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Two new species of *Heteromastix* (Cantharidae, Dysmorphocerinae) from New Guinea

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Abstract.

Two new *Heteromastix* Boheman, 1858 from Mount Arfak in New Guinea (Indonesia, West Papua) are described. *Heteromastix casadioi* **sp. nov.** is characterized by 12 antennomeres, a feature only known in one other species until now. *Heteromastix colacurcioi* **sp. nov.** is similar to *H. elongatus* Wittmer, 1959 but differs in the antennomeres X-XI. Furthermore, a redefinition of the species-groups of the entire genus *Heteromastix* is provided.

KEYWORDS: CANTHARIDAE, *HETEROMASTIX*, ENTOMOLOGY, NEW SPECIES, SOLDIER BEETLES, WEST PAPUA.

Introduction

The genus *Heteromastix* Boheman, 1858 belongs to the subfamily Dysmorphocerinae Brancucci, 1980. It is distributed in New Guinea and Australia, including King Island and Tasmania (Delkeskamp 1977; Calder 1998). Researchers have so far described 90 species of this beetle (Delkeskamp 1977), of which only 13 taxa are present in New Guinea, all of which are endemic to this island (Westwood 1876; Wittmer 1955a, 1955b, 1959, 1964). *Heteromastix* is characterized by females with filiform antennae (Lea 1909, 1921). Females often cannot be determined at the specific level due to the uniformity of their macroscopic characters (Lea 1909, 1921). Males of the genus are characterized by either filiform antennae or by antennae with some modified or distorted antennomeres, sometimes present with spines and teeth. Certain forms likely use these antennae as a prehensile function (Westwood

1876; Lea 1921). *Heteromastix* is characterized by a strongly transverse pronotum (Lea 1909), elongated elytra and small size (usually 2–7 mm). They are relatively unknown, although a list of Australian species with information on typical localities and typical series can be found in Calder (1998), which notes that these species are terrestrial and are capable of flying (Calder 1998). *Heteromastix* are also attracted to light (Casadio pers. comm.). This work adds the description of two new species of this genus of Soldier Beetles from New Guinea.



Figure 1
Heteromastix casadioi **sp. nov.** Holotype, habitus,
scale bar = 1.0 mm.



Figure 2
Heteromastix colacurcioi **sp. nov.** Holotype, habitus,
scale bar = 1.0 mm.

Material and Methods

Specimens were captured during a trip in November, 2019 by Carlo Arrigo Casadio on Mount Arfak, West Papua (Indonesia) using a lamp with a 250-watt mercury bulb. Photographs taken by Loris Colacurcio have been converted into plates using a Ulead PhotoImpact Viewer SE program. Drawings were created using a mixed traditional-computer graphic technique. The specimens are preserved in the Fabrizio Fanti collection at Piazze (Siena, Italy). The holotypes carry a red printed label: Holotypus//“*species name*”//Fanti & Menufandu, 2022.

The aedeagi have not been extracted, as they are not known in literature and the species are recognized for the particular antennal structures of the males. The two new species were compared with the holotypes of species most similar to them. The holotype of *H. toxopeusi* is preserved in the “Nationaal Natuurhistorisch Museum Naturalis” - Naturalis Biodiversity center (RMNH) in Leiden, Netherlands, with the registration number RMNH.INS.1480704, while *H. elongatus* is preserved in the Bernice Pauahi Bishop Museum in Honolulu, Hawaii, USA.

Results

Family Cantharidae Imhoff, 1856
Subfamily Dysmorphocerinae Brancucci, 1980
Genus *Heteromastix* Boheman, 1858
= *Astychina* Westwood, 1876: 494 [synonymized by Wittmer 1951: 278, but already ipotized by Lea 1921: 72].

***Heteromastix casadioi* sp. nov.**
(Figs. 1, 3)

Etymology: Named in honor of our friend and collector of the two new species, Carlo Arrigo Casadio.

Holotype: male, labelled as follows: “W.PAPUA-ARFAK Mount.//Susi vill.-ANGGI mt. 2000//MANOKWARI: 12.XI.2019//leg. CASADIO C.”

Diagnosis

The only species with 12 antennomeres is *H. toxopeusi* Wittmer, 1955, which differs in having a tooth of antennomere X that is wider and without appendage, and an antennomere XI that has a very sinuous spine (Wittmer 1955a; Brancucci 1980). In addition, the coloration is different: *H. toxopeusi* has a blackish-dark brown elytra and a testaceous-orange pronotum that has a curved and transversal black mark (in the shape of a complete arch) at the center.

Description

Male, adult. Head and antennae black, pronotum testaceous-orange with brownish sides, elytra testaceous with a blackish apex (just under half of the elytra, with blackish traces that reach back along the elytra), legs blackish. Body length: 4.5 mm.

Head transverse, restricted (roundish) behind the eyes, with sparse, shallow punctation and very short and sparse setae. Eyes convex, protruded and very prominent, rounded, inserted laterally on the head. Mandibles strongly curved, falciform. Maxillary palps 4-segmented. Antennae difform, 12-segmented, relatively short, slender; scape long, club-shaped; antennomere II slightly difform, thin, restricted in the center and enlarged at apex; antennomere III elongated, enlarged at apex, thicker than previous one; antennomeres IV-VIII subequal, almost serrate; antennomere IX difform, triangular (irregular square shaped) with the internal side progressively restricted from the base to apex; antennomere X difform, narrow and elongated, curved, internally opened longitudinally and testaceous-brown in colour, ventrally near the apex with a lamellar expansion equipped with a lobe rounded at apex (it has the appearance of an upside down “thumb”); antennomere XI difform, robust, globular-elongated, as long as previous one, equipped at the internal base with a long spine that is curved and testaceous-brown in color, with the spine not reaching the base of antennomere X; antennomere XII short, globular-squared, with the external side curved; all antennomeres pubescent. Pronotum strongly transverse, wider than long, wider than head; sides that narrow from the apex to the base, bordered; anterior and posterior corners rounded; anterior margin strongly curved and bordered; posterior margin almost straight and slightly bordered, disc flat only very slightly convex at the center; surface equipped with long setae and shallow punctation. Scutellar shield triangular with rounded apex and shallow punctation. Elytra strongly wider than pronotum, long, covering the last abdominal segments, almost parallel-sided and only slightly narrower at humeri, rounded at apex, surface wrinkled equipped with several long setae. Metathoracic wings covered by elytra. Sternites transverse and pubescent. Legs slender and pubescent, femora shorter and sturdier than tibiae, tibiae cylindrical with a spur at the internal apex. Tarsal formula 5-5-5, claws simple without teeth.

Distribution

Indonesia, West Papua, Doberai Peninsula.

Type locality

Susi village 2000 meters a.s.l., Anggi district.

Note

The female and the ecology of the species are unknown.

***Heteromastix colacurcioi* sp. nov.**
(Figs. 2, 4)

Etymology: Named in honor of our friend, Loris Colacurcio, who provided the specimens to the first author (Fanti).

Holotype: male, labelled as follows: “PAPUA-M. ARFAK//MIMYANBOU//14-18.XI.2019//leg. CASADIO C. A.”

Diagnosis

The species most similar to the new species is *H. elongatus* Wittmer, 1959, which features an antennomere X with a folded expansion ventrally at apex not present in the new species, and antennomere XI without the expansion near the spine in the ventral region (Wittmer 1959). In addition, *H. elongatus* has antennomeres X-XI that are subequal in length (Wittmer 1959), and has antennomeres IV-IX more elongated. The new species is also somewhat similar to *H. archboldi* Wittmer, 1955 and *H. moerens* Westwood, 1876, which have identical antennomere XI to the new species but the antennomere X has a large tooth in the center (Westwood 1876; Wittmer 1955a; Matthes 1962; Brancucci 1980) that is not present in the new species. The new species is also slightly similar to *H. ovalatus* Wittmer, 1955, which differs in having antennomere X with a small hollow with a small tooth/thorn and a smaller and shorter antennomere XI (Wittmer 1955a).

Description

Male, adult. Black, mandibles testaceous with black marks, maxillary palps black with the last palpomere testaceous at the apex. Body length: 5.0 mm.

Head transverse, strongly restricted behind the eyes, with sparse shallow punctation and short and sparse setae. Eyes convex, protruded, rounded, inserted laterally to the head. Mandibles strongly curved and very thin at apex. Maxillary palps 4-segmented. Antennae difform, 11-segmented, short, robust, elbow-bent; scape long, club-shaped; antennomere II short and thin; antennomere III globular-elongated, enlarged in the middle, much stouter than previous one; antennomeres IV-VIII subequal, transverse; antennomere IX similar to previous ones, internally open and concave and testaceous in colour; antennomere X difform, wide at base, and progressively narrowed and elongated, internally open and concave and testaceous in colour; antennomere XI difform, very elongated,

longer than previous one, robust, in the shape of an elongated “ax iron”, equipped at the internal base with a long spine that is curved and testaceous with black marks, with a spine that reaches and slightly passes antennomere X, internal base in the ventral part of antennomere XI with a small lamellar expansion that is concave in the center; all antennomeres pubescent. Pronotum strongly transverse, wider than long, wider than head; sides curved and strongly bordered, sharply protruding at the front corners and constricted towards the base; anterior corners rounded, posterior corners slightly protruding at an acute angle; anterior margin curved and bordered; posterior margin almost straight, disc slightly convex at the center and flat and depressed near the sides and the anterior margin; surface equipped with short setae and shallow punctation. Scutellar shield triangular with rounded apex and shallow punctation. Elytra slightly wider than pronotum, long, covering the last abdominal segments, narrower at humeri, rounded at apex, surface wrinkled and equipped with several long setae. Metathoracic wings covered by elytra. Sternites transverse and pubescent. Legs slender and pubescent, femora shorter than tibiae, tibiae cylindrical with a spur at the internal apex. Tarsal formula 5-5-5, claws simple without teeth.

Distribution

Indonesia, West Papua, Doberai Peninsula.

Type locality

Mimyanbou = Menyambouw/Minyambaouw, Arfak Mountains.

Note

The female and the ecology of the species are unknown.

Discussion

Heteromastix is a genus that in New Guinea, in all probability, has a large number of undescribed species considering that this region is largely inaccessible and the subject of relatively few studies. Cantharidae are only occasionally collected. It would be very helpful to have a biological study of these species to better understand their extreme antennal variability.

Lea (1909) studied the *Heteromastix* of Australia and recognized four groups that he subsequently raised to five (Lea 1921). This is definitely a useful and interesting subdivision that we are updating and redefining here by adding three groups (N. 6-7-8), as well as naming for convenience and utility all the groups, which Lea had not done, on the basis of the first species described, as in the table 1.

N.	Group's name	Features	N. species	Species from New Guinea and notes
1	<i>distortus</i> Lea, 1909	Antennomeres III-V distorted in the male	3	None
2	<i>fuscicornis</i> (Blackburn, 1892)	Antennomere IX dilated / distorted	5	None
3	<i>bicolor</i> Boheman, 1858	Antennomeres X (often distorted)-XI distorted in the male	39	<i>H. flavicollis</i> <i>H. moerens</i> <i>?H. funebris</i> (a female?) <i>H. ovalatus</i> <i>H. archboldi</i> <i>H. elongatus</i> <i>H. testaceicornis</i> <i>H. colacurcioi</i> sp. nov.
4	<i>pusio</i> (Gemminger, 1869)	Antennae simple in both sexes	36	None
5	<i>mirocerus</i> Lea, 1922	Many antennomeres distorted in the male (III-VI particularly IV-V, plus X-XI)	1	None
6	<i>undecimus</i> Lea, 1929	Antennomeres X-XI distorted in the male, with apex of 11th antennomere more or less restricted, making it appear that it has a total 12 antennomeres	5	<i>H. lieftincki</i> <i>H. globosus</i> <i>H. similiglobosus</i> <i>H. parallelus</i>
7	<i>toxopeusi</i> Wittmer, 1955	12 antennomeres in the male; X-XII distorted	2	<i>H. toxopeusi</i> <i>H. casadioi</i> sp. nov.
8	<i>neoguineensis</i> Wittmer, 1955	Antennomeres VI-IX longer than wide (In all other species from New Guinea they are wider than long)	1	<i>H. neoguineensis</i> Group compared only with species from New Guinea (compared with the Australian species, it could belong to group No. 3)

TABLE 1. Groups of *Heteromastix*



Figure 3A-B.
Heteromastix casadioi **sp. nov.** A. Holotype, detail of antennae, B. Drawing of the tip of the right antenna.



Figure 4A-B.
Heteromastix colacurcioi **sp. nov.** A. Holotype, detail of antennae, B. Drawing of the tip of the right antenna.

It is interesting to note that two species of *Heteromastix* have 12 antennomeres, a very rare character in living species of the entire Cantharidae family. This character is known in some extant species of *Pseudosilis* Pic, 1911 (Silinae) and *Heteromastix* (Fanti & Pankowski 2019, 2020; Poinar & Fanti 2019), and it's also present in fossil species of a particular lineage where we also find genera with a greater number of antennomeres, up to 19 of them (Fanti & Pankowski 2019, 2020; Poinar & Fanti 2019). The presence in the genus *Heteromastix* of some taxa with 11 antennomeres, with the last strongly narrowed at the apex appearing as a sort of 12th antennomere, confirms that the ancestral character state of antennae of adult beetles is 11 antennomeres (Minelli 2005; Fanti & Pankowski 2019). Furthermore, it's worth noting that even the modified antennae in "bizarre" forms are also encountered in other subfamilies, such as in the genus *Prosthaptus* Gorham, 1900 (Malthininae).

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Literature cited

Blackburn, T. (1892) Notes on Australian Coleoptera, with Descriptions of new Species. Part X. *Proceedings of the Linnean Society of New South Wales* (Second Series) 6: 479-550.

Boheman, C.H. (1858) Coleoptera (pp. 1-112, 113-218, plates I-II). In: Virgin C. (ed.), *Kongliga Svenska Fregatten Eugenies Resa omkring jorden under befäl af C. A. Virgin, Åren 1851-1853. Vetenskapliga Iakttagelser på H. M. Konung Oscar Den Förstes befallning utgifna af K. Svenska Vetenskaps Akademien. II. Zoologi. 1. Insecta*. P. A. Norstedt & Söner, Almqvist et Wiksells, Uppsala et Stockholm, 614 pp., 9 plates. [issued in parts: pp. 1-112 in 1858, 113-218 in 1859].

Brancucci, M. (1980) Morphologie comparée, évolution et systématique des Cantharidae (Insecta: Coleoptera). *Entomologica Basiliensia* 5: 215-388.

Calder, A.A. (1998) *Zoological Catalogue of Australia* 29.6. *Coleoptera Elateroidea*. CSIRO Publishing, Melbourne/ Australian Biological Resources Study, Canberra, 264 pp.

Delkeskamp, K. (1977) *Coleopterorum Catalogus Supplementa. Pars 165 (Fasc. I). Cantharidae*. W. Junk, The Hague, 485 pp.

Fanti, F. & Pankowski, M.G. (2020) A new Eocene soldier beetle (Cantharidae) of the genus †*Cacomorphocerus* Schaufuss, 1892 from Baltic amber. *Zootaxa* 4869(3): 437-443. <https://doi.org/10.11646/zootaxa.4869.3.10>

Fanti, F. & Pankowski, M.K. (2019) A new soldier beetle of the extinct tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018. *Zootaxa* 4651(3): 589-595. <https://doi.org/10.11646/zootaxa.4651.3.11>

Gemminger, M. (1869) [new taxa] In: Gemminger M. & Harold E. F. von. (ed.), *Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus. Tom. VI. Rhipidoceridae, Dascillidae, Malacodermidae, Cleridae, Lymexylonidae, Cupesidae, Ptinidae, Bostrychidae, Cioidae*. Sumptu E. H. Gummi, Monachii, pp. 1609-1800 + 5.

Gorham, H.S. (1900) Descriptions of new Genera and Species of Coleoptera from South and West Africa, of the Section Serricornia, and of the Families Erotylidae, Endomychidae, and Languriidae. *The Annals and Magazine of Natural History, including Zoology, Botany, and Geology* 5 (Seventh Series), Number XXV: 71-94.

Imhoff, L. (1856) *Versuch einer Einführung in das Studium der Koleoptern. In zwei Theilen und einem, 25 Tafeln lithographirter Abbildungen nebst Text enthaltenden, Anhang*. Schweighauser, Basel, xxxi + [2] + 114 + [2] + 272 pp. + 25 plates.

Lea, A.M. (1909) Revision of the Australian and Tasmanian Malacodermidae. *The Transactions of the Entomological Society of London* 1909: 45-251 + plates II-VI and explanations (6 pp.).

Lea, A.M. (1921) On Australian Coleoptera of the Family Malacodermidae. *Transactions and Proceedings of the Royal Society of South Australia* 45: 50-135.

Lea, A.M. (1922) Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia 1910-1913. 26. Cryptophagidae, Cucujidae, Malacodermidae, Melandryidae, Mordellidae, Rhipidophoridae and Oedemeridae. *Arkiv för Zoology* 14(11): 1-21.

Lea, A.M. (1929) On Coleoptera, mostly from Queensland. (Part II.). *Memoirs of the Queensland Museum* 9(3): 335-363.

Matthes, D. (1962) Excitatoren und Paarungsverhalten mitteleuropäischer Malachiiden (Coleopt., Malacodermata). *Zeitschrift für Morphologie und Ökologie der Tiere* 51: 375-546.

Minelli, A. (2005) A segmental analysis of the beetle antenna. Studi Trentini di Scienze Naturali, *Acta Biologica* 81: 91-101.

Poinar, G.O. Jr. & Fanti, F. (2019) A new fossil soldier beetle (Coleoptera: Cantharidae) of the genus *Cacomorphocerus* Schaufuss, 1892 from Baltic amber. *Palaeodiversity* 12(1): 99-105. <https://doi.org/10.18476/pale.v12.a9>

Westwood, J.O. (1876) Descriptions of some new exotic species of Coleopterous Insects. *The Transactions of the Entomological Society of London* 1876: 493-495 + 1 plate (Plate II).

Wittmer, W. (1951) Notas sinonimicas y sistematicas sobre *Malacodermata*. *Annales de la Sociedad Científica Argentina* 151(6): 276-278.

Wittmer, W. (1955a) Ergebnisse der Neu Guinea expedition 1938-39. Coleoptera: Cantharidae und Malachiidae. (16. Beitrag zur Kenntnis der indo-malayischen Malacodermata). *Nova Guinea*, new ser. 6(1): 57-86.

Wittmer, W. (1955b) Neue Malacodermata (Coleoptera) aus Neu-Guinea und Neu-Pommern in der Sammlung des Ungarischen Naturwissenschaftlichen Museums, Budapest. *Annales Historico-Naturales Musei Hungarici* (N.S.) 6: 213-224.

Wittmer, W. (1959) Neue Cantharidae und Malachiidae aus Neu Guinea (Coleoptera). (21. Beitrag zur Kenntnis der indo-malayischen Malacodermata). *Nova Guinea*, new ser. 10(1): 11-20.

Wittmer, W. (1964) Neue Malacodermata aus Neu Guinea. (24. Beitrag zur Kenntnis der indo-malayischen Malacodermata, Col.). *Nova Guinea*, Zoology 30: 115-137.

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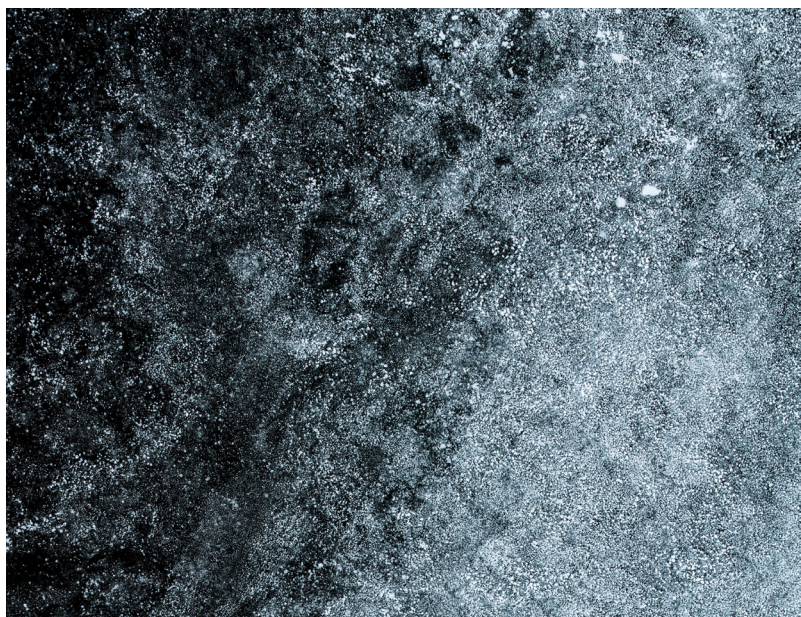
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