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A new subgenus and species of *Crepidogaster* from Madagascar (Coleoptera: Carabidae, Brachininae, Crepidogastrini)

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Abstract
Crepidogaster (*Sphaerotyronia*) *rotundata* subg. nov., sp. nov. is herein described on the basis of a male specimen from East Madagascar. The male habitus and genitalia are illustrated, and some considerations are presented about the systematics of the genus *Crepidogaster* and the tribe Crepidogastrini.

Keywords: Carabidae, ground beetles, *Crepidogaster*, new subgenus, new species, Madagascar

http://zoobank.org/urn:lsid:zoobank.org:pub:CC37EDC6-C288-4BEA-95EF-F142DB3F37D1

Introduction

The genus *Tyronia* Liebke, 1934 has been established to include 2 species from the Indian region originally placed in genus *Crepidogaster* Boheman, 1848: *Tyronia humerata* (Chaudoir, 1876) and *Tyronia horni* (Dupuis, 1914), from India and Sri Lanka, respectively (Liebke 1934). Subsequently, the genus was redefined by Basilewsky in his revision of the tribe Crepidogastrini to include further species from Continental Africa (Basilewsky 1959). According to this paper, *Tyronia* differs from *Crepidogaster* in having two lateral setae on pronotum instead of one, with the posterior one inserted before the posterior angle, and in the shape of the last labial palpomere, which is swollen or securiform but not truncate.

Later, the same author (Basilewsky 1988) noticed that many of the African species of *Tyronia* show a marked sexual dimorphism on the ventral side of the body, with the presence in males of a deep dimple on the prosternum and of a modification of the abdomen, with the ventrites 2, 3 and 4 forming a flattened apophysis, or the ventrites 5, 6 and 7 exhibiting a less sclerotized and thinner outer region. The function of these structures is unknown. No similar features have been described in the Malagasy species attributable to the subgenus *Tyronia*, but a description of the ventral side of these species is lacking (Deuve & Mateu 1986; Deuve 2005).

In a subsequent paper Deuve & Mateu (1986) provisionally treat *Tyronia* as a subgenus of *Crepidogaster* because they consider the characteristics used by Basilewsky (1988) to distinguish the two genera not significant enough to justify their separation. In a subsequent paper, Deuve (2005) completely abolishes the division in two subgenera after the study of Malagasy species, in which the dilation of the palps and the presence or absence of a posterior pronotal setae seem uncorrelated. Thus, he includes all species in a great genus *Crepidogaster*. The taxonomic situation of the tribe unfortunately has never undergone a complete revision.

In this paper, in absence of further research on the relationship between these species, we will cautiously follow Deuve & Mateu (1986) and we will consider *Tyronia* as a subgenus, describing a new subgenus to accomodate a new, very aberrant, Malagasy species.

The species of the tribe Crepidogastrini are uncommon in collections and many species of *Tyronia* are known only upon isolated specimens (Deuve & Mateu 1986), therefore the ecology of most species is still unknown. Species of subgenus *Tyronia* are distributed in Sub-Saharan Africa from Ivory Coast (Basilewsky 1968) to South Africa (Basilewsky, 1959, 1988, 1992), in Madagascar (Deuve & Mateu 1986) and in the Indian subcontinent (Basilewsky 1959; Deuve 2012, 2015; Deuve & Wrase 2014). They seem to prefer more humid environments than the species

of subgenus *Crepidogaster*, such as secondary transitional or mountain forests or wooded or marshy savannas (Basilewsky 1988).

Materials and Methods

The only known specimen of the new species described herein has been examined with a Optika ST-30-2LF stereomicroscope and a Kyowa Stereomicroscope. Photos taken with a Canon EOS 70D equipped with MP-E 65mm lens. The photos have been elaborated with the stacking software HeliconFocus on a MacIntosh computer.

Abbreviations:
TBL = total body length (from the apex of labrum to the end of the elytral suture)
TL = total length
MW = maximum width.

Results

Family Carabidae Latreille, 1802
Subfamily Brachininae Bonelli, 1810
Tribe Crepidogastrini Jeannel, 1949
Genus *Crepidogaster* Boheman, 1848

***Sphaerotyronia* Sciaky & Massimo, subg. nov.**
Diagnosis: A subgenus of *Crepidogaster* morphologically closely related to the subgenus *Tyronia*. Two pairs of lateral setae on pronotum, last palpomere of both labial and maxillary palps swollen and globose, not truncate. Labrum with 12 setae and a deep indentation in the center of its anterior margin.

Derivatio nominis: The name of the subgenus is composed by the suffix "-tyronia", which refers to the similarity of this species to the subgenus *Tyronia* Liebke, and the prefix "Sphaero-" (from Latin "*sphaera*", meaning "sphere"), which refers to the unusual shape of the elytra of the only known species.

Systematic considerations: This new subgenus seems rather closely related to *Tyronia* and much less to *Crepidogaster* s.str. We maintain many doubts on the reunion of the two former genera, because, except a few doubtful species, the bulk of them seem clearly attributable to one or the other genus. There are also other instances of genera of the same group with a doubtful position, for instance the genus *Crepidolomus* Basilewsky, 1959, is a highly modified genus evidently more related to *Tyronia* than to *Crepidogaster* (Mateu 1986). Waiting for a more complete revision of the whole complex of genera that will clear the systematic position of each included taxa, we prefer to keep the two taxa at least separate at the subgeneric level, while *Sphaerotyronia* remains as a third subgenus, clearly more closely allied to *Tyronia* than to *Crepidogaster* s.str.

Crepidogaster* (*Sphaerotyronia*) *rotundata Sciaky & Massimo, **sp. nov.**
(Figs 1-3)

Diagnosis: A small species of *Crepidogaster* (*Sphaerotyronia*) from Madagascar, characterized by elytra extremely enlarged laterally, almost circular. Body stout, testaceous-brown. Aedeagus with a developed, strongly recurved base and a ventral margin linear, not curved and slightly sinuous at apex. Apex prolonged in a small rounded lobe.

Type material. Holotype: ♂ (only known specimen). E Madagascar, 130 km E Antananarivo, near Andasibé vill., Feb 2020, A. Sokolov legit, in coll. R. Sciaky, Milan (part of Zoologische Staatssammlung München), Italy.

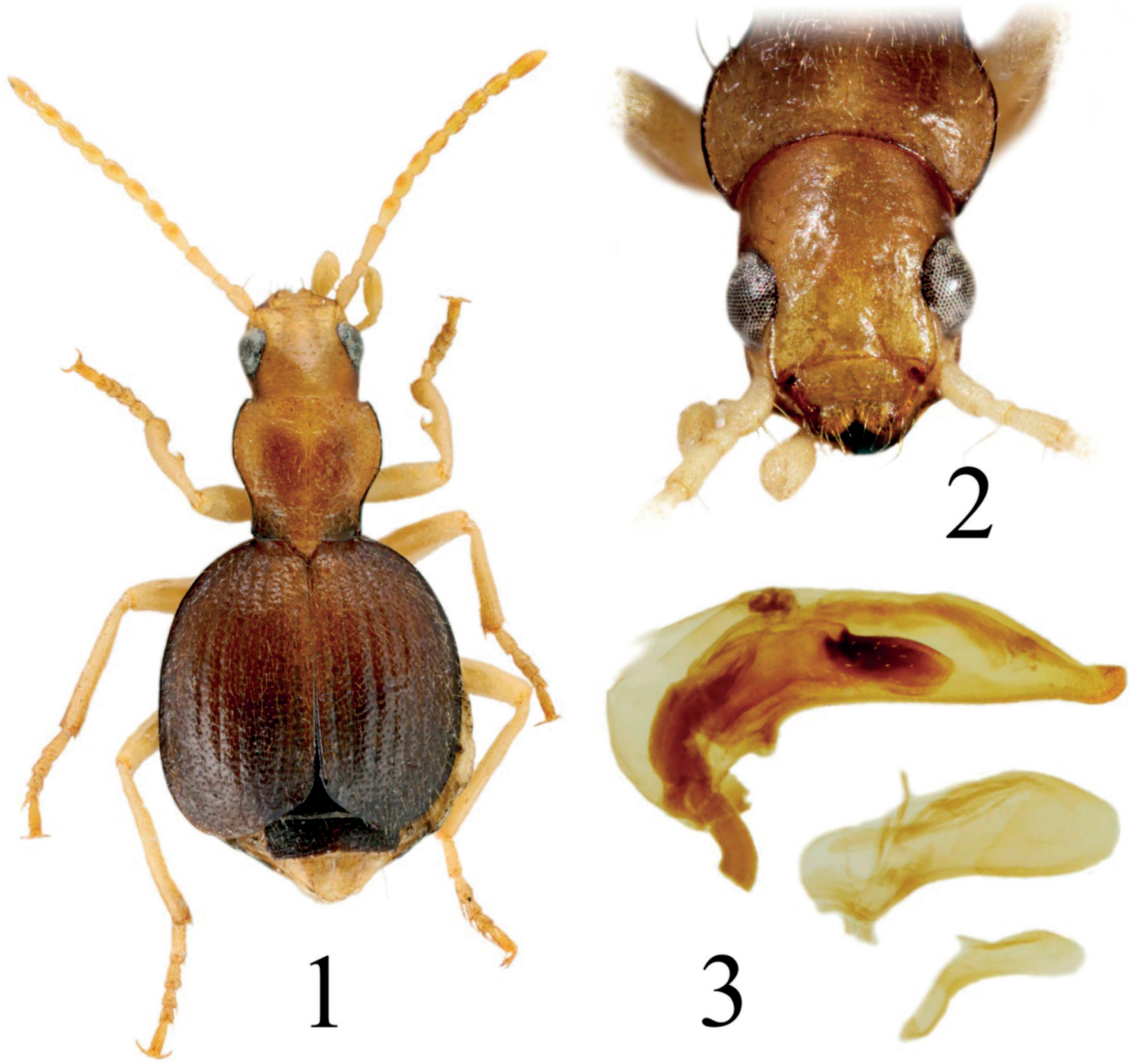
Description. **Male** (Figs 1-3). TBL: 4,2 mm. Habitus as in Fig. 1. Body stout, large and relatively flattened in lateral view. Head and pronotum testaceous, with darker spots at the posterior angles of clypeus and on the temples behind the eyes and lateral pronotal edges black. Around the eyes there is a subtle black contour. Dorsal apex of the head, clypeus and labium of a lighter coloration, somewhat yellowish, that gradually darkens along the head and the pronotum. Hind angles of pronotum dark brown, pronotal hypomeron darkened. Elytra brown, lighter on the disc, along the suture and in proximity of the scutellum. Epipleura black. Visible uroterga black. All appendages yellowish, except for mandibles, that are testaceous and whose apex and lower outer margin are black. Antennae yellowish at base, and only slightly darkened toward the apex. Ventral side of body lighter in colour: head and prosternum yellowish, ventrites light brown with darker lateral and hind margins. Pubescence consisting in short yellow setae covering all the body surface (both dorsally and ventrally), slightly less dense on head.

Head. MW (including eyes): 0,9 mm. Head narrower than pronotum, subquadrate in dorsal view and pubescent on the whole surface. Eyes large and convex, but only moderately protruding, longer than temples. Frontal furrows subparallel, superficial but visible from the level of the center of the eyes. Within them the punctuation is more pronounced and produces faint diagonal wrinkles. One pair of supraorbital setae present, positioned slightly more distally than the posterior end of the eye. Clypeus trapezoidal, with two setae on each side; anterior margin feebly concave. Microsculpture isodiametric. Labium divided into two lobes by a deep indentation, with 6 setae on each side: 4 setae positioned dorsally (the outermost two significantly longer and more robust than the inner two) and 2 setae inserted on the anterior margin itself, pointing forward (Fig. 2). Mandibles robust, the lateral furrow with a large seta and few smaller hairs. Distal article of both maxillary and labial palps swollen and globose (this feature is more pronounced in labial palpomeres) with apex pointed, not truncate. Antennae rather long, exceeding the base of the pronotum by 4 articles. All antennomeres

pubescent, the scapus carrying two more robust setae on the dorsal side before its apex. First 3 antennomeres more slender, antennomeres from 4 to 11 thicker. Apical crown of setae present on all antennomeres except the scapus.

Prothorax. MW of pronotum: 1,0 mm; TL of pronotum (along midline): 1,1 mm. Pronotum as long as wide in correspondence to the point of maximum width, which is positioned almost in the middle. Pronotum wider than head (including eyes). Anterior margin subrectilinear in the center, slightly advanced in correspondence of the anterior angles; posterior margin slightly arched, with hind angles subright and sharp. Base of pronotum narrower than anterior margin. Lateral margins evenly rounded in distal half, sinuous in proximal half, parallel before hind angles. Lateral gutter very narrow and of constant width on all the length of the margin. Two marginal setae: the anterior one positioned near the middle, the posterior one positioned before the hind angles. One basal impression on each side, and a central impression in the proximal half, along the midline. Some transverse wrinkles are visible in the proximal half of pronotum. Microsculpture isodiametric, almost hidden by dense punctuation. Prosternum simple, prolonged in a small and thin process between the procoxae. Central dimple absent. Legs rather short but very slender, with no particular characters.

Elytra. TL (measured along the suture): 1,9 mm; MW (of both elytra together): 2,4 mm. Elytra remarkably short and laterally enlarged, so that from above they assume a circular shape; their width about 2,5 times the maximum width of the pronotum. Apex obliquely truncate. Humeral angles completely rounded, basal margin conjoined with lateral margin of the elytra in a continuous curve. Sides



Figs 1-3 – *Crepidogaster (Sphaerotyronia) rotundata* **sp. nov., holotype** ♂. **1**, dorsal view; **2**, frontal view of the head; **3**, aedeagus and parameres.

of elytra gradually arched along their entire length, seemingly continuing their curve also along the margin of the apical truncation, so that the apical external angle is broadly rounded. Sutural angle closely rounded, largely obtuse. Elytra convex, with just the last interval flattened in the posterior half of the elytra. Punctuation present on all elytral surface, denser on the anterior half of disc. Striae 1 to 7 visible along all their length, less engraved at base; 8th stria absent. Intervals feebly convex. Interval 3 wider than the adjacent ones. Basal seta positioned on stria 1, closer to the suture than to the scutellum. Umbilicate series continuous from base to apex of elytra, composed of 18 points difficult to distinguish due to the sculpture of elytral margin.

Abdomen. Abdomen protruding from the elytra in dorsal view, leaving the last 2 terga visible (the penultimate only to a small extent). Apophysis or dechitinized regions on ventral side absent.

Genitalia. TL of the aedeagus: 1,0 mm. Median lobe of the aedeagus robust, with a rounded apex in lateral view (Fig. 3). Base with a large, globous bulb; median section parallel-sided; at ⅔ of the total length the aedeagus narrows up to the apex. Ventral margin almost rectilinear, slightly sinuous before apex. Dorsal margin linear at the beginning (parallel to the ventral side), then gradually curved downwards. Apex prolonged in a small rounded lobe. The inner sac of the aedeagus has two symmetrical sclerified parts, vaguely elliptical in shape. Parameres as in Fig. 3.

Derivatio nominis: The name "*rotundata*" refers to the combined shape of the elytra of this species, which, in dorsal view and together with the abdomen, assume an almost circular shape (from Latin "*rotundata*", meaning "rounded").

Discussion

Crepidogaster rotundata **sp. nov.** differs from all other Malagasy species of subgenus *Tyronia*, apart from the curious combined shape of the elytra, by the presence of 12 setae on the labrum, while the other species have 6 or 8 setae. Deuve & Mateu (1986) consider the arrangement with 6 setae primitive and the one with 8 derived, therefore, following this consideration, the occurrence of 12 setae of *Crepidogaster rotundata* **sp. nov.** could be considered a further derivation. We add that Erwin (1970) stated that all the Brachinini have 6 or 8 setae on the labrum, therefore this is the first known case of a species of this subfamily with more than 8 labral setae.

The shape of the labrum, deeply bilobed, is certainly very peculiar, but we observed that in *Crepidogastrillus curtulus* Basilewsky, 1959, despite the original description and drawing reported the presence of an arched labrum, this is evidently bilobed, although to a lesser extent than in *Crepidogaster rotundata* **sp. nov.** It would be interesting to investigate if other Crepidogastrini may show a similar structure of the labrum, although all the species thus far examined by us show a normal, arched or subrectangular shape.

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