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Description of *Cypturus zappii* n. sp. from Sri Lanka (Coleoptera: Histeridae)

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Abstract – A new species of the Indo-Malayan genus *Cypturus* Erichson 1834 is described and compared with the other five congeneric species currently known. Male genitalia and a peculiar sexual dimorphism of female pygidium are illustrated in detail. Holotype ♂ and allotype ♀ are housed in the collection of the Civic Museum of Natural History of Milan (Italy). It is the third species reported for Sri Lanka after *Cypturus aenescens* Erichson 1834 and *Cypturus thugi* Lewis 1894.

Key words: Exosternini, Histerinae, Indo-Malayan Region, new species, sexual dimorphism.

Riassunto – Descrizione di *Cypturus zappii* n. sp. dello Sri Lanka (Coleoptera: Histeridae).

Viene descritta una nuova specie del genere *Cypturus* Erichson 1834, che va ad aggiungersi alle cinque fino ad oggi note e segnalate di India, Sri Lanka e Laos. La descrizione è corredata da fotografie e completata da una diagnosi differenziale che consente di distinguere la nuova specie dalle congeneri. Sono inoltre illustrati in dettaglio l'apparato genitale maschile ed un peculiare dimorfismo sessuale che caratterizza il pigidio delle femmine. Holotypus ♂ e allotypus ♀ sono depositati nella collezione del Museo civico di Storia naturale di Milano. Si tratta della terza specie segnalata per lo Sri Lanka dopo *Cypturus aenescens* Erichson 1834 e *Cypturus thugi* Lewis 1894.

Parole chiave: dimorfismo sessuale, Exosternini, Histerinae, nuova specie, Regione Indo-Malese.

INTRODUCTION

The Indo-Malayan histerid genus *Cypturus* Erichson 1834 belongs to the tribe Exosternini Bickhardt 1914 of the subfamily Histerinae Gyllenhal 1808 and currently contains five species, of which two are presently known (Mazur, 2011: 40) only from India (*C. assamensis* Lewis 1894 and *C. bengalensis* Lewis 1901), two from India and Sri Lanka (*C. aenescens* Erichson 1834 and *C. thugi* Lewis 1894), and one is endemic to Laos (*C. perroti* Cooman 1941). The examination of a series of eight specimens collected in Sri Lanka few years ago (2017) by the Italian cleridologist Iuri Zappi, and sent in study to one of us (P.V.), revealed their belonging to an unknown species, which is described in the present paper.

MATERIALS AND METHODS

Some dry-mounted specimens were relaxed in isotonic solution of white vinegar and common salt for several hours or overnight. Then, they were remounted on new cards and observed under stereoscopic microscopes with diffused light. Male genitalia were prepared for examination using the method described by Kanaar (1990). Both specimens and genitalia were glued on cards using entomological water-soluble glues (respectively Entofix™ and Bioplak™). Digital photos have been taken with the stacking technique using a Canon powershot S50 camera mounted on a Leica MS5 microscope, and subsequently merged with Helicon phocus 8pro program. SEM (Scanning Electron Microscope) photos have been taken with backscattered signals using a JEOL JSM5600LV. For head, prosternum, mesosternum, foretibia and female pygidium both digital and SEM photos are shown to allow a comparison between what can be seen under a binocular microscope and the finest details visible only at SEM. Terminology follows that of Kanaar (1997). Separate labels are demarcated by a double slash (//), while separate lines of the same label by a single slash (/). The following acronyms of museums and private collections are used throughout the text:

FPMI	private collection of Fabio Penati, Morbegno (SO), Italy
IZCI	private collection of Iuri Zappi, Casalecchio di Reno (BO), Italy
MSNM	Museo Civico di Storia Naturale, Milano, Italy (Fabrizio Rigato)
NHM	Natural History Museum, London, United Kingdom (Max Barclay)
PVVI	private collection of Pierpaolo Vienna, Venice, Italy
ZSM-YG	Zoologische Staatssammlung München - coll. Y. Gomy, Munich, Germany (Michael Balke)

Cypturus zappii Vienna & Penati n. sp.

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Figs. 1–8

Holotype ♂: SRI LANKA, North W / prov., Puttalam dist., / Eluwankulama env., 9 m / 8°16'06"N 79°52'06"E / 14.VII.2017 leg. I. Zappi // ♂ // *Cypturus* / *aenescens* Erichson / P. Vienna det., 2019 // HOLOTYPUS / *Cypturus zappii* n. sp. / Vienna & Penati des. (MSNM).

Allotype ♀: same data as holotype (MSNM).

Paratypes: 2 ♂♂ & 1 ♀, same data as holotype (IZCI); 1 ♂ & 1 ♀, same data as holotype (PVVI); 1 ♀, same data as holotype (FPMI); 1 ♀, Polonnaruwa / 25.iii.1973 / sous pierre // M. Tronquet // CEYLAN // Collection / Y. GOMY (ZMS-YG); 1 ♂, Horowapothana [= Horowupotana] / Ceylon G. Horn // G. Lewis Coll. / B.M. 1926-369. // *Cypturus* / *aenescens* / Er. (NHM); 1 ♀, Colombo, / Ceylon. / V.'89. / H.P. Green. / 1916–157 // *Cypturus* / *aenescens* Er. / H. Desbordes det. 1923 (NHM).

Description. Body elongate oval, slightly convex. Black, moderately shiny, entirely clothed with shallow but dense punctation (Fig. 1). PEL (length between anterior angles of pronotum and apices of elytra): ♂♂ 3.8–4.1 mm, ♀♀ 4.1–4.7 mm; EW (maximal width between outer margins of elytra): ♂♂ 3.2–3.5 mm, ♀♀ 3.2–3.4 mm.

Head (Figs. 3a,b). Frontal stria complete, well impressed, in middle faint and slightly arcuate backwards, laterally joint to supraorbital striae basally hamate, occipital stria absent. Front punctulate, with punctures small and dense above eyes and in occipital area, larger and deeper, sometimes confluent, on the disk, where

they form an approximately Y-shaped impression. Antennal scape slightly arcuate, as long as the other antennal segments taken together. Antennal club rusty-brown.

Pronotum. Marginal stria complete, not interrupted behind the head, lateral striae absent. Punctuation double: at the anterolateral angles and along sides the punctures are deep, coarse, disorderly arranged in bands somewhat distant from marginal stria, and separated by 1–3 their own diameter (intermingled with very fine punctures), becoming smaller and denser anteriorly and posteriorly; on the disk the punctures are fine and separated by about 1–2 their own diameter. Basal margin, from posterolateral angles to the correspondence with the 3rd dorsal striae and in front of the scutellum, marked with a few scattered large punctures.

Elytra. Disk entirely and evenly clothed with small punctures of variable size. External subhumeral stria less impressed than dorsal striae 1st–3rd, present only on medial 3/4. Oblique humeral stria lightly impressed on basal 1/3. Internal subhumeral stria absent. First dorsal stria deeply impressed on basal 1/2 or more, then fine and irregular up to apical 3/4 (in some specimens oblique innerwards). Second and 3rd dorsal striae deeply impressed and slightly crenulated (due to the presence of punctures along the internal side), slightly shortened apically. First to 3rd dorsal striae not reaching the basal margin of elytra, which is marked by short striolae. Fourth dorsal stria variable, shallowly impressed, fragmented, abbreviated basally and apically (so to be present between 1/2 and 2/3 of elytral length) or completely absent. Fifth dorsal stria absent. At elytral base, in correspondence with the 4th and 5th dorsal striae, there can be two deep punctures. Sutural stria present on about apical 2/3, fragmented and faint basally, reaching the apical margin (sometimes joint to a rudiment of the apical stria). Marginal stria present on basal 1/2 or 2/3. Only one epipleural stria, present in the humeral region.

Propygidium. Entirely and densely clothed with punctures, larger at the base and at the sides, separated by 0.5–1 their own diameter, intermingled with small punctures. In some specimens the punctures are so close and deep to resemble striolae.

Pygidium. Large, not visible from above, characterized by an evident sexual dimorphism: ♂, pygidium covered with punctures smaller and fainter than those of propygidium, slightly deeper along sides on basal 1/2; ♀, pygidium with two deep and large longitudinal impressions, separated by a very narrow smooth keel, each joint to a rotundate impression present near the base halfway between the angle and the middle, both roughly tuberculate and opaque inside; apical margin of the pygidium contoured by a deep sulcus, shortly emarginated in the middle to receive a small rectangular projection present on the apical margin of the last visible sternite (Figs. 4a,b).

Prosternum (Figs. 5a,b). Prosternal lobe with complete marginal stria and disk coarsely punctate (punctures separated by 0.5–1 their own diameter). Prosternal keel with complete carinal striae, shortly divergent basally, then parallel and somewhat distant from each other, not united apically, or slightly convergent and united at the apex; surface between carinal striae clothed with punctures smaller, shallower and denser than those of prosternal lobe, separated by about 1–2 their own diameter; base deeply incised to receive the mesosternal projection.

Mesosternum (Figs. 5a,b). Anterior margin with triangular projection in the middle; marginal stria complete in front, laterally interrupted halfway down the mesocoxae; disk with the same punctuation of prosternal keel or smaller and sparser; meso-metasternal suture almost straight.

Metasternum. Disk with punctuation smaller and sparser than mesosternum, marked with a median longitudinal stria; inner lateral stria oblique, almost straight, connected to its recurrent arm near the metacoxae (sometimes almost imperceptibly interrupted); postmesocoxal striae faint, irregular and slightly bent.

First visible abdominal sternite. Disk with even thinner and sparser punctuation, visible almost only laterally; lateral striae complete, more impressed on basal 1/2.

Legs. Forelegs with femurs punctulate on the lower surface and somewhat narrow tibiae (Figs. 6–7) with 6–7 large teeth on outer margin, topped by stout denticles, and 2–3 smaller denticles on apical margin, decreasing in size inward; tarsal claws unequal, the inner being strongly stouter than the outer. Median and posterior femora with very small and sparse punctures on the lower surface; median and posterior tibiae with two complete striae on the lower surface and a double row of long denticles on outer margin.

Male genitalia as shown in Figs. 8a,b,c,d,e.

Differential diagnosis. *Cyrturus zappii* can be easily distinguished from *C. perroti* and *C. thugi* for the body longer and entirely punctulate and the external subhumeral stria present only on medial 3/4, while in the other two species the body is shorter and smooth, and the external subhumeral stria is complete. Moreover, it differs from *C. assamensis* in elytral punctuation, for the latter described as “fine” and “sometimes scarcely perceptible”

(Lewis, 1894: 177), and in dorsal elytral striation, i.e. *assamensis* has 1st–4th striae complete (“fourth one occasionally shortened”) and 5th present on apical 1/2.

It seems more difficult to separate *C. zappii* from the remaining two species (*aenescens* and *bengalensis*), also them characterized by dense dorsal punctation and reduced 4th–5th dorsal striae (Erichson, 1834; Lewis, 1901), as proved by a first attribution to *C. aenescens* of the specimens collected by I. Zappi and by the old identifications of the two specimens housed at NHM. Nevertheless, a more careful study of the type series made it possible to ascertain that *C. zappii* can be distinguished for the body shinier (due to the less coarse and dense elytral punctation, never rugose) and above all for the 1st dorsal elytral stria always shortened (marked only on basal 1/2 or little more) and the 5th absent, while in the other two species the 1st stria is always complete and the 5th is present although sometimes evanescent.

Male genitalia of *assamensis*, *bengalensis* and *thugi* are undescribed, so no comparison with the aedeagus of *zappii* is possible. On the other hand, the drawing of the aedeagus of *aenescens* given by Hongzhang et al. (2022: 126) shows an apex with acute preapical teeth like in the genus *Epitoxus* Lewis, 1900, while that of *perroti* given by Cooman (1941: 332) shows an apex bent at 90° forming almost a hook, then both completely different from the aedeagus of our new species (Figs. 8d,e).

Unfortunately, at the current state of the knowledge, also the sexual dimorphism of female pygidium has no differential value. In fact, although it has been firstly noted by Marseul (1853: 294) in specimens by himself identified as *C. aenescens* Erichson (note that he did not examine the types and this character is not reported in the original diagnosis) and subsequently also by Lewis for *assamensis* (Lewis, 1894: 177), then for *bengalensis* and *aenescens* (Lewis, 1901: 242), this dimorphism has not been throughout studied and the given descriptions are too poor to be of any help. Only a revision of the type series and the examination of more material will allow to establish whether there are differences among species and any intraspecific variability.

Ecology. The specimens from the environment of Eluwankulama have been collected in and under a semi-dry bovine dung on the side of a road (Iuri Zappi, pers. comm.).

Distribution. Presently known only from Sri Lanka (Fig. 9). This is the third species reported for the island after *Cyrturus aenescens* and *C. thugi* (Mazur, 2011: 40).

Etimology. This species is dedicated to the collector and friend, Iuri Zappi.

Acknowledgements

We wish to sincerely thank Iuri Zappi, for letting us study the specimens collected by him in Sri Lanka, Michele Zilioli (MSNM), for having taken and processed all the photographs that greatly enhanced our study, Max Barclay and Michael Balke for the loan of the specimens housed respectively in the collections of the Natural History Museum London and the Zoologische Staatssammlung München, and the two anonymous referees for their precious suggestions.

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Fig. 1 – Dorsal view, holotype ♂ / Visione dorsale, olotipo ♂ (Photos: M. Zilioli).



Fig. 2 – Ventral view, allotype ♀ / Visione ventrale, allotipo ♀ (Photos: M. Zilioli).

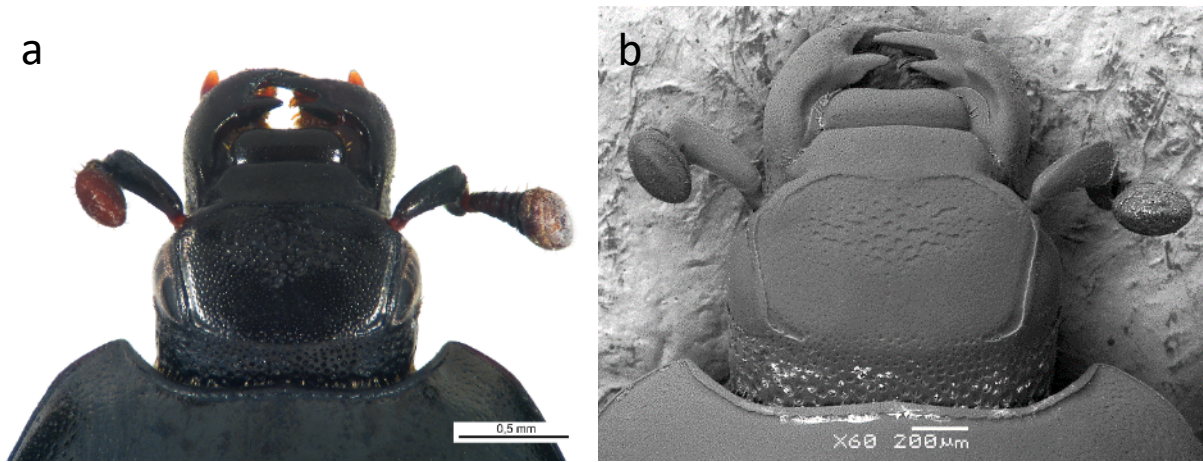


Fig. 3 – Head, holotype ♂. a) Digital photo. b) SEM photo / Capo, olotipo ♂. a) Foto digitale. b) Foto al SEM (Photos: M. Zilioli).

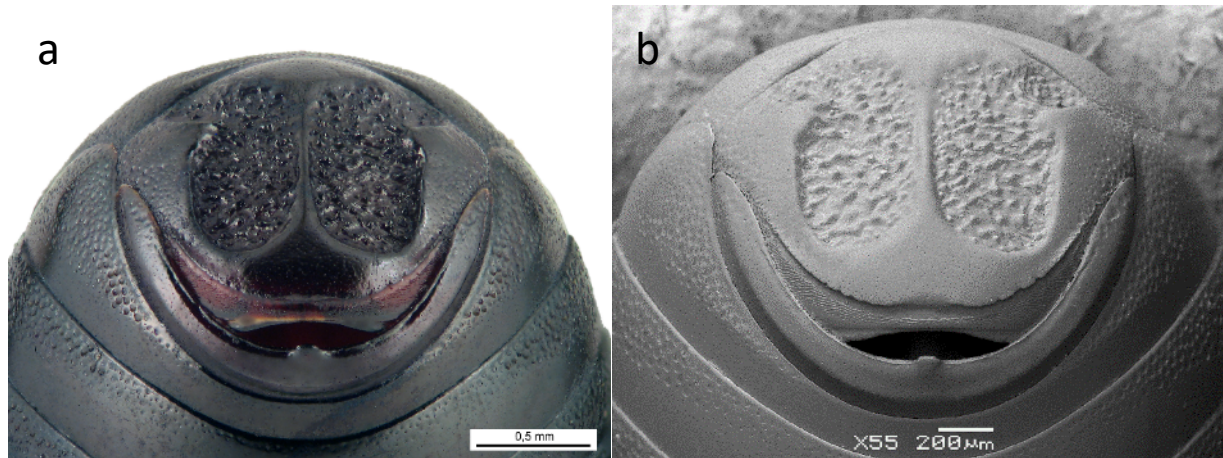


Fig. 4 – Pygidium, allotype ♀. a) Digital photo. b) SEM photo / Pigidio, allotipo ♀. a) Foto digitale. b) Foto al SEM (Photos: M. Zilioli).

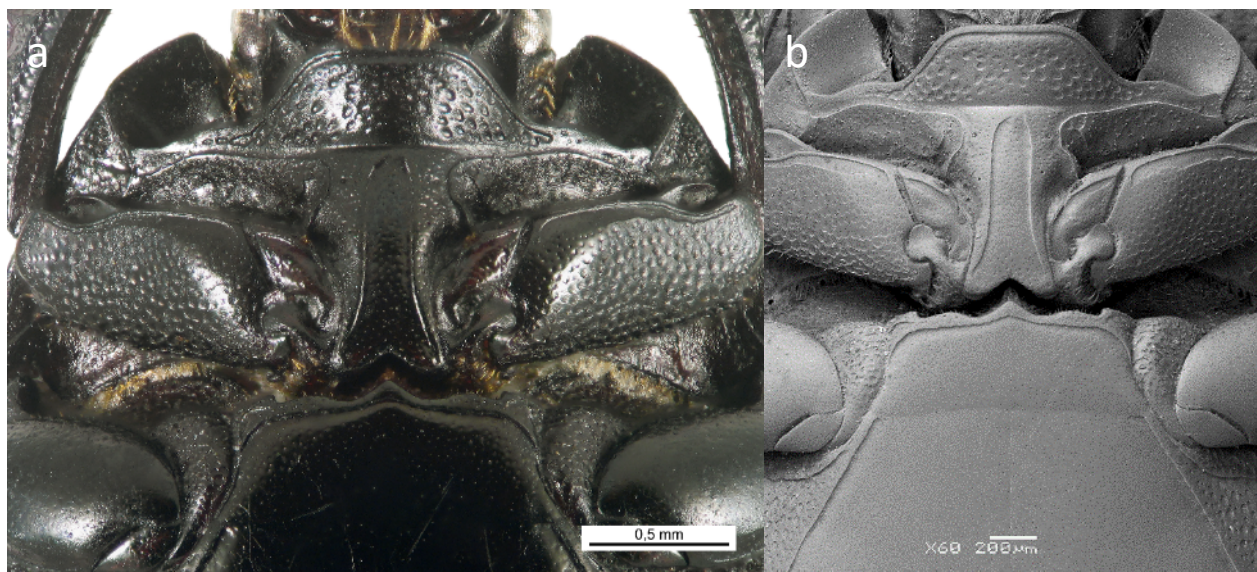


Fig. 5 – Prosternum and mesosternum, allotype ♀. a) Digital photo. b) SEM photo / Prosterno e mesosterno, allotipo ♀. a) Foto digitale. b) Foto al SEM (Photos: M. Zilioli).

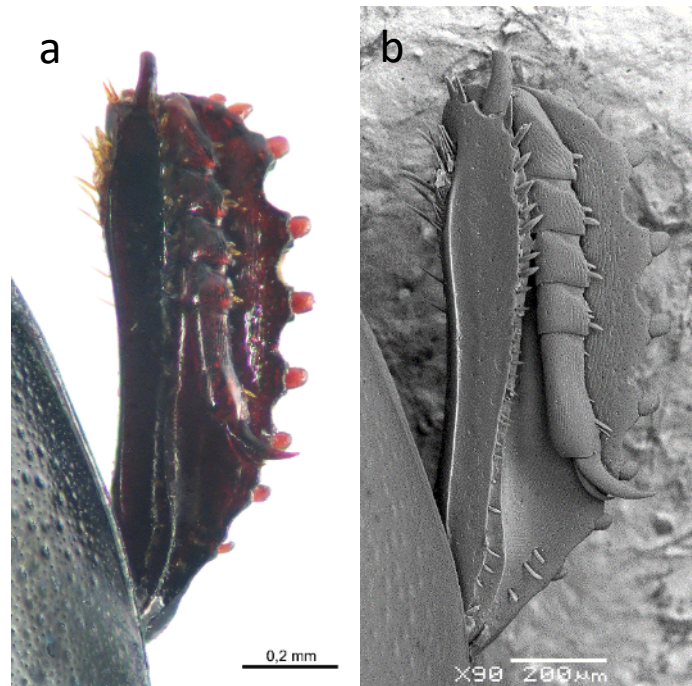


Fig. 6 – Foretibia (right, dorsal view), holotype ♂. a) Digital photo. b) SEM photo / Tibia anteriore (destra, visione dorsale), olotipo ♂. a) Foto digitale. b) Foto al SEM (Photos credits / Fotografie: M. Zilioli).

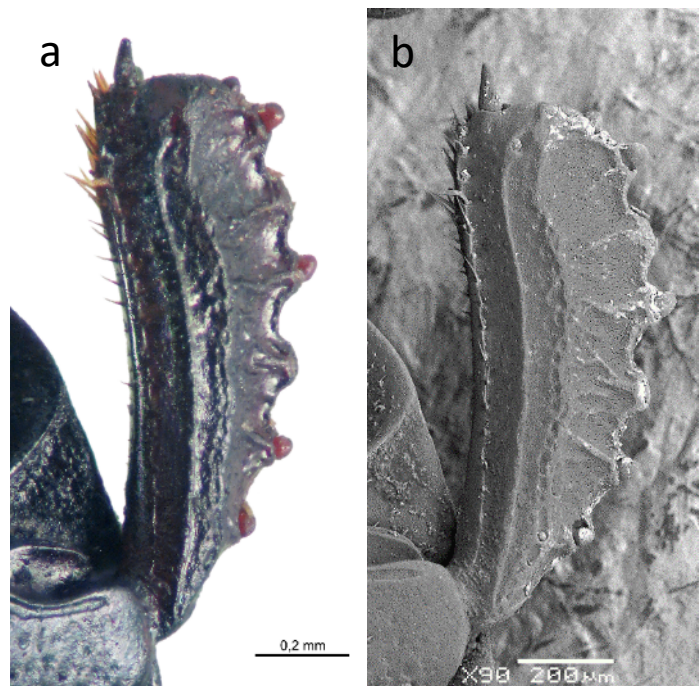


Fig. 7 – Foretibia (left, ventral view), allotype ♀. a) Digital photo. b) SEM photo / Tibia anteriore (sinistra, visione ventrale), allotipo ♀. a) Foto digitale. b) Foto al SEM (Photos credits / Fotografie: M. Zilioli).

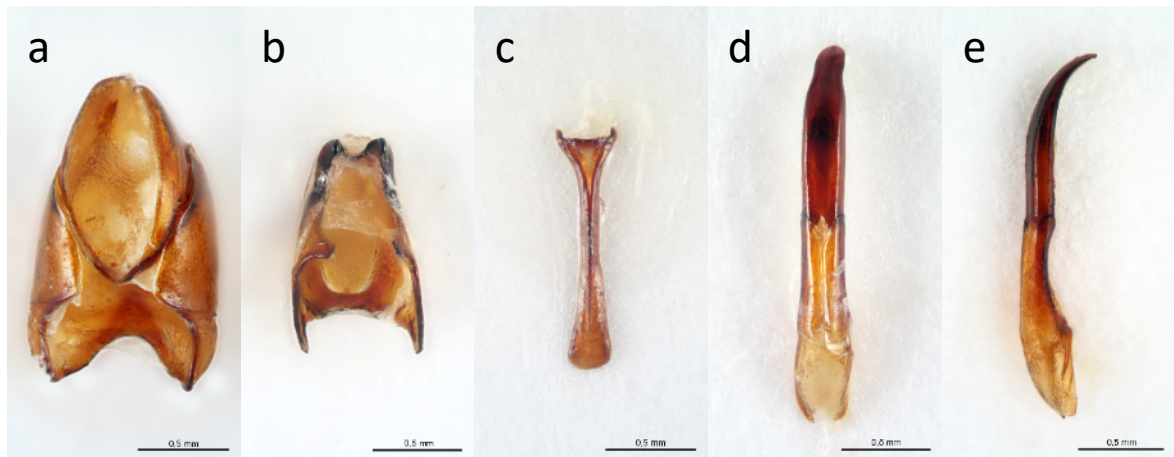


Fig. 8 – Male genitalia, holotype ♂. a) 8th sternite and 8th tergite, ventral view. b) 9th and 10th tergites, ventral view. c) spiculum gastrale (9th sternite), ventral view. d) aedeagus, dorsal view. e) idem, lateral view / Genitali maschili, olotipo ♂. a) Ottavo sternite e ottavo tergite, visione ventrale. b) Nono e decimo tergite, visione ventrale. c) spiculum gastrale (nono sternite), visione ventrale. d) edeago, visione dorsale. e) idem, visione laterale (Photos credits / Fotografie: M. Zilioli).

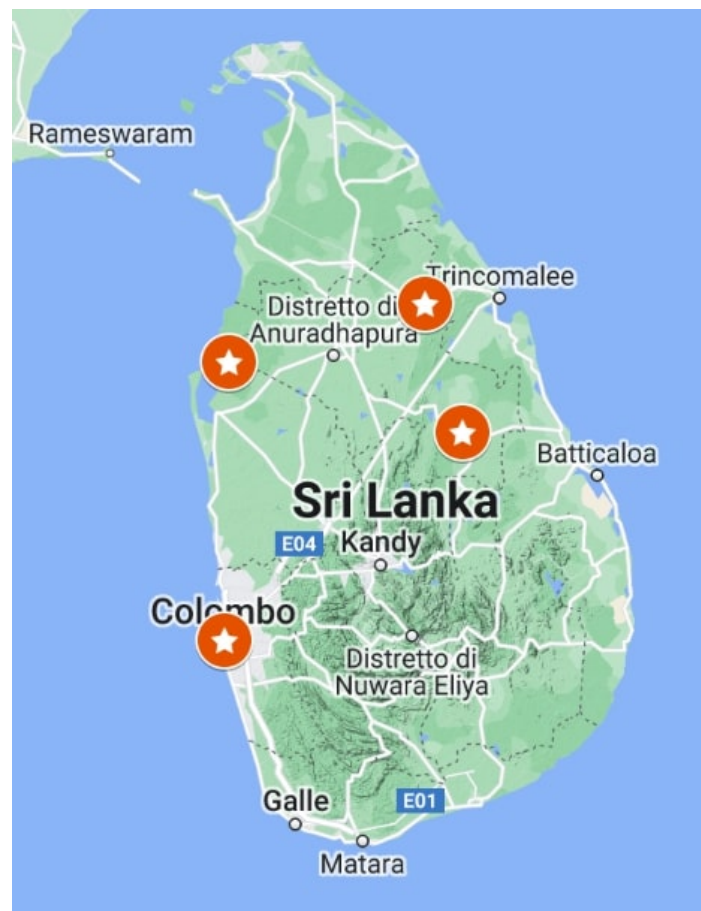


Fig. 9 – Distributional map (collecting localities marked by ⚡). / Carta della distribuzione (località di raccolta contrassegnate da ⚡).