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THE AFRO-ASIAN *BOLBOCEROIDES VALIDUS* GROUP (COLEOPTERA: GEOTRUPIDAE)

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With 13 text figures and two plates

ABSTRACT

Five species are placed in the *Bolboceroides validus* group, which is diagnosed. Four of the species are transferred from *Bolboceras*, viz. *Bolboceras serrripes* Fairmaire, *B. validum* Klug (= *rollii* Müller), *B. carinicolle* Laporte (= *B. capitatum* Westwood, syn. nov.), *B. scotti* (Paulian); *Bolboceroides kubaricus* sp. nov. (Yemen) and *B. serrripes tsavoensis* subsp. nov. (East Kenya, Somalia) are diagnosed. An illustrated key to the males is given. For *Bolboceras carinicolle* Laporte and *B. capitatum* Westwood lectotypes are designated. New records are given. In a footnote the synonymy of the names *Bolboceras* and *Odontaeus* is briefly discussed.

Because only some West Palaearctic and Nearctic species can be retained in *Bolboceras* Kirby¹⁾, the Afro-Asian group of species around *B. validum* Klug, hitherto combined with that generic name, has to be accommodated elsewhere. The ridged pronotal base, and the glabrous area on the proximal side of the antennal club render this *validum* group suitable for a position in the recently proposed genus *Bolboceroides* Vulcano et al. (1969). The males of the *validus* group also share a characteristic cephalic and pronotal ornamentation, but, like in the case of the rather closely related *iphicles* group

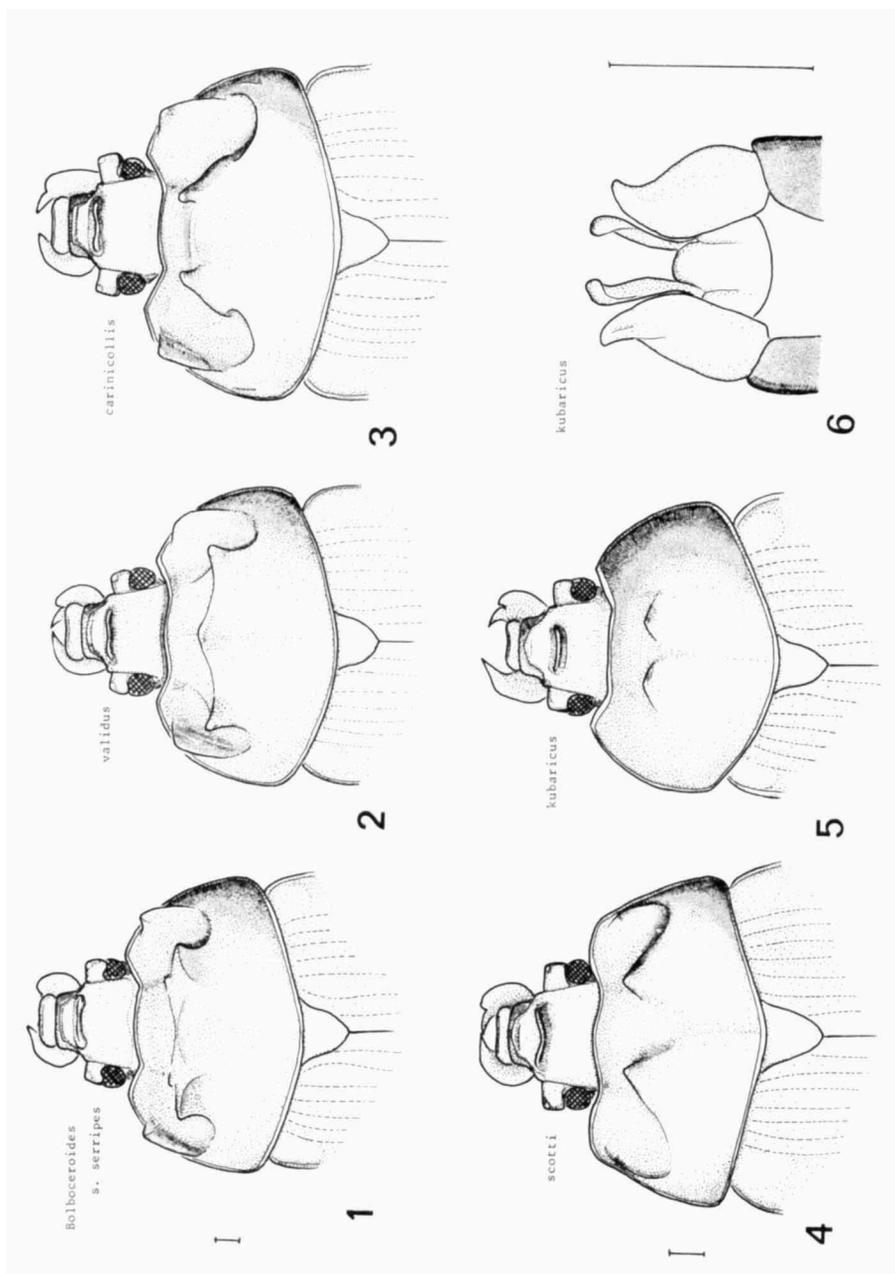
1) The synonymy of *Bolboceras* Kirby (1819: 459) and *Odontaeus* Dejean (1821: 56) was explained by Cartwright (1953: 101), and subsequent American authors have recognized this. The type-species of both genera are identical. In Europe the synonym *Odontaeus* is widely used (e.g., Machatschke, 1969, Pope, 1977, Baraud, 1977). Without going into detail I should add that, while in early 19th century works *Odontaeus* is attributed to various manuscript authors, a printed usage seems to have been overlooked: "*Scarabaeus mobilicornis*, Marsh., forms the genus *Odontaeus*, Köppe" (Samouelle, 1819: 189; same spelling used on pp. 389, 483). I have not found an earlier usage. Kirby's paper was published about July 1819 (not in 1818, cf. Mathews, 1925: 138). It depends therefore on a more detailed publication date of Samouelle's Compendium whether *Bolboceras* Kirby or *Odontaeus* Samouelle has priority, and this has to be checked.

(Krikken, 1977), this, nor any of the other features mentioned below in the group diagnosis, would now justify a position in a separate genus. I recognize five species in the *validus* group, ranging from West Africa to North India; one Arabian species is new, and a good series from East Africa is here considered to represent a new subspecies. On the whole the available material is very scanty, and future collecting may well show the taxonomy of the *validus* group to be more complicated than suggested here.

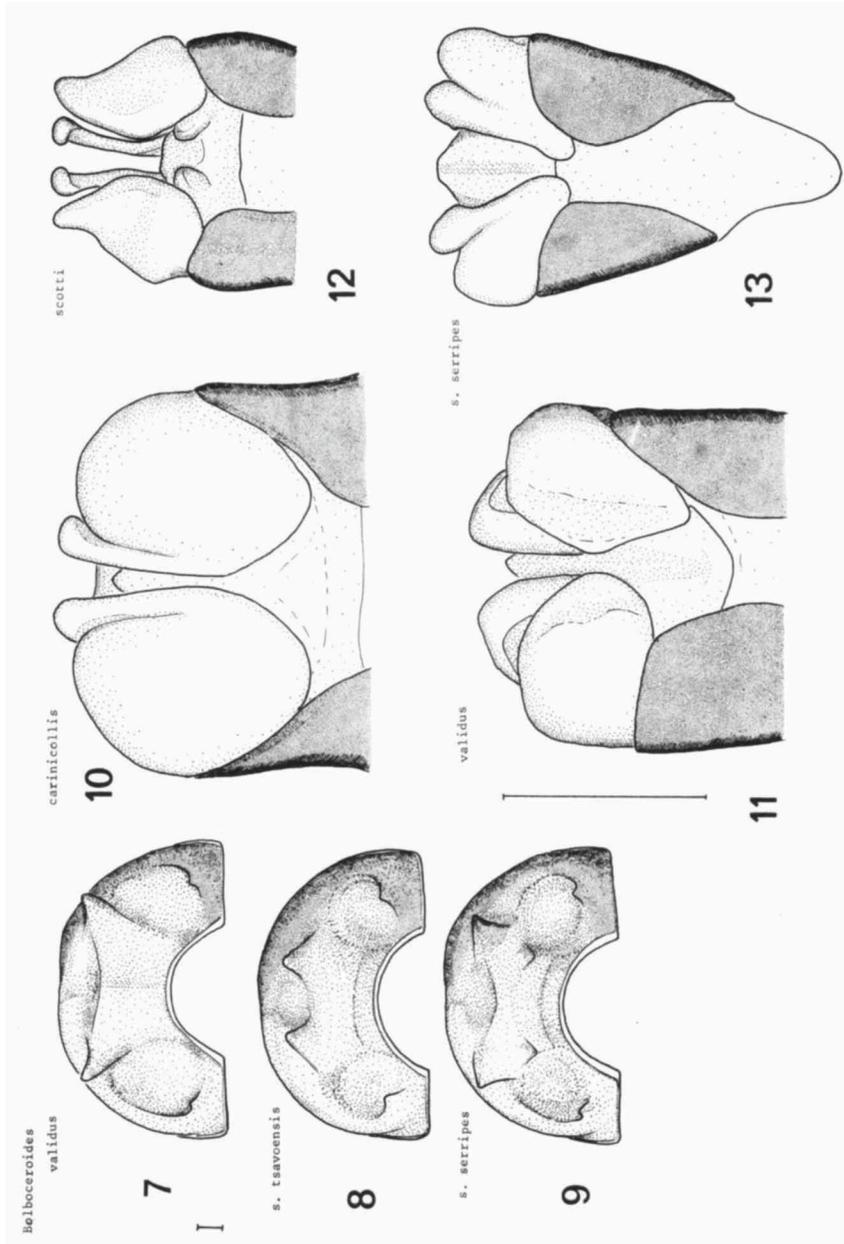
***Bolboceroides validus* group**

Diagnosis (generic characters included). — Head of males only with transverse ridge on clypeus or clypeofrontal transition; females with transverse ridge on frons; ridge never connected with marginal ridge. Pronotum with two paramedian and two lateral prominences, these pairs separated by more or less distinct concavity; lateral prominences may be reduced (fig. 5). Scutellum deltoid, sides more or less sinuate; length/width ratio between 1 and 2. Antennal club not thicker than flagellar segments combined, distal side of club segment 3 evenly convex; glabrous, polished area on proximal side of club segment 1 gradually passing to pubescent parts. Middle coxae strongly separated, anterior lobe of metasternum wide, unmodified, lacking perimarginal ridge, mesometasternal suture distinct in front, anterior declivity (ventral view) concave; metasternal disc rhomboid in outline.

Outline of mandibles in dorsal view arcuate (apart from usual lobes), left side may be slightly sinuate. Labrum variably ridged along anterior margin. Outline of clypeus in dorsal view approximately trapeziform; perimarginal ridge present and unmodified. Apart from extension of paraocular ridge, vertex gradually sloping to tempora; vertex unmodified. Anterolateral angle of eye-canthus well pronounced. Eye-canthus and temporal lobe separated. Dorsally visible area of eyes small (see figures). All sides of pronotum with raised margin. Elytral epipleuron reaching apicosutural angle. Elytral base immarginate; 7 striae between elytral suture and humeral umbone, stria 1 terminating at side of scutellum, others reaching base; striae at most superficially impressed, interstriae at most feebly convex. Full-face outline of antennal club circular or nearly so. Anterior paramedian costae of prosternum distinct, posteromedian ridge in lateral view angulate or not. Fossorial elevations of middle and hind tibiae with bilobate crest, the antepical lobes connected by ridge, the others (usually) isolated. Fore tibia unmodified, with 6 or 7 external denticles; terminal spur robust, elongately triangular, with acute apex. Tarsi unmodified. Aedeagus strongly sclerotized, parameres distinct, with various lobes and/or styli (figs. 6, 10-13). Colour uniformly light- or medium-brown. Body medium-sized to large (length 15-23 mm).



Figs. 1-5. Fore-body, dorsal view, of *Bolboceroides* males. 1, *B. serripes serripes*, Amboseli; 2, *B. validus*, Abeche; 3, *B. carinicollis*; 4, *B. scotti*, Sana/Beicha; 5, *B. kubaricus*, holotype. Fig. 6. Aedeagus, dorsal view, of *B. kubaricus*, holotype. Scale lines = 1 mm, 1-3: same scale, 4-5: same scale.



Figs. 7-9. Pronotum, frontal view, of *Bolboceroides* males. 7, *B. validus*, Abéché; 8, *B. serripes tsavoensis*, holotype; 9, *B. serripes serripes*, Amboseli. Figs. 10-13. Aedeagus, dorsal view. 10, *B. carinicollis*; 11, *B. validus*, Chartoum; 12, *B. scotti*, Sana/Beicha; 13, *serripes serripes*, Amboseli (entire phallus). Scale lines = 1 mm; 7-9: same scale, 10-13: same scale.

Affinities. — This group is here placed in *Bolboceroides* Vulcano et al., and stands near the *iphicles* group. The *validus* group species strongly resemble the members of a new genus around *Bolboceras calanus* Westwood (Krikken, revision in preparation). The configuration of the cephalic and pronotal protrusions, the shape of the intercoxal lobe of the metasternum, and the structure of the aedeagus easily distinguish the *validus* group species from these related groups. Later I will present a comprehensive subdivision of *Bolboceroides* and other Afro-Asian Bolboceratini.

Distribution and composition. — Five species from North India, Pakistan, Arabia, and the northern half of the Afrotropical Region.

Bionomics. — Collected at light in the open vegetation of (semi-) arid regions.

KEY TO THE MALES OF THE VALIDUS GROUP

1. Aedeagus with pair of long ventral styli (figs. 6, 12). — Arabia . . . 2
 - Each paramere with ventral, laterally reflexed parameral lobe (figs. 10, 11, 13) 3
2. Pronotum with abundant double punctation, punctures not contiguous. Outline of pronotum very characteristic, fig. 4. Length 15-18 mm *scotti*
 - Pronotum largely rugulate-punctate. Outline of pronotum different, compare fig. 5 with 4. Length ♂♀ 14-17 mm *kubaricus*
3. Large species (length ♂♀ 19-23 mm) from South Asia with opaque elytra. Aedeagus, fig. 10 *carinicollis*
 - Smaller species (mostly 20 mm or less long) with shiny elytra from Africa and Arabia 4
4. Ventral lobe of paramere larger (fig. 11). Paramedian protrusion lacking supplementary protrusion on anterior declivity (figs. 2, 7). Anterior declivity of pronotum usually abundantly, distinctly punctate, non-microreticulate; base of anterior declivity steeper. Length ♂♀ 18-21 mm *validus*
 - Ventral lobe of paramere smaller (fig. 13). Anterior declivity of pronotum indistinctly, sparsely punctate, superiorly opaque due to microreticulation; basal surface sloping down more gently (in lateral view at an angle of ca 45° to longitudinal axis) *serripes*, 5
5. East Kenya and (part of) Somalia. Paramedian protrusions of pronotum upright, coniform (fig. 8); anterior declivity usually lacking supplementary protrusions. Length ♂♀ 15-21 mm *s. tsavoensis*
 - Other parts of East Africa. Paramedian protrusions of pronotum directed laterad, more or less pyramidiform (fig. 9); anterior declivity of large males with supplementary protrusions. Length ♂♀ 17-20 mm . *s. serripes*

DIAGNOSES, RECORDS, OTHER NOTES

Bolboceroides serripes (Fairmaire) comb. nov.

Bolboceras serripes Fairmaire, 1882: 19 (diagnosis ♀, type-loc. Somaliland). Gestro, 1892: 756 (♂). Paulian, 1941: 18 (= *B. validum* Klug). Scott in Paulian 1948: 145 (records doubtful).

Identification. — This species is certainly different from *B. validus*, but the existence of two subspecies, plus the individual variation, somewhat obliterate the exoskeletal diagnostic characters. In case of doubt the aedeagus should be examined. The females of *B. serripes* and *B. validus* are scarcely different.

Subspecies. — The collection of *B. serripes* made at Voi, Kenya, with pronotal protrusions constantly different from those of the *B. validus* and *B. serripes* males recorded so far, led me to study the types of those species. The monotype of *B. serripes* is a female with a microreticulate, scarcely punctate anterior pronotal declivity. Although on the basis of this single female little can be said about the subspecific status of the population concerned, I tentatively accept the allocation to *B. serripes* of a male by Gestro (1892). This then becomes the nominate subspecies, whilst a new subspecific name has to be proposed for the Voi material.

Bolboceroides serripes serripes (Fairmaire) (figs. 1, 9, 13)

Material examined. — 3 males, 2 females.

Holotype, female, from "Museum Paris / Somoli / Quarsangueli / Revoil 1881" (all in capitals). Gestro's male and female from Errer-es-Jaghir, 2-viii-1891, Br. Rob. (Genoa museum). Kenya: Amboseli, 1-iii-1972, H. & J. Hazewinkel (1 ♂, van Ooststroom collection; Magadi, v-19.18, A. J. Rhead (1 ♂, Nairobi museum).

Bolboceroides serripes tsavoensis subsp. nov. (fig. 8, pl. 1, pl. 2 figs 1, 2)

Material examined. — 9 males, 8 females.

Holotype, male, from Kenya: Voi Mzinga, 7-i-1972, C. Smeenk (Leiden museum). Paratypes as follows.

Kenya: Voi Mzinga, 7-i (2 ♀), 8-i (1 ♂), 19-i (1 ♂, 1 ♀), 20-i (1 ♂, 1 ♀), 3-xii (1 ♀), all 1972, C. Smeenk; same locality, 19-31-xii-1972, J. Krikken (3 ♂, 2 ♀); Voi Safari Lodge, 1-6-i-1973, J. Krikken (1 ♀); Voi Lion Hill, 27-xi-1974, J. Krikken & A. L. van Berge Henegouwen (1 ♂); all these specimens collected at light in the deciduous orthophyll savanna of Tsavo East National Park; all kept in Leiden. Somalia: Arboreim, W of Argeissa, x-1954, P. R. O. Bally (1 ♂, Nairobi museum).

Variation. — Length ♂ 15.5-20, ♀ 18-20.5 mm. One male with reduced pronotal protrusions seen.

Bolboceroides validus (Klug) comb. nov. (figs. 2, 7, 11, pl. 2 fig. 3)

Bolboceras validus Klug, 1843: 47 (diagnosis, type-loc. Arabia). Paulian, 1941: 10 (in key), 18 (= *serripes* Fairm.), figs. 8, 18, 33, 53. Scott in Paulian, 1948: 146 (record cf. *B. kubaricum*).

Bolboceras rollii Müller, 1941: 347 (diagnosis ♂ ♀, type-loc. Asmara). Paulian, 1942: 141 (synonymy).

Identification. — *Bolboceroides validus* is not easily distinguishable from the other species, and I can hardly add more to the information given by means of the key (couplet 4) and the illustrations. *B. validus* should not be confounded with *B.s. serripes*, as has been done since Paulian (1941).

Material examined. — 8 males, 3 females.

Holotype of *Bolboceras validus*, male, with illegible label, apparently from "das wüste Arabien"; parameres had been ruined; kept in Berlin museum. Holotype of *B. rollii*, male, from Asmara, 1939, Rolli; female "cotype" from Tessenei, viii-1935, Remedelli (Triest museum). Further specimens from Ethiopia; Dire Daoua, viii (1 ♀), 1919, A. Marchand (1 ♂); no locality, 1854 (1 ♂) (all in Paris museum). Sudan: Chartoum (1 ♂, Berlin museum). Chad: Abéché, 7-ix (1 ♀), 25-ix-1935 (1 ♂) (both Paris museum); ditto, 18-xi-1973, Slingerland (1 ♂, Kuijten collection). Niger: Aïr: Azbin, 1908, Posth (1 ♂, Paris museum). Several males had their abdomens missing. Paulian (1941: 19) suggested a very wide distribution; some records might pertain to *B. serripes* or other species — I have not recovered his material from Zaire and Damaraland.

Bolboceroides carinicollis (Laporte) comb. nov. (figs. 3, 10, pl. 2 fig. 4)

Bolboceras carenicollis Laporte, 1840: 104 (diagnosis, type-loc. Indes-Orientales). Westwood, 1848a: 385; 1848b: 354; 1852: 21 (spelled *carinicollis*), pl. 4 fig. 5 (fore-body). Boucomont, 1912: 8 (*carinicolle*).

Bolboceras capitatum Westwood, 1848a: 386 (diagnosis, type-loc. Assam); 1848b: 355; 1852: 24 (♂, ♀ of different species), pl. 3 figs. 20 (♂ fore-body), 21, 21a (♀ fore-body). Syn. nov.

Identification. — In addition to those mentioned in the key, the following characters may be used. Pronotum with triple punctuation (magnification × 50), secondary and tertiary punctuation abundant, evenly distributed on disc, primary punctuation sparse. Pronotal protrusions variable in accordance with total size, but paramedian protrusions always upright. Crest of frontal elevation of female not between anterior corner of eyes but slightly more rostrad.

Notes. — There can be no doubt that *Bolboceras capitatum* Westwood is the same species. I have seen the types of both names in Oxford. One of the reasons why Westwood himself didn't see this is his subsequent allocation of the female of a different species to his *Bolboceras capitatum*. The type of

Bolbocheras carinicolle is also a female; Westwood's second female seems to belong in the group around *Bolbocheras calanus* Westwood. As it is not unambiguously clear that Laporte and Westwood based their first diagnoses on a single specimen, lectotypes are here designated. The female lectotype of *Bolbocheras carenicollis* Laporte has a round type-label, a label reading: "TYPE COL: 524 / Bolbocheras / carenicollis / Cast. / HOPE DEPT. OXFORD", plus a possibly contemporary but illegible label.

In Oxford there are three "*capitatum*" specimens labelled type, two of which seem not to have been part of the original material; the female was mentioned above; one male seems to have been considered an intermediate variety ("var. interm."); the lectotype is a male with the following labels: "Bolbocheras / capitatus / Westw. Ind. / or. Boys" (in Westwood's handwriting), a rhomboid label "W" (= from Westwood's collection), two curatorial labels, the most recent one reading "TYPE COL: 510 2/3 / Bolbocheras / carenicollis / Cast. / HOPE DEPT. OXFORD".

Material examined. — 5 males, 3 females.

In addition to the types mentioned, I studied three males and two females. India: Musserabad, on cow dung (1 ♂); Pakistan: Lyallpur, 30-vii-1929 (1 ♀); no locality (1 ♀); "Ceylon?" (1 ♂) (all in the British Museum); 1 ♂ "ex Capt. Boys" (Paris museum).

Bolbocheroides scotti (Paulian) comb. nov. (figs. 4, 12, pl. 2 fig. 5)

Bolbocheras scotti Paulian, 1948: 144 (diagnosis ♂ ♀, type-loc. Jebel Jihaf), fig. 2 (habitus).

Identification. — *Bolbocheroides scotti* has a most characteristic dorsal outline of the pronotum. The clypeofrontal ridge is feebly but distinctly V-shaped, the anterior margin of the clypeus somewhat pointed. Contrary to *B. kubaricus*, this species is very shiny. The slight differences in the aedeagi of *B. scotti* and *B. kubaricus* may not be constant.

Note. — To me the specimens described as females (from Dhala) seem males (of *B. kubaricus*?); unfortunately, the abdomens are missing.

Material examined. — 2 males.

Holotype, male, from Aden: Jebel-Jihaf, x-1937, H. Scott & E. B. Britton, 7100 ft, at light (British Museum). Yemen: Sana to Beicha, 1-5-ix-1962, G. Popov (1 ♂, British Museum).

Bolbocheroides kubaricus sp. nov. (figs. 5, 6, pl. 1 fig. 6)

Holotype (male). — Approximate length 14, width 9, height 6.5 mm. Brown; fore-body dull due to heavy punctation; elytra shiny, lighter brown compared to fore-body. Habitus, pl. 1 fig. 6.

Labrum scarcely emarginate in front, sides rounded, surface rugulate-punctate, finely ridged along anterior margin. Cephalic contours, fig. 5. Clypeus with complete marginal ridge, which is slightly angulate anteromedially; almost entire surface of head finely contiguously punctate; clypeofrontal suture indistinct; transverse ridge situated between genal angles. Eye-canths rectangulate, marginate, separated from frons by distinct ridge extending from genal angle to vertex; genae in front of canths angulate.

Pronotal contours, fig. 5. Sides of pronotum feebly rounded, anterolateral angle obtuse, shortly rounded; pronotal border completely ridged; pronotal disc with pair of transverse protrusions; no further protrusions, no distinct cavities. Pronotal punctation double ($\times 10$); primary punctation largely restricted to lateral declivities and base of anterior declivity; secondary punctation dense, evenly distributed, very distinct, slightly fading out to median section of pronotal base; mixed punctation halfway lateral declivities more or less contiguous. Scutellum (fig. 5) with ca 35 fine scattered punctures.

Elytra evenly convex; humeral umbone distinct; 7 feebly impressed punctate striae between suture and humeral umbone. Punctures on striae distinct, peripunctural impression affecting almost flat interstitial surface, each impression separated by about its own diameter. Interstriae minutely punctate ($\times 80$), very shiny.

Fore tibia with 2 + 5 external denticles; terminal spur acuminate, reaching halfway tarsal segment 3. Middle and hind tibiae each with one antepical bilobate-emarginate fossorial elevation; middle tibia with (proximad) one further pair of denticles and two single protrusions; hind tibia with three further pairs of denticles, decreasingly developed proximad; these protrusions sparsely setose. Terminal spurs and tarsi of middle and hind tibiae unmodified.

Some measurements in mm. Width of clypeofrontal ridge 1.3; interocular distance 2.8; maximum length of head (exclusive of labrum and mandibles) 2.6, maximum width 3.9. Distance anterolateral angles of pronotum 4.4; distance tips of paramedian protrusions 1.7; median length of pronotum 4.7, maximum width 8.3. Maximum scutellar length 1.6, maximum width 1.8. Maximum width of elytra combined 8.8. Densities of frontal punctures 17-20, of secondary punctures beside midline of pronotal disc 9-12, both per 0.1 sq.mm.

Sexual dimorphism. — The two female paratypes have a transverse ridge between the anterior corners of the eyes and a simple transverse ridge on the pronotum. Their pronotum is as heavily punctate as that of the holotype. Length of females 15.5-17 mm.

Identification. — These specimens were identified as *validus*, from which they differ in shape of pronotum, punctation, and presence of parameral styli. None of the other species has a so heavily punctate pronotum as *kubaricus*. Whether the absence of the lateral pronotal protrusions is a constant feature of the male remains to be seen.

Material examined. — 1 male, 2 females.

Holotype and paratypes from El Kubar on the Yemen Frontier, G. W. Bury (British Museum).

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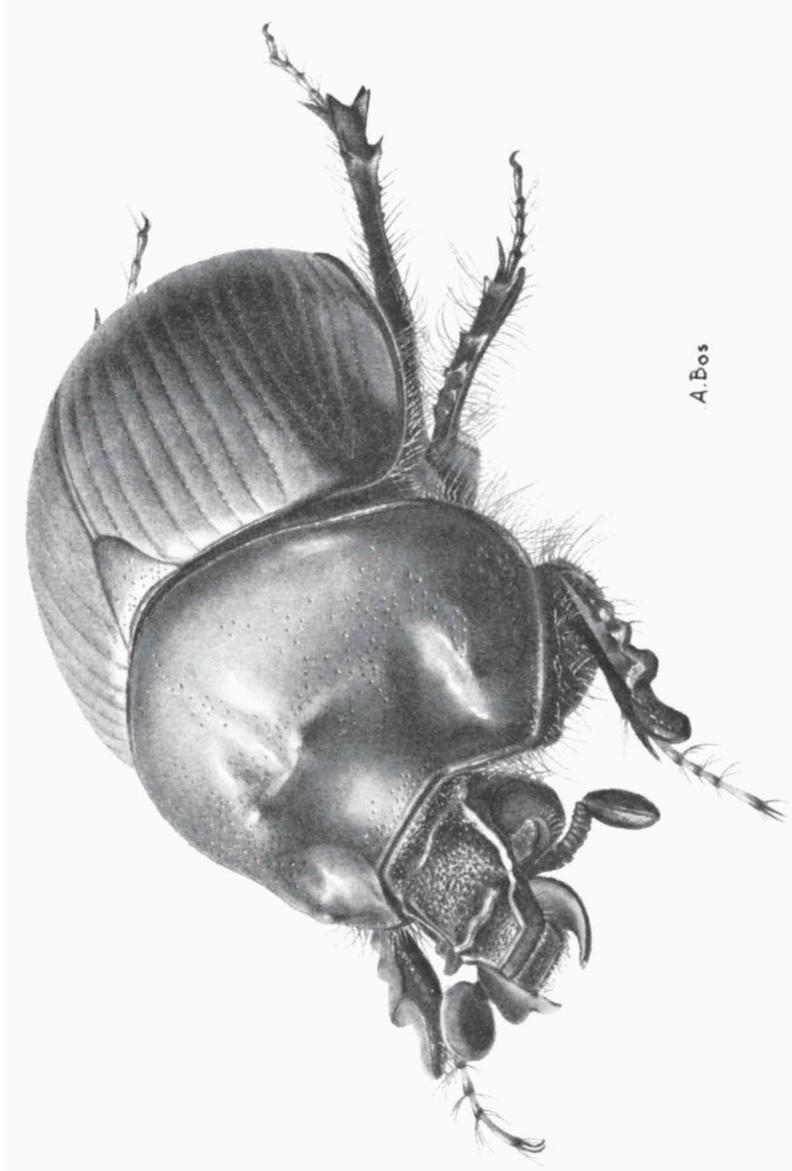
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The habitus drawing (plate 1) was produced by our museum's staff artist, A. Bos.

REFERENCES

- BARAUD, J., 1977. Coléoptères Scarabaeoidea. Faune de l'Europe occidentale. — *Publ. Nouv. Revue Ent.*, 4, 352 pp., 526 figs.
- BOUCOMONT, A., 1912. Scarabaeidae: Taurocerastinae, Geotrupinae. — *Col. Catalogus*, 46, 47 pp.
- CARTWRIGHT, O. L., 1953. Scarabaeid beetles of the genus *Bradycinetulus* and closely related genera in the United States. — *Proc. U.S. nat. Mus.*, 103: 95-120, figs. 14-16, pl. 3.
- DEJEAN, P. F. M. A., 1821. Catalogue de la collection de M. le Baron Dejean. — Paris: Crevot, viii + 136 pp.
- FAIRMAIRE, L., et al., 1882. Coléoptères recueillis par M. G. Révoil chez les Çomalis. — Mission G. Révoil aux Pays Çomalis. Faune et flore, 104 pp., 1 pl. — Paris.
- GESTRO, R., 1892. Di alcuni Coleotteri raccolti nel paese dei Somali dall'Ing. L. Bricchetti Robecchi. — *Ann. Mus. civ. Stor. nat. Genova*, (2) 12: 747-790, 1 fig.
- KIRBY, W., 1819 (July). A century of insects, including several new genera described from his cabinet. — *Trans. Linn. Soc. London*, 12 (1818): 375-482, 3 pls.
- KLUG, J. C. F., 1843. Die Coleopteren-Gattungen: Athyreus und Bolboceras, dargestellt nach den in der Sammlung hiesiger Königl. Universität davon vorhandenen Arten. — *Abh. Akd. Wiss. Berlin (Physik. - math. Kl.)* 1843: 21-57, 2 pl.
- KRIKKEN, J., 1977. A reappraisal of the *Bolboceras iphicles* group from southwestern Africa. — *Rev. Zool. afr.*, 91: 337-344, 20 figs.
- LAPORTE, F. L. (Comte de Castelnau), 1840. Histoire naturelle des insectes. Coléoptères 2 (1). — Paris: Soc. bibliophile, 563 pp., pls. 20-54.

- MACHATSCHKE, J. W., 1969. Lamellicornia. — Die Käfer Mitteleuropas, 8: 265-371, figs.
- MATHEWS, G. M., 1925. The birds of Australia. Supplement 4 & 5. Bibliography. — London: Witherby, viii + 149 pp.
- MÜLLER, J., 1941. Nuovi Coleotteri dell'Africa orientale. — Atti Mus. civ. Stor. nat. Trieste, 14: 319-352.
- PAULIAN, R., 1941. Coprophaga Africana: Deuxième note. Revision des Bolboceras africains. — Rev. Zool. Bot. afr., 35: 1-71, 8 pls.
- , 1942. [Deux synonymies en Bolboceras]. — Bull. Soc. ent. France, 47: 141.
- , 1948. Colcoptera, Scarabaeidae: Troginae, Geotrupinae, Dynamopinae, Hybosorinae, Coprinae, Aphodiinae. — Brit. Mus. Exp. SW Arabia, 1: 141-155, 3 figs.
- POPE, R. D., 1977. A check list of British insects. Part 3 (2nd edition). Coleoptera and Strepsiptera. — Handbooks Ident. Brit. Insects, 11 (3), xiv + 105 pp.
- SAMOUELLE, G., 1819. The entomologist's useful compendium. — London: Boys, 496 pp., 12 pls.
- VULCANO, M. A., A. MARTÍNEZ, F. S. PEREIRA, 1969. Notes on African Bolboceratini (Coleoptera, Geotrupidae). — Papéis avulsos Zool., 22: 159-174, 13 figs.
- WESTWOOD, J. O., 1848a (Oct. 2). Descriptions of some new or imperfectly known species of Bolboceras. — Proc. Linn. Soc. London, 1: 384-387.
- , 1848b (Nov.). [Title and text ditto]. — Ann. Mag. nat. Hist., (2) 2: 353-356.
- , 1852. Descriptions of some new or imperfectly known species of Bolboceras, Kirby. — Trans. Linn. Soc. London, 21: 19-30, 2 pls.



Platc. I. *Bolboceroides serripes* subsp. *tsavoensis*, holotype from Voi, Kenya.

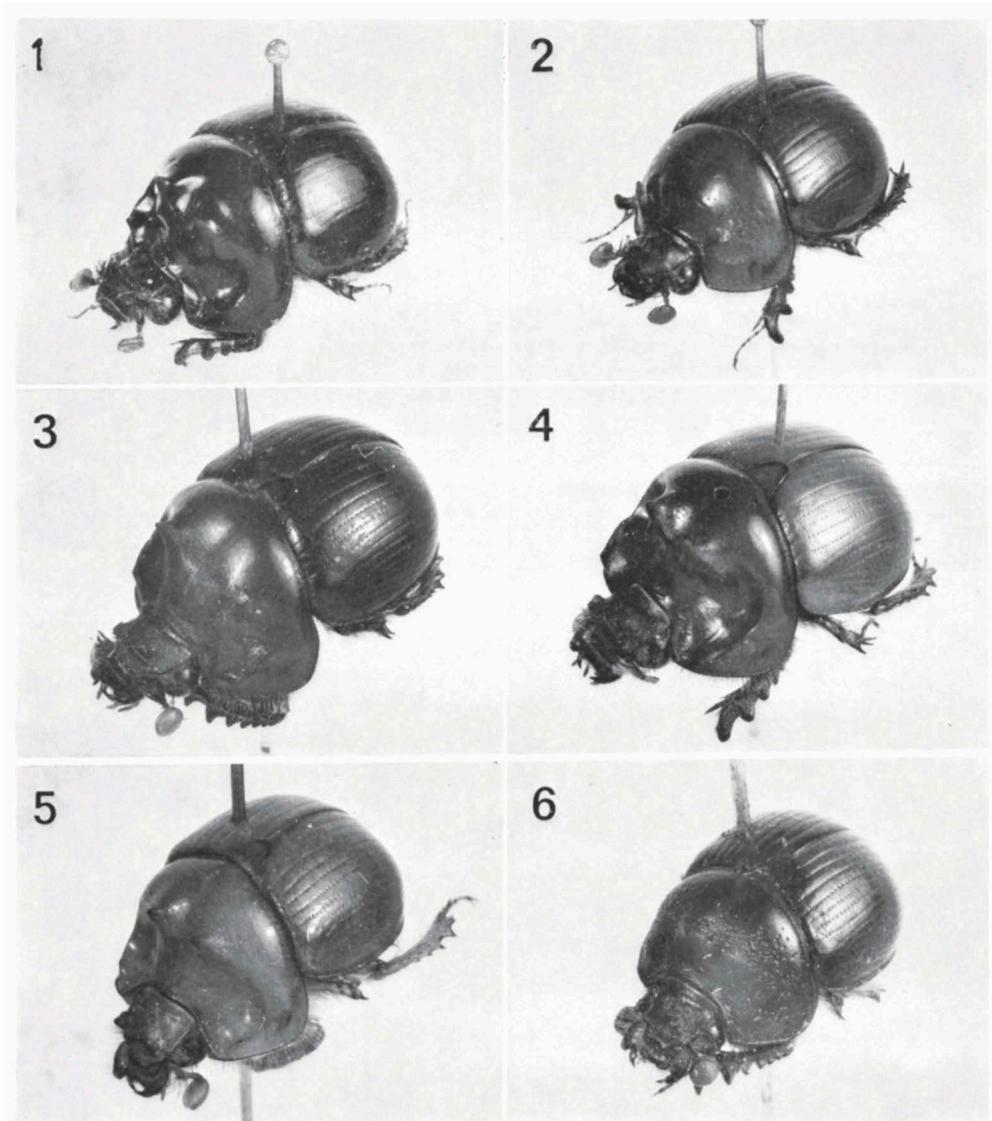


Plate 2. *Bolboceroides* species, males, except 2. 1, *B. serripes tsavoensis*, paratype, Voi, length 20.5 mm; 2, female ditto, 19 mm; 3, *B. validus*, holotype, 20 mm; 4, *B. carinicollis*, Lyallpur, 22 mm; 5, *B. scotti*, Sana/Beicha, 15 mm; 6, *B. kubaricus*, holotype.