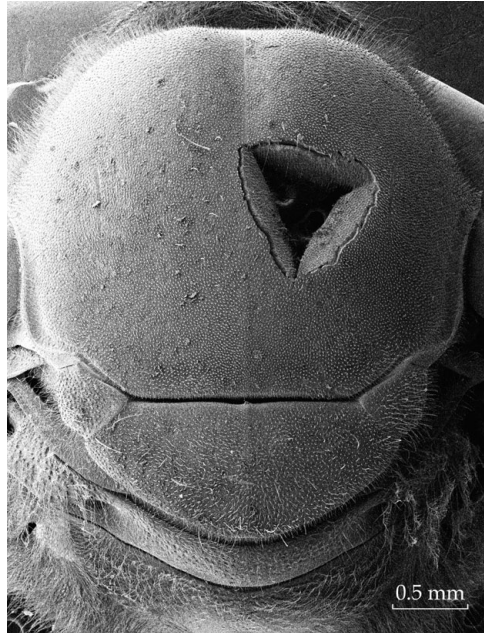


Fig. 15: Scanning electron micrograph of female mesosomal dorsum of *Ctenoplectra elsei* Engel sp. n. from Sulawesi.

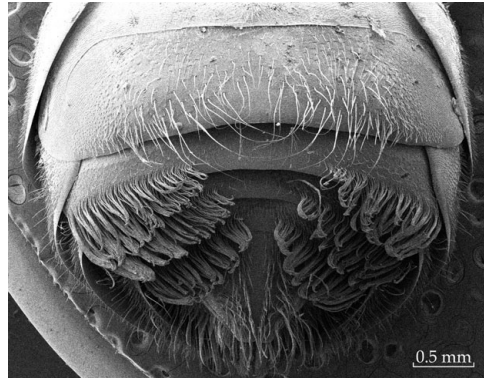
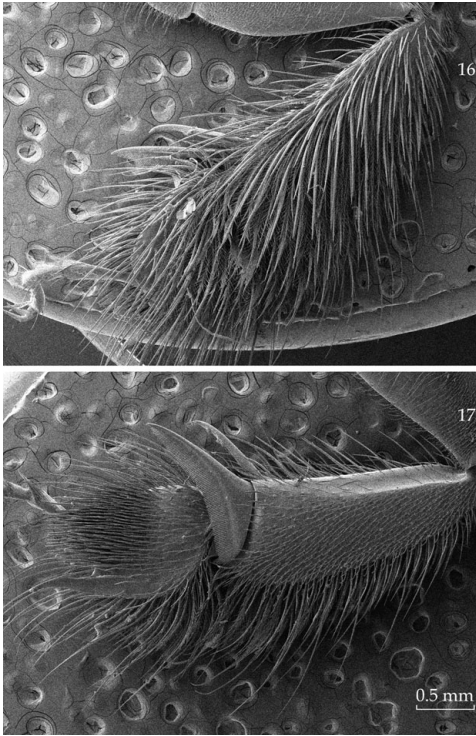


Fig. 18: Scanning electron micrograph of female metasomal venter of *Ctenoplectra elsei* Engel sp. n. from Sulawesi.

Figs. 16–17: Scanning electron micrographs of female metatibia and metabasitarsus of *Ctenoplectra elsei* Engel sp. n. from Sulawesi; 16) Outer surface of leg; 17) Inner surface of leg (note densely pectinate inner metatibial spur, typical of *Ctenoplectra*, and the metabasitarsal apical process). Scale bar identical for both images.

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