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The taxonomic identity of some enigmatic darkling beetle genera: *Archinamaqua* Schawaller, 2012 and *Menederopsis* Koch, 1954 (Coleoptera: Tenebrionidae) from Namaqualand, South Africa

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Based on the newly established synonymy of the type species (i.e., *Menederopsis constrictus* Koch, 1954 = *Archinamaqua lyleae* Schawaller, 2012 syn. nov.) the genus-group name *Archinamaqua* Schawaller, 2012 (Pimeliinae: Tentyriini) is interpreted as a junior synonym of *Menederopsis* Koch, 1954 (Tenebrioninae: Eurynotina). This newly interpreted taxon has a restricted distributional area on sand dunes in Namaqualand, western South Africa.

Key words: Tenebrioninae, Platynotini, Eurynotina, *Menederopsis*, Pimeliinae, Tentyriini, new synonymy, female terminalia

The genus *Archinamaqua* was established by Schawaller (2012) for a single newly described South African species, *A. lyleae.* Although, the morphology of this taxon seemed to be enigmatic, based on the comparison with *Archinamibia* Koch, 1952 and *Broomium* Koch, 1950 this genus was placed within the darkling beetle tribe Tentyriini (Pimeliinae). All these genera contain highly adapted sand living species.

During a recent curatorial work on the Tenebrionidae collection, Ms Ruth Müller (Ditsong Museum, Pretoria, South Africa) noticed a great morphological resemblance between the above-mentioned *Archinamaqua* species and the only known representative of the genus *Menederopsis* Koch, 1954b (Tenebrioninae: Eurynotina), *i.e. M. constrictus* Koch, 1954b. The email from Ms Müller drew the attention of the authors of this note to this particular taxonomic problem. The aim of this study was to establish the proper placement of *Archinamaqua* and *Menederopsis* and their representatives.

Material and methods

This study was based on material from the Ditsong National Museum of Natural History, Pretoria, South Africa and the Staatliches Museum für Naturkunde, Stuttgart, Germany. The original label data for the specimens is given in quotation marks and separated by a comma. Each line of the original label data is separated by a forward slash. Morphological terminology follows that of Matthews *at al.* (2010), with additional specialized terms used for the male and female terminalia (Iwan & Kamiński 2016). Images were taken using a Canon 1000D body with accordion bellows and a Canon Macro Lens EF 100 mm. Female terminalia were dissected with a standard approach; however, instead of using KOH for the abdominal tissue relaxation a solution of 180µL of ATL Buffer and 20µL of proteinase K (QIAamp DNA Micro kit, Qiagen) was used (see Kanda *et al.* 2015). The remaining fluids were further processed and the DNA extract was preserved at the Aaron D. Smith collection (Northern Arizona University) with the reference number: MEL320.

Results and discussion

According to the recently proposed classification Eurynotina, together with Platynotina, constitutes the tribe Platynotini (Kamiński *et al.* 2018). Both entities share a unique, within the opatrinoid clade (former Pedinini and Opatrini), structure of gula which is equipped with a stridulatory surface (see Fig. 1C, D in Kamiński 2016). A close affiliation between

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Eurynotina and Platyonotina was highly supported by the recently performed phylogenetic analysis based on molecular data (Kamiński *et al.* 2018).

The subtribe Eurynotina is most clearly characterised by the lack of aedeagal clavae – a character treated as a synapomorphy for the former tribe Pedinini (Doyen & Lawrence 1979, Iwan 2001, 2004). Moreover, a majority of the representatives (i.e. *Oncotus* and *Schyzoschelus* generic complexes) possess either extremely shallowly emarginate or straight clypei (Koch 1954a, b, Kamiński 2016), which is further misleading since the deeply emarginate clypeus was traditionally used as main character distinguishing the members of the opatrinoid clade from other Tenebrioninae (e.g., Watt 1974).

Over its history, Eurynotina received relatively little attention from researchers. The most comprehensive taxonomic works were done by Koch (Koch 1954a, b, 1955, 1956). Despite this, many Eurynotina species are extremely difficult to identify without referring to the type material. Moreover, the status of many taxa is uncertain because they were described based on single and/or damaged specimens (e.g., *M. constrictus*). To sum it up, Eurynotina is a South African endemic subtribe grouping sixteen morphologically peculiar darkling beetle genera (~95 species and subspecies) (Kamiński 2016).

Type investigation of *A. lyleae* and *M. constrictus* did not reveal any characters to support taxonomic distinctiveness of those two entities. However, it needs to be clarified that prior to this publication *M. constrictus* was only known from a heavily damaged female specimen (Fig. 1 in Koch 1954b). The analysis of known distributional records of both taxa also favorus the above-stated hypothesis of homogeneity of *A. lyleae* and *M. constrictus*, since the closest type localities of both entities are separated only by ~5 km. In conclusion, *A. lyleae* is interpreted here as a junior synonym of *M. constrictus*.

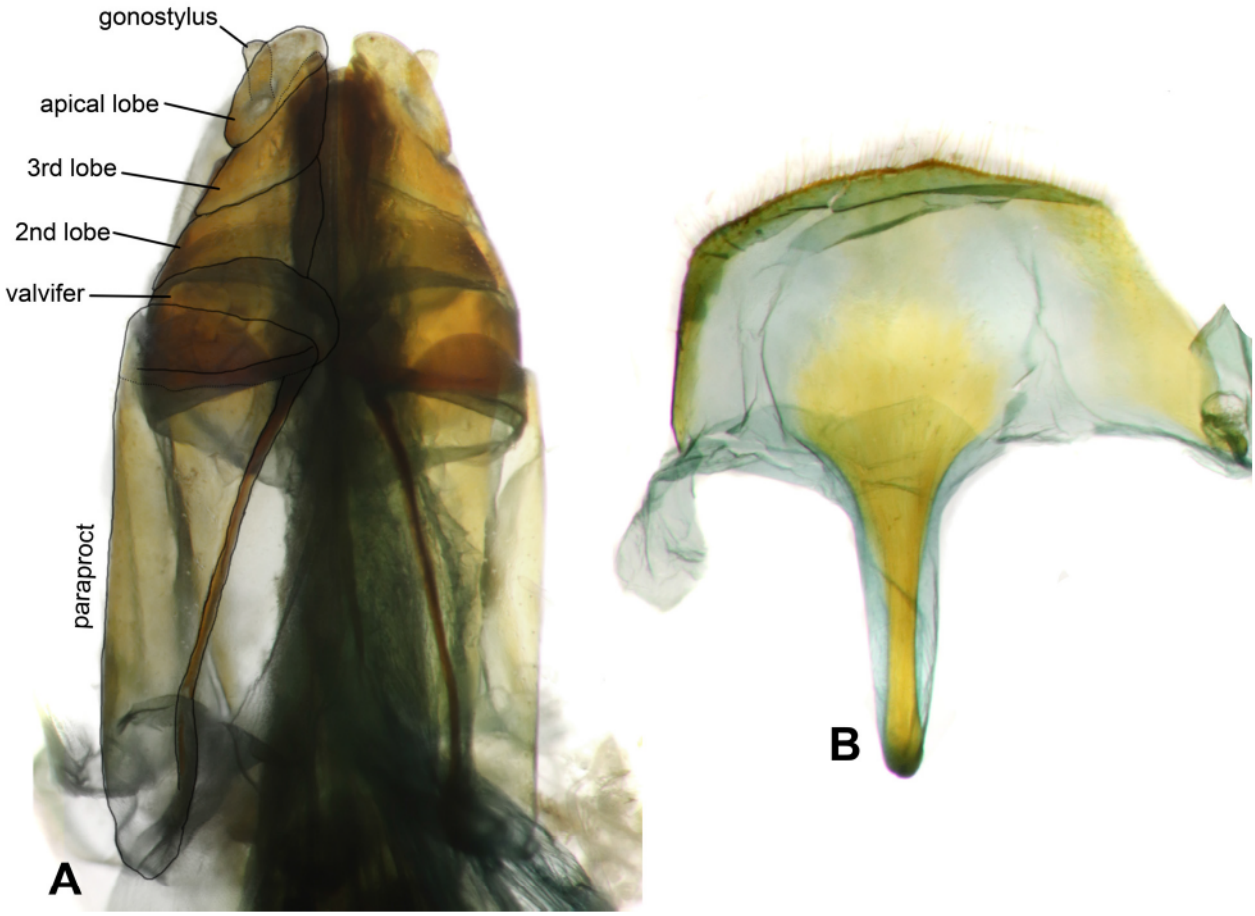

FIGURE 1. Ovipositor (A) and spiculum ventrale (B) of *Menederopsis constrictus* Koch, 1954 (= *Archinamaqua lyleae* Schawaller, 2012 **syn. nov.**).

The morphology of the ovipositor of *M. constrictus* (= *A. lyleae*) clearly indicates the placement of this taxon within the subfamily Tenebrioninae (Tschinkel & Doyen 1980), i.e. 4-lobed coxites, well developed gonostyli (Fig. 1A). On the

other hand, this type of female terminalia and spiculum ventrale strongly differs from the one reported for the representatives of Tentyriini, i.e. fused lobes of coxites, strongly reduced gonostyli, elongate spiculum (Doyen 1993). Moreover, *M. constrictus* possesses exposed membranes between the apical abdominal ventrites, which is further supporting its Tenebrioninae affiliation (Watt 1974, Doyen 1993).

As already stated, up to now *Menederopsis constrictus* was known from a single, not dissected, female specimen (see Fig. 1 in Koch 1954b). Therefore, placement of this species remained questionable. However, the currently reported synonymy extended the available entomological material for this species allowing to fully test the hypothesis concerning its phylogenetic affiliation. As Schawaller (2012) already illustrated, *M. constrictus* posses a typical structure of male terminalia for Eurynotina (bipartite tegmen, penis without clavae). Furthermore, the herein presented morphology of female terminalia is consistent with the common type observed in the other representatives of this subtribe (see Banaszkiewicz 2006). Finally, because *M. constrictus* also possesses the stridulatory gula its position within Eurynotina seems to be morphologically strongly supported.

Taxonomy

Family Tenebrionidae Latreille, 1802
Subfamily Tenebrioninae Latreille, 1802
Tribe Platynotini Mulsant & Rey, 1853
Subtribe Eurynotina Mulsant & Rey, 1854
Genus *Menederopsis* Koch, 1954b: 16
Type species. *Menederopsis constrictus* Koch, 1954b (by original designation).
= ***Archinamaqua*** Schawaller, 2012: 80 **syn. nov.**
Type species. *Archinamaqua lyleae* Schawaller, 2012 (by original designation)

Menederopsis constrictus Koch, 1954b: 16

Type data: Holotype, female (Ditsong Museum): "Buffels River near Grootmist / 21 Nov. 1948 /leg. Univ. Calif. Transv. Mus. Exp."

= *Archinamaqua lyleae* Schawaller, 2012: 80 **syn. nov.**

Type data: Holotype (Ditsong Museum) and 35 paratypes (Ditsong Museum and Stuttgart State Museum of Natural History). For label information see Schawaller (2012).

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