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## ***Bordatius mthatha* sp.n., a remarkable new species of Psammodiini from South Africa (Coleoptera: Scarabaeidae)**

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### Abstract

A new species of *Bordatius* PITTINO & MARIANI, 1986 (Coleoptera: Scarabaeidae: Aphodiinae: Psammodiini) from South Africa is described: *B. mthatha*. An updated key for all known species is provided and the mouthparts of the genus are discussed in comparison with other Psammodiini and its implications regarding the ecology of the genus.

**Key words:** Coleoptera, Scarabaeidae, Aphodiinae, Psammodiini, South Africa, new species.

### Introduction

The genus *Bordatius* PITTINO & MARIANI, a rare taxon endemic to the African continent, is known from a handful of specimens and currently includes four described species, three from South Africa and one from Morocco. It was created by PITTINO & MARIANI (1986) to accommodate three new, morphologically divergent species of Psammodiini characterised by reduced pronotal sculpturation, carinate tibiae, narrow hind femora, and microptery. The fourth species was described by PITTINO (1996). A search in the accession collections at the British Museum of Natural History (BMNH) resulted in the discovery of some material collected by R.E. Turner in South Africa, which yielded two specimens of *Bordatius* representing a new species. This species differs from the rest in some key aspects, requiring a redefinition of the genus. In addition, the morphology of the mouthparts, in particular the maxillae, warrants discussion due to their distinctiveness.

### ***Bordatius mthatha* sp.n.**

TYPE LOCALITY: Mthatha, Transkei, South Africa.

TYPE MATERIAL: **Holotype** ♂ (BMNH): “S.Africa R.E. Turner; Brit. Mus. 1923-189” [printed label #1]; “Umtata Transkei 18.ii.-18.iii.1923.” [printed label #2]; “HOLOTYPUS *Bordatius mthatha* J.F.Maté 2014” [handwritten, red label, #3]. **Paratype** ♀ (BMNH): “S.Africa R.E. Turner; Brit. Mus. 1923-189” [printed label #1]; “Umtata Transkei 18.ii.-18.iii.1923.” [printed label #2]; “PARATYPUS *Bordatius mthatha* J.F.Maté 2014” [handwritten, yellow label, #3].

**DESCRIPTION:** 3,75 mm (HT) to 3,50 mm (PT) long. Body short, suboval and convex, more dilated in middle of elytra; body shiny, piceous with legs, antennae, palps and edge of elytra reddish. Laterally body strongly convex but not globose. Wings normally developed.

Head strongly convex, surface densely but shallowly granulate (Fig 1a) providing it with an almost wrinkled appearance when worn. Clypeus deeply emarginate and sharply rounded on either side of emargination. Genae small and long, only slightly produced, being nearly in line with eyes. Genae with one or two long setae.

Pronotum as in other *Bordatius* species, transverse and convex (pronotal length/width = 1.4). Surface regularly convex, with pronotal base heavily bordered and distinctly separated by indentation along border. Remarkably, for a Psammodiine there is no trace of furrows on the pronotum, the surface being perfectly smooth save for the regular, double punctation evenly

distributed on the pronotal surface, albeit not as strong anteriorly. On the anterolateral angles this punctation becomes denser but never to the point of merging punctures, which remain clearly separate. Smaller punctures 1/5 the diameter of the large ones, the later deep, with rounded edges. Surface between punctures smooth and shiny. Setation on lateral margins absent.

Elytra widest at middle, suboval (elytral length/width = 1,19) and nearly twice as long as pronotum ( $\times 1.86$ ), with strong and rather acute humeral denticles, and strongly bordered anteriorly. Striae strong and deep, with equally strong strial punctures with crenulate sides. Interstriae obviously convex throughout except on apex, where they become slightly carinate. Interstriae 4, 6 and 8 ending before apex. Surface very shiny but finely alutaceous. Faintly punctate on disc, becoming less impressed elsewhere such that even at high magnification ( $\times 50$ ) punctation is difficult to recognize. Scutellum narrowly triangular, 1.4 times as long as wide, and very small.

Metaventrite short (Fig. 1b) as is characteristic in this genus, with a strong medial sulcus. Disc of metaventrite shallowly concave and alutaceous, contrasting with smooth shiny and finely punctate metaventral margins. Metaventral triangles faint, largely limited to basal end.

Abdomen with five medially visible sternites; glabrous, shiny and impunctate, slightly alutaceous on sides. Anterior edges of sternites strongly fluted, particularly towards the sides. Surface regularly convex except for apical sternite which has a deep medial impression. Pygidium with elytral locking mechanism characteristic of all psammodines (transverse carina through the middle and anterior, medial sulcus); armed with two short apical setae.

Metatibia strongly carinate and narrow; upper metatibial spur slightly longer than first tarsal segment but clearly shorter than first two combined. Meso-, meta- and profemora smooth and shiny with only fine punctures. Metafemora slender.

Aedaeus (Fig. 1d) typical of other psammodines. Parameres short and wide, widened apically. Endophallus unarmed, only covered with fine denticles.

Etymology: named after the area where it was collected, Mthatha, formerly Umtata.

This species can be easily distinguished from the other known species in the genus by the combination of characters given in the key and by the genitalia. In particular the narrower body, metatarsal length, metaventral morphology, genae development and lack of pronotal furrows should suffice to distinguish this species from the others described to date.

### Discussion

*Bordatius mthatha* does not fully conform to the generic definition as stated by PITTINO & MARIANI (1986) but instead shares characters that “place” it somewhat between *Platyotomus* MULSANT and *Bordatius*. Without a comprehensive study of all other Psammodiini genera it would be premature to create yet another genus to accommodate a seemingly divergent species. Instead, a different phylogenetic framework must be developed to classify Psammodiini, one that relies more on internal morphological characters, rather than the external (and mostly dorsal) plesiomorphic ones, on which most Aphodiinae classifications have been based until now.

To fill the lack of data in this regard the morphology of the mouthparts is described below. Although the mouthparts of *B. mthatha* are grossly comparable to other psammodines, the combination of characters differs from others examined to date:

Epipharynx (Fig. 2a): Corypha small, highly reduced such that the anterior edge of the epipharynx is not produced at all but is straight instead. The setae that compose it are very short, peglike or almost molariform (this could be due individual age). The chaetopodium is composed of 4–5 short and strong spines, which run almost parallel to the anterior border of the epipharynx

to the chaetoparia. This reduction is characteristic of Psammodiini, however in *Bordatius mthatha* the haptomerum is still clearly visible and armed, albeit with very short spines, as in other Psammodiini species.

Maxilla (Fig. 2b): Strongly sclerotised and adapted for hard, saprophagic diets. The galea and lacinia are reduced compared to other Aphodine tribes. The galea in particular is strongly sclerotised, its anteromedial edge is reduced and is composed of three or four blunt grinding molars. The lacinia is also somewhat reduced and armed with a smaller number of strongly developed setae. These are much shorter and thicker than usual and, as is characteristic in detritivorous species, bluntly tipped.

Labium (Fig. 2c): Labium unremarkable compared to other Psammodines. Mentum rectangular with the palps reduced and thickened as in *Psammodius* FALLÉN and, as in this genus, with the paraglossa widely broadened distally. However, unlike in *Psammodius*, the setae along the paraglossa and glossa are generally unmodified and short and blunt, with just a few modified ones towards the distal edges.

The mouthparts of *Bordatius* strongly indicate a hard, grinding diet on particulate matter. They are similar to the Psammodine genera *Neopsammodius* RAKOVIČ and *Brindalus* LANDIN (as compared to preparations in VERDÚ et al. 2006), both psammophilous detritivores. No similarity was found in the mouthparts with *Platytomus* MULSANT that could suggest close affinity as suggested by PITTINO (1996), although only a North American species and a European one have been examined to date. The collecting localities in South Africa suggest that they could be psammophilous coastal dwellers. One species, *B. capensis* PITTINO & MARIANI, 1986, was collected from pitfall traps in such a habitat. During the preparation of the specimens, small amounts of sand were found within the abdominal cavity, although it was not possible to verify if they were ingested or had instead been collected under the elytra.

Available records suggest that the specimens are found during the wetter parts of the year (August, September and December), or at least that they are active on the surface during this time and hence observable. Targeted sampling by sieving in sandy habitats along the numerous parks in this area will yield additional records and probably new species.

#### Key to the species of *Bordatius*

The following key is partly a modification of the key published by PITTINO & MARIANI (1986), adding the new species as well as *B. muelleriae* PITTINO, 1996.

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|---|--|---|
| 1 | Pygidium with four apical setae. Meso- and metatibia not carinate. Eyes larger than antennal club. Elytral striae fine and not strongly impressed. North Africa..... |   |
|   | .....  | <i>tingitanus</i> PITTINO & MARIANI, 1986 |
| – | Pygidium with two or six apical setae. Meso- and metatibia distinctly carinate. Southern Africa.....   | 2   |
| 2 | Pygidium with two apical setae.....  | 3   |
| – | Pygidium with six apical setae.....  | <i>australis</i> PITTINO & MARIANI, 1986  |
| 3 | Eyes of same size as antennal club. Macropterous, elytra not fused.....  | <i>mthatha</i> sp.n.                      |
| – | Eyes smaller than antennal club. Micropterous, elytra fused.....   | <i>capensis</i> PITTINO & MARIANI, 1986   |
|   | .....  | <i>muelleriae</i> PITTINO, 1996           |

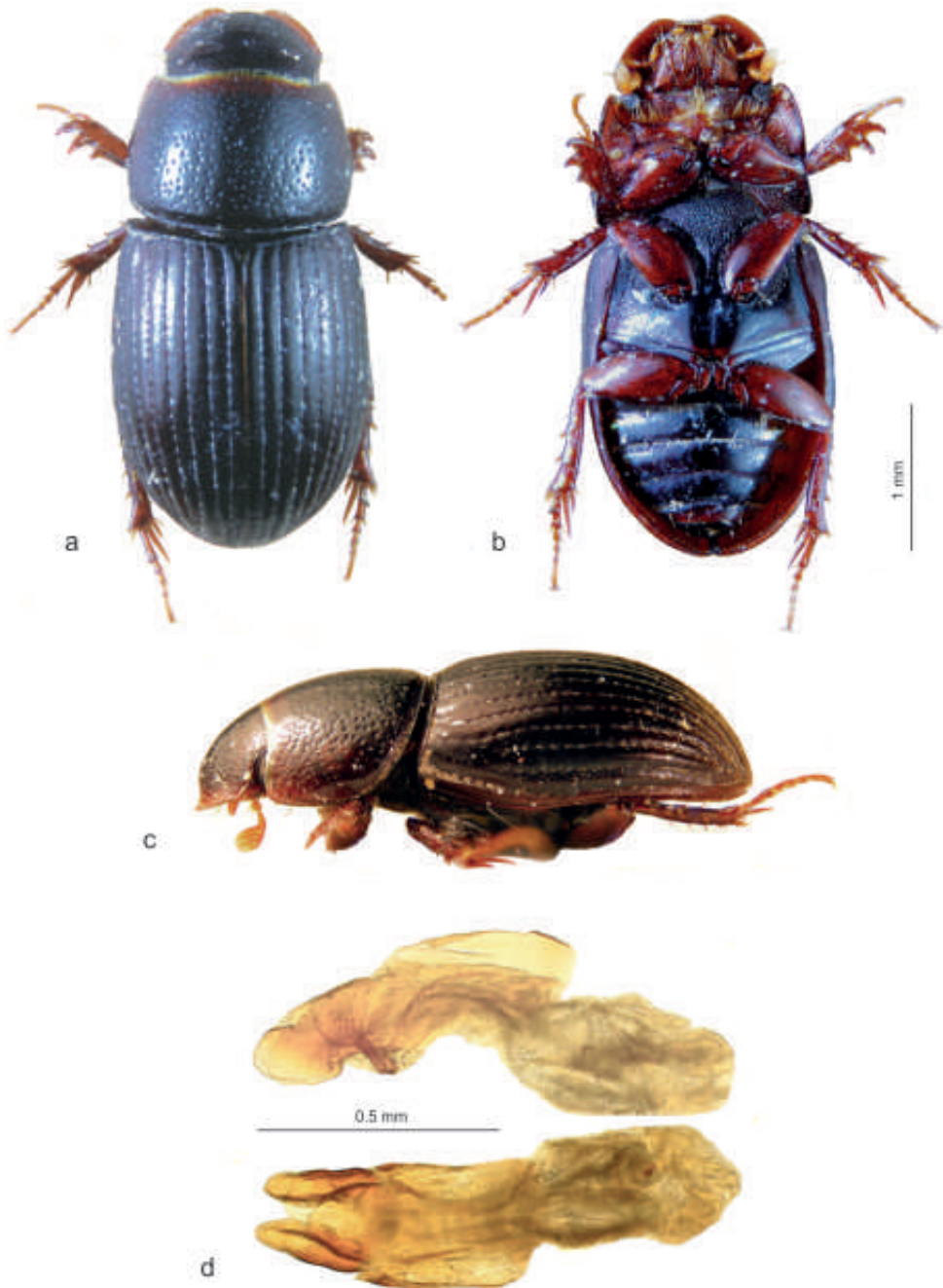


Fig. 1: *Bordatius mthatha*, a–c) habitus, a) dorsal, b) ventral, c) lateral, d) aedeagus, dorsal and lateral view.

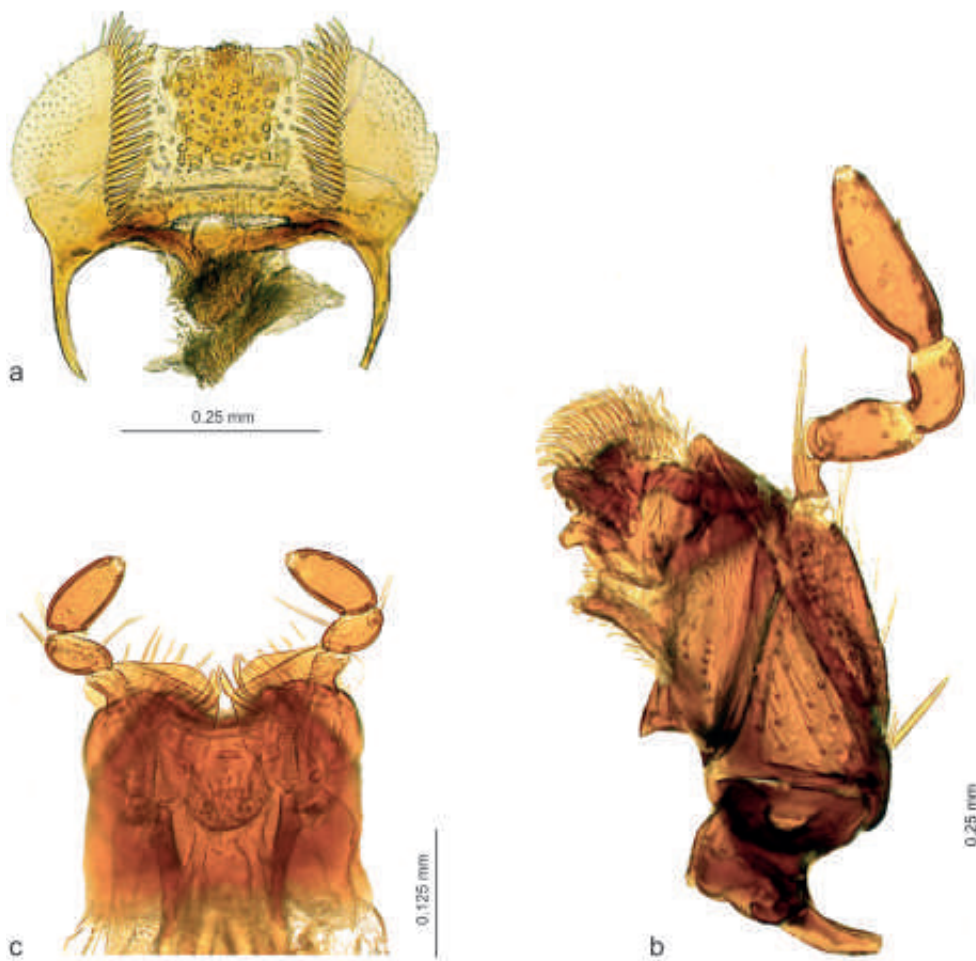


Fig. 2: *Bordatius mthatha*, a) epipharynx, b) maxilla, c) labium and mentum.

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