

A remarkable new flightless *Madrasostes* Paulian, 1975 from Vietnam (Coleoptera Scarabaeoidea Hybosoridae Ceratocanthinae)

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ABSTRACT

Madrasostes bartolozzii n. sp. is described from Vietnam (Ba Be National Park) on the basis of two females. Some remarks on this unusual flightless species are provided. Distinguishing characters between *Madrasostes* Paulian, 1975 and *Besuchestostes* Paulian, 1972 are briefly discussed.

KEY WORDS

Ba Be National Park; Ceratocanthinae; Flightlessness; *Madrasostes*; new species.

Received 10.06.2013; accepted 26.06.2013; printed 30.06.2013

INTRODUCTION

The last (and only) synopsis of Vietnamese Ceratocanthinae (Coleoptera Scarabaeoidea Hybosoridae) was the volume by Renaud Paulian (1945) on the Coleoptera Scarabaeoidea of French Indochina, which listed four species: *Madrasostes tonkinense* (Paulian, 1945), *Pterorthochaetes incertus* Gestro, 1899, *Pterorthochaetes coomani* Paulian, 1945 and *Pterorthochaetes armatus* Paulian, 1945. No additions have been recorded since then (Paulian, 1978; Ocampo & Ballerio, 2006). Paulian's work was based exclusively on material from Hoa Binh region (Northern Vietnam), and the country still awaits a proper exploration in order to inventory its Ceratocanthine fauna, which will probably score a final number several times larger than the four species listed above (for instance the study of the *P. incertus* from Hoa Binh kept in the Museum National d'Histoire Naturelle collection in Paris, in the course of an ongoing revision of the genus *Pterorthochaetes* Gestro, 1899, revealed that *P. incertus* does not occur in Vietnam and that the alleged *P. incertus* specimens actually represent three un-

described species). It is not surprising therefore that an expedition organized in 2011 by the team of the Museo Zoologico La Specola of Florence discovered a new species of the genus *Madrasostes* Paulian, 1975, remarkable by its unusual morphology, which is herein described.

METHODS

I refer to Ballerio et al. (2011) and references therein quoted for methods and terminological conventions. Habitus photographs were taken with a Canon Eos D5 MII with a macro objective MP 65 mm, all photos were then mounted with the Zerene Stacker software and cleaned and unmasked using a photo processing software.

ABBREVIATIONS. EL = maximum elytral length; EW = maximum total elytral width; HL = maximum head length; HW maximum head width; PL = maximum pronotal length at middle; PW = maximum pronotal width at middle; W/L = ratio width length.

Madrasostes bartolozzii n. sp.

EXAMINED MATERIAL. Holotypus, female, in Coll. Vietnam National Museum of Nature, Hanoi, Vietnam: Northern Vietnam, Bac Kan Province, Ba Be National Park (~350 m), 22°25'0.69"N 105°37'53.16"E, 3-8.VI.2011, L. Bartolozzi, S. Bambi, F. Fabiano & E. Orbach leg. Paratypus, female, in Coll. Museo Zoologico La Specola, Firenze: same data as holotypus.

DESCRIPTION OF HOLOTYPE. HL = 0.69 mm; HW = 1.44 mm; PL = 1.38 mm; PW = 2.33 mm; EL = 2.36 mm; EW = 2.27 mm.

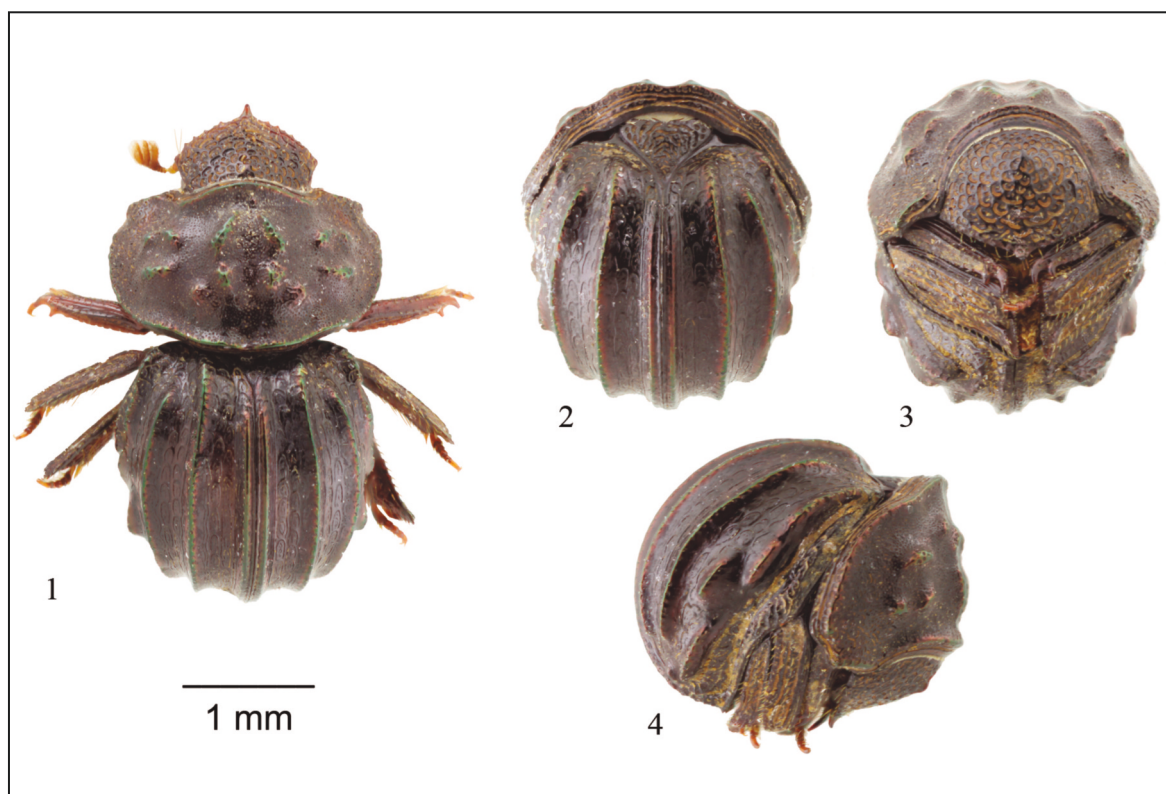
Small sized *Madrasostes* (Figs. 1-4), flightless, shiny dark-brown with green metallic sheen on reliefs, antennae, tarsi and sternum reddish-brown. Glabrous (45x). Head subpentagonal, wider than long (W/L ratio= 1.26). Clypeal extremity pointed, distinctly protruding forwards and apically slightly bent upwards (probably a sexually dimorphic character). Fore side of clypeus serrate, clypeopleuron short, genae slightly protruding outwards, genal canthus indistinct, dorsal ocular area absent. Head dorsal surface completely covered by dense impressed comma-shaped punctures, punctures larger on disc and frons and smaller on head base, centrifugally oriented, each one bearing a simple puncture next to inferior side, punctures dense, almost touching each other. Eyes small, longitudinally elongate. Antennae 10-segmented, scape long (about half the total length of antenna), slightly clavate distad, pedicellus cupuliform, flagellum short, made of short articles distinctly wider than long, antennal club three-segmented, uniformly hairy.

Mouthparts. Labrum wide and short, hemicircular, surface finely wrinkled, bearing medially a transverse row of about ten long erect fine setae and distally fringed by a dense fine setation directed forward. Distal epipharynx bisinuate, longitudinally divided by a strong anterior median process; median brush and corypha absent; apical fringe made of long, fine setae, absent in the middle. Mentum ventrally flat, widely emarginated in the middle, emargination regularly wide-U-shaped; labial palpi (including palpiger) four-segmented, first segment short and transverse, segment two short, segment three longer and plumper than preceding two together, segment four subconical, about as long as seg-

ment three, apically bearing some short sensilla, all segments, apart from the last one, fringed with long setae. Maxillae with an elongate single membranous lacinia, covered with fine long setae, monolobed galea proximally sclerotized and distally clothed with coarse long, fine setae with distinctive comb-like tip (galeal brush), maxillary palpi (including palpiger) four-segmented, palpiger small, segment two wide and short, segment three short, segment four long and subconical, about as long as preceding two together, apically bearing some short sensilla. Mandibles short, regularly curved, apicalis with pointed apical tooth very short and blunt, not protruding over mesal brush, lateral sclerite of apicalis bearing a distinct large pore, mesal brush wide and well developed, basalis with molar lobe strong.

Pronotum wider than long (W/L ratio= 1.6), fore angles truncate and sinuate externally, fore margin bisinuate, with visible bead, lateral and basal margin with a thick bead not visible from above, basal margin slightly swollen upwards, pronotal sculpturing as follows: whole surface, apart from area near fore angles, uniformly covered by very fine impressed simple punctures, their distance being one or two times their diameter. Area near fore angles covered by a mix of coarse shallow comma-shaped and ocellate punctures. Two large longitudinal irregular raised cariniform processes on disc, convergent anteriad, basally, next to each cariniform process, there is a large blunt tubercle, and next to the tubercle there are two transversal processes subparallel to each other, the superior one is an irregular carina, while the inferior is a pair of tubercles; surface of carinae and tubercles smooth, apart from a few sparse large impressed simple punctures.

Scutellum wider than long (W/L ratio=1.4), sides proximally subparallel and distinctly notched by elytral articular process, then convergent to form a triangle with elongate acute apex and sides slightly curved inward. Surface slightly depressed in the middle, covered by irregular impressed comma-shaped punctures. Elytra slightly longer than wide (W/L ratio=0.98), sutural interstria raised and cariniform, another longitudinal strongly raised complete carina next to sutural carina, one further longitudinal complete raised carina, starting from the end of proximal third and ending at the beginning of the distal third, one fourth short raised carina occupying most of median third and finally a fifth longitudinal raised carina starting at humerus



Figures 1-4. *Madrasostes bartolozzii* n. sp. Fig. 1: Holotypus dorsal view. Fig. 2: rolled up holotypus dorsal view. Fig. 3: rolled up holotypus ventral view. Fig. 4: rolled up holotypus lateral view.

(and inglobating humeral callus) and ending near apex, interrupted medially in correspondence with the fourth carina. Surface of carinae smooth, surface between carinae covered by two irregular rows of longitudinally oriented elongate and narrow shallow horseshoe-shaped punctures, with opening backwards and having a simple puncture in the middle.

Pseudoepipleure absent, marginal area broad, expanded outwards, coarsely wrinkled, inferior sutural stria not present, articular area not visible. Fore tibiae ending with two outer teeth, outer margin coarsely serrate, apical spur long and broadly curved downwards. Meso- and metatibiae ending with two apical spurs.

VARIABILITY. The paratype does not show any appreciable variation compared to the holotype in size, colour, shape and sculpturing.

ETYMOLOGY. I am pleased to dedicate this remarkable new species to Dr. Luca Bartolozzi (Museo Zoologico La Specola, Firenze), who collected the type series.

DISTRIBUTION AND BIOLOGY. Known only from the type locality, Ba Be national Park in Northern Vietnam. The area falls within the South China-Vietnam Subtropical Evergreen Forest ecoregion (Wikramanayake et al., 2002). The type series was collected by sifting leaf litter collected in the rainforest near the park headquarters (Bartolozzi, pers. comm.).

COMPARATIVE NOTES. *M. bartolozzii* n. sp. can be easily distinguished from all other *Madrasostes* because of the following combination of characters: head with serrate clypeal margin, genal canthus indistinct without any dorsal ocular area, pronotum with surface covered by a dense very fine puncturation, elytra with five strongly raised longitudinal carinae, flightless.

REMARKS. This new species strongly diverges morphologically from all other known *Madrasostes*. No other known *Madrasostes* displays such a combination of characters and at present it is not

possible even to find its closest relatives. The unusual puncturation pattern of pronotum, made of very fine simple punctures is not found in any other known *Madrasostes* and is unique even within Ceratocanthinae. The combination of flightlessness, indistinct eye canthus and dorsal ocular area absent and strong carinate elytra could lead to place this species in the genus *Besuchetostes* Paulian, 1972, according to the criteria set by Paulian (1978). However a re-definition of the genus *Besuchetostes* in preparation will soon circumscribe the genus to the Indian and Sri Lankan species ascribed to it (Ballerio, in prep.). *Madrasostes bartolozzi* n. sp. shares some characters typical of the *Perignamptus* genus group, as defined by Ballerio (2009), and absent in true *Besuchetostes*, such as the shape of epipharynx and the presence of a basal pore in the mandibles. Indistinct eye canthus and dorsal ocular area absent as well as strong carinate elytra and the pattern of distribution of tubercles on pronotum are probably the result of convergent evolution, due to flightlessness and strong adaptation to life in leaf litter.

Therefore the species is here attributed to *Madrasostes*, even if as previously highlighted in Ballerio (2009), this placement must be seen as provisional, due to the unsatisfactory current definition of the genus *Madrasostes* and its allies within the *Perignamptus* generic group.

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