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## A new Kenyan species of *Bolboceras* KIRBY (Coleoptera: Geotrupidae: Bolboceratinae)

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### Abstract

Four species of *Bolboceras* KIRBY, 1819 (Coleoptera: Geotrupidae: Bolboceratinae) have been recorded from sub-Saharan Africa. In this paper, a new species, *B. kenyense*, is described from Kenya. The genus is briefly characterized and a key to the Afrotropical species of *Bolboceras* is given.

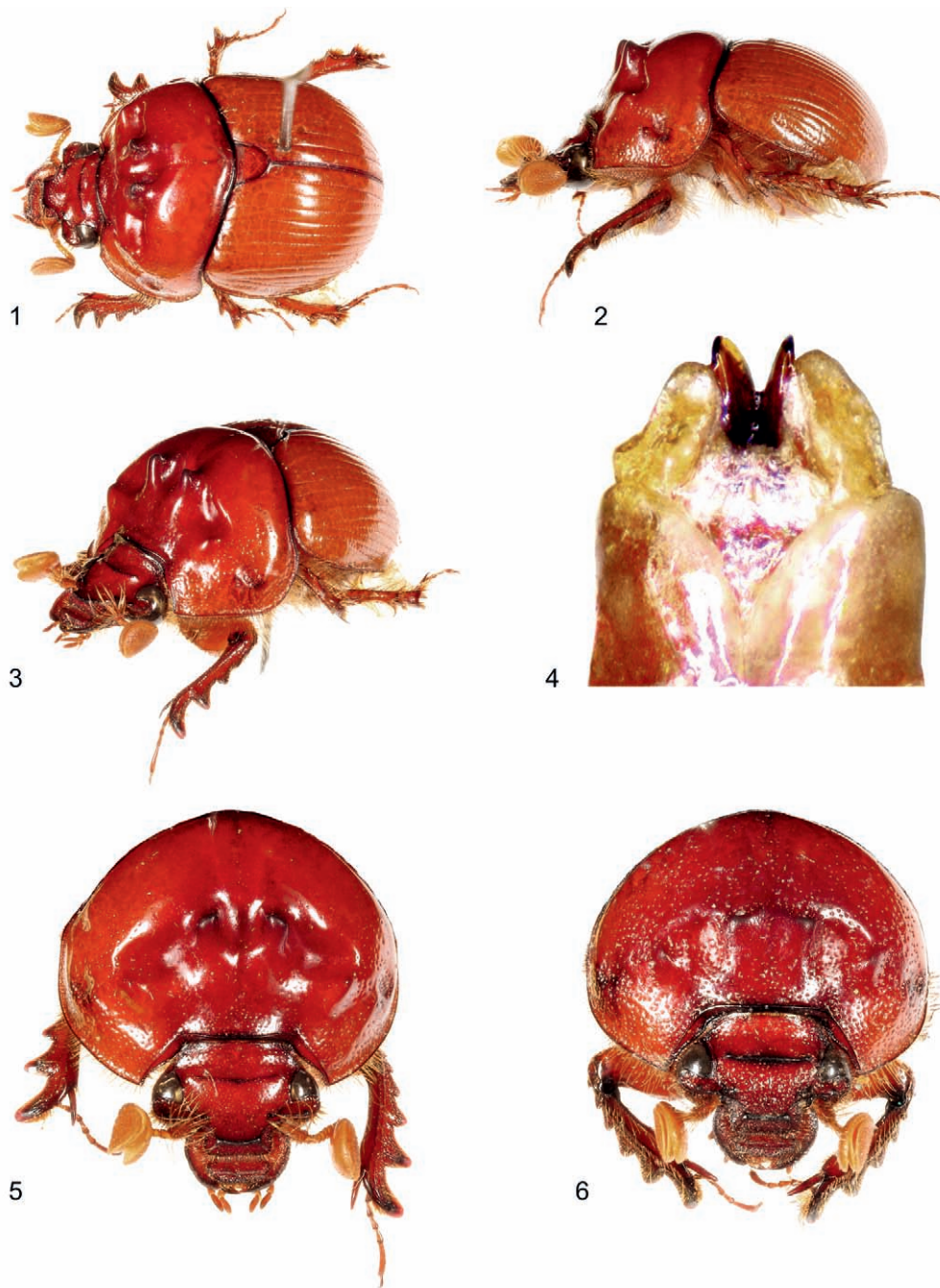
**Key words:** Coleoptera, Scarabaeoidea, Geotrupidae, Bolboceratinae, *Bolboceras*, key, new species, Kenya.

### Introduction

Most of the species in the genus *Bolboceras* KIRBY, 1819 occur in South Asia (particularly the Indian Subcontinent, cf. KRIKKEN 2011). Four species have been reported from sub-Saharan Africa. A new species from Kenya is added herein. This species is represented by three major and two minor males, which, judged from their genitalia, belong to a single species – they are from Tsavo and Meru. The predominant natural vegetation in these regions, as in most of central and southern Kenya, is deciduous orthophyll savanna. Virtually all East African Bolboceratinae in the collections at hand (members of other genera included) were collected at light. *Bolboceras* specimens were not commonly seen during visits to East Africa – my campaigns, including an estimated total of 400 hours collecting at light during rainy seasons, spread over almost a decade, yielded only nine specimens (four of these are females close to another species, *B. niloticum* BOUCOMONT, 1928). Representatives of certain other genera of Bolboceratinae appeared more numerous.

The shape of the head and pronotum (their outline and pattern of protrusions and impressions), along with the structure of the male genitalia, are the basic features of the genus, their details varying according to species. For more generic background on *Bolboceras* and technical conventions see my review of the group of Oriental species around *B. nigricans* WESTWOOD, 1848 (KRIKKEN 2011). In this paper the genus is diagnosed and explicitly contrasted with other Afrotropical Bolboceratinae (currently ca. 110 species in ca. 15 genera); a key to the five known Afrotropical species is given, and the new Kenyan species is described and illustrated. I am sure that more African *Bolboceras* species will be added in the years ahead, thus warranting a full synopsis and a phylogenetic analysis. Work on Asian *Bolboceras* and other Bolboceratinae is in progress.

In passing it may be noted that, although recent papers have expanded and improved our knowledge on bolboceratine diversity and distribution in Africa, nothing particular has appeared on *Bolboceras* as currently conceived. The short generic account in KRIKKEN (1984, under *Indobolbus*) aside, the present paper must be the first with substance since PAULIAN (1941).



Figs. 1–6: *Bolboceras*, 1–5) *B. kenyense*, holotype (major male), pronotal width 8.0 mm; 6) *B. niloticum*, topotype (female, Sudan: Medani), pronotal width 8.1 mm. – Habitus, 1) dorsal, 2) lateral, 3) oblique. Aedeagus, 4) distal part, upper side, maximum width 0.9 mm. Forebody, 5, 6) dorsofrontal.

***Bolboceras* KIRBY, 1819**

**DIAGNOSIS:** Frons with long, transverse, interocular ridge (length at least half of interocular distance); remainder of head surface lacking non-marginal ridges or other protrusion(s), fine ridge issuing from genal angle (delimiting eye canthus) on each side. Clypeal outline subtrapeziform or tapering to anteromedian point (marginal border of clypeus never evenly arcuate-convex in full face view). Eye canthus not completely dividing eye into upper and lower part (i.e., canthus not reaching an expanded temporal lobe), distal section of canthus narrowing to rounded tip (with angle or tubercle on anterior edge, separating straight proximal from arcuate distal section). Pronotum with anterior declivity topped by transverse row of four variably pronounced protrusions. Anteromedian margin of pronotum without any protrusion(s). Pronotal base marginate (variably delimited in front of scutellum). Scutellum broad, lateral sinuate edges fitting against elytra without slit. Seven finely punctate striae between elytral suture and humeral umbone, stria 1 reaching sinuate scutellar side, others reaching elytral base (which is emarginate). Antennal club large but not conspicuously inflated; central disc on internal side of antennomere 1 glabrous, but not abruptly separated from surrounding pubescent surface. Abdominal tip unmodified. Mesocoxae distinctly separated by (anteriorly abruptly declivous) metaventral process. Protibia with six tapering denticles on outer edge; protarsal segment 1 not much longer than 2. Aedeagus with strongly sclerotized (dark-brown) mobile pair of stalks on median apparatus, usually (when at rest, in non-extruded state) accommodated inside relatively simple parameral sheaths. Sexual dimorphism (as far as known) negligible. Unicolourous yellow to brown. Dorsum generally glabrous. Body length 6–17 mm. Immature stages unknown.

**TYPE SPECIES:** *Scarabaeus quadridens* FABRICIUS, 1781 (ICZN 2006; cf. KRIKKEN 2011). Junior synonym: *Indobolbus* NIKOLAJEV, 1979, same type species.

**RANGE AND ECOLOGY:** Oriental (ca. 20 spp.), Palaearctic (1 sp.), Afrotropical (5 spp.). No records from central and southern parts of Africa. Open forest and savanna, at light; tunnellers, possibly associated with hygeic fungi.

**Comments on previously described species (see key below)**

The African record of *Bolboceras nigricans*, common in parts of India, is based on a single worn male from Tanzania: Dar-es-Salaam (ex Boucomont coll., MNHN, KRIKKEN 2011); fresh material is needed to confirm the identity and/or exclude accidental introduction or mislabelling. The African records of the reputedly Afro-Oriental *B. inaequale* WESTWOOD, 1848, from as far west as Senegal, are based on PAULIAN (1941) and equally need further verification – preferably on fresh series including males.

The description by PAULIAN (1941) contains some errors. For instance for *B. niloticum* he gave a body length (6–7 mm) different from the original description by BOUCOMONT (1928: length 8–11 mm). I studied a topotypical female of 11 mm, identified by Boucomont in 1930 (BMNH, forebody in Fig. 6). PAULIAN (1941) added records of *B. gaujani* FAIRMAIRE, 1892 from regions around Djibouti (the type came from Obock); neither he nor I could trace the type. His description of the pronotal ornamentation differs from that of FAIRMAIRE (1892). PAULIAN (1941: fig. 21) gives a drawing of the head of his *B. gaujani*.

**Key to Afrotropical *Bolboceras* species (major males)**

- 1 Clypeus with lateral perimarginal ridges converging to single, anteromedian protrusion. Length 11–15 mm. Tanzania, India ..... *nigricans* WESTWOOD, 1848

- Clypeus subtrapeziform, anterior, transverse perimarginal ridge long, not forming a single median point ..... 2
- 2 Pronotum with a usually transverse concavity situated behind closely set paramedian protrusions ..... 3
- Pronotum with rounded concavity between paramedian protrusions or without median concavity ..... 4
- 3 Discomedian concavity of pronotum posteriorly delimited by roughly W-shaped rim. Anterolateral angle on eye canthus more or less distinct. Length 7–12 mm. Northern sub-Saharan Africa, India ..... *inaequale* WESTWOOD, 1848
- Discomedian impression of pronotum transverse but without W-shaped posterior rim. Anterolateral angle on eye canthus strongly protuberant. Length ca. 11 mm. Northeastern Africa ..... *gaujani* FAIRMAIRE, 1892
- 4 Pronotal paramedian protrusions low, somewhat transverse, subcontiguous, not separated by deeper median impression (Fig. 6). Length 8–11 mm (and less?). Northeastern Africa ..... *niloticum* BOUCOMONT, 1928
- Pronotal paramedian protrusions erect, their tip rounded in axial view (Fig. 5), distinctly separated by median impression. Length 8.5–11.0 mm. Kenya ..... *kenyense* sp.n.

### ***Bolboceras kenyense* sp.n.**

(Figs. 1–5)

TYPE MATERIAL: **Holotype** ♂, in National Museum of Natural History Naturalis (RMNH), Leiden, with the following data: KENYA: Tsavo NP (E), Voi: Mzinga, 3°21'S 38°37'E, ca. 600 m, 19.–31.XII.1972, leg. J. Krikken & C. Smeenk, “#45”, deciduous orthophyll savanna, at light. **Paratypes**, 4 ♂♂ (RMNH): same locality data but 7.I.1972, C. Smeenk (major); same data as holotype, but 1.1973, leg. J. Krikken “#73” (minor). Meru NP: Camp Ground, 00°10'N 38°13'E, ca. 600 m, 9.IV.1981, leg. J. Krikken et al. “#326”, deciduous orthophyll savanna, at light (minor); same area, without locality name, 00°13'N 38°10'E, 13.IV.1981, leg. J. Krikken et al., same ecology (major).

**DIFFERENTIAL DIAGNOSIS:** This species agrees with the definition of the *B. quadridens* species group (KRIKKEN 2011) in having the subtrapeziform clypeus, the distinct set of four pronotal protrusions separated by impressions (major males), a sparse pronotal punctation, and a body size of 8.5–11.0 mm. The aedeagal sclerotized stalks (dark brown in Fig. 4) are spatuliform (tip not hooked or recurved); parameral sheath on either side slightly membranous, lobiform (tip blunt, not acuminate); and no extra paramedian aedeagal struts inside and parallel to the pair of sclerotized stalks. Paramedian tubercles on pronotum of major males broad, distinct, erect, but hardly higher than pronotal disc, their tip rounded in axial view (not blunt-transverse or pointed); concavities distinct, discomedian one widely separating paramedian protrusions (compare Figs. 5 and 6); discolateral concavity in major males with anterior and posterior rim parallel (appearing somewhat rectangular in dorsal view), discolateral protrusion low but distinct. Interocular ridge long (ca. 0.8 interocular distance), and crest fine, not particularly modified. Distal section of eye canthus relatively short, widely rounded from distinct anterolateral tubercle. Most of pronotum, particularly disc on either side of midline, smooth, shining, sparsely punctate. Clypeus with numerous distinct punctures. Colour generally light to medium brown.

**DESCRIPTION** (holotype, major male): Body length ca. 11 mm. Colour medium-brown (slightly rufous), shiny, locally sericeous on pronotum.

Labrum with straight anteromedian border, transverse ridge on upper surface distinct. Clypeal surface with supra-antrolateral angles distinct; intervening, transverse, anterior ridge slightly convex in anterior view, almost straight; lateral perimarginal ridges distinct, moderately evenly curved, genal angle distinct. Clypeus densely, distinctly punctate, frons sparsely punctate; finer secondary punctation abundant to sparse on frons. Anterior edge of eye canthus straight towards

slight anterolateral tubercle, edge arcuate-raised from tubercle to tip of short distal lobe; surface rugulate-punctate; paraocular ridge fine, issuing from genal angle, virtually straight, extending posteriorly, effaced along eye; fine ridge noticeable on side of vertex. Transverse interocular elevation long, low, not reaching paraocular ridges, lateral slope slight, crest fine, unmodified, straight to obtuse lateral angle on either side (axial view).

Pronotum immediately behind anteromedian border shortly depressed (lateral view); outline of margined anterior border convex (dorsal view); anterior declivity steep (vaguely microreticulate between punctation, pronotal sides also microreticulate); paramedian and discolateral protrusions distinctly protuberant, paramedians with rounded tip (axial view); discomedian impression distinct, rounded, not continuing over anterior declivity; discolateral impression also distinct, anterior and posterior rim transverse, outside discolateral protrusion an additional shallow depression; bottom of three discal concavities matt, microreticulate; basomedian surface with punctate midline hardly impressed; anterolateral plane angle of pronotum ca. 100°. Pronotal surface with double punctation; primary punctation (size slightly variable) laterally and anteriorly abundant to dense, from upper edge of lateral (punctate) fovea onto basomedian surface a cluster of 30–40 distinct punctures; secondary punctation sparse, minute. Pronotal base marginate (medially poorly delineated). Scutellum with scattered, sparse, double punctation.

Elytra with discal striae shallowly impressed, finely punctate; punctures separated by 3–6 puncture diameters, with barely crenulated interstriae. Elytral interstriae slightly convex, vaguely, sparsely, minutely punctate.

Protibia with six distinct external denticles; apex unmodified, with robust tapering spur. Meso- and metatibiae with bilobate, apical and one complete antepical fossorial elevation (their crests fringed with fine spines, with robust outer angle in mesotibial antepical elevation).

Aedeagus (Fig. 4) has sclerotized stalks with rounded tip, parameral sheaths with blunt tip.

Estimated measurements of respective parts in mm. Median length of head (full-face, excluding labrum and mandibles) 2.2 mm, width 3.5 mm. Median length of pronotum (dorsal) 4.6 mm, maximum width 8.0 mm. Median length of scutellum 1.1 mm, maximum width 1.5 mm. Sutural length of elytra 3.7 mm, maximum width combined 8.1 mm. Width of genital capsule 0.9 mm.

VARIATION: Differences in size and development of ornamentation are evident, but the external details of the genitalia of the five males are similar, apparently supporting conspecificity (median aedeagal apparatus extruded in minor paratype from Voi). Minors have reduced protrusions and pronotal impressions and are presumably easiest to identify by association with majors in series. Punctation on forebody variable, much less numerous in minors.

ETYMOLOGY: Species name derived from the country name Kenya.

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I thank the Muséum National d'Histoire Naturelle (MNHN), Paris and The Natural History Museum (BMNH), London, for providing access to their holdings of Afrotropical Bolboceratinae. My colleague, Chris Smeenk, was most helpful with securing scarabs while working as a professional eagle watcher in Tsavo in the early 1970s.

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