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On some poorly known species of South African seed beetles (Coleoptera: Chrysomelidae: Bruchinae)

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Abstract. The types of five South African species, namely *B. discoidalis* Fåhraeus, *B. innocuus* Fåhraeus, *B. petechialis* Gyllenhal, *B. pyrrhoceras* Fåhraeus, and *B. submaculatus* Fåhraeus, are redescribed, and their male genitalia figured. *B. caffer* Fåhraeus is synonymized with *B. innocuus* and *B. rubicundus* Fåhraeus with *B. submaculatus*. All, except *B. innocuus*, belong to a species-rich clade of Mimosoid feeders with numerous representatives in tropical Africa and Asia. *B. innocuus* appears as a close relative of certain *Conicobruchus* species.

Key words: entomology, taxonomy, *Bruchidius*, Afrotropical region, host plant, *Acacia.*

INTRODUCTION

Fåhraeus and Gyllenhal described a large number of South African seed beetles in volume 1 of Schönherr's Synonymia Insectorum (1833), and volume 5 of Genera Curculionidum (1839). A few more species were added much later by Fåhraeus (1871). This material is deposited in the collections of the Swedish Museum of Natural History, Department of Entomology. Most of it was studied by specialists over the last century, but a few species remain poorly known. As most Acanthoscelidini at that time, South African seed beetles reviewed here were described in the genus *Bruchus*. For convenience, we choose to place or maintain all studied species in the large paraphyletic genus *Bruchidius* (see Delobel, 2007; Kergoat *et al*., 2007).

Decelle had the opportunity to study most of the species reviewed here between 1950 and 1960 (e.g., Decelle, 1951). He dissected types of *B. discoidalis* Fåhraeus, *B. innocuus* Fåhraeus, *B. petechialis* Gyllenhal, *B. rubicundus* Fåhraeus, and *B. submaculatus* Fåhraeus, but drawings of male genitalia were not published, which made

identification of several species quite uneasy. Our purpose is to provide means to properly identify these difficult species, which includes detailed redescriptions, synonymic notes and drawings of male genitalia. The present paper completes a recent article that dealt with members of the *Bruchidius subarmatus* species group (Delobel, 2009).

Unless otherwise mentioned, redescriptions apply to types. Botanic names follow ILDIS database (ILDIS, 2008). Abbreviations used: BZL, Biologiezentrum des Oberösterreichischen Landesmuseums, Linz; CBGP, Centre de Biologie et Génétique des Polulations, Montpellier; MNHN, Muséum National d'Histoire Naturelle, Paris; NRS, Swedish Museum of Natural History, Stockholm; ZMB, Museum für Naturkunde der Humboldt-Universität, Berlin.

Bruchidius discoidalis (Fåhraeus, 1839)

Bruchus discoidalis Fåhraeus, 1839: 104.
Bruchidius discoidalis: Van Tonder, 1985: 143.

Type material

Holotype: Male, SOUTH AFRICA, "Typus − Terra Caffrorum / Ecklon & Zeiher [hdw., black ink] − *B. discoidalis* [probably Decelle's hdw.] − 468/64 − Riksmuseum / Stockholm − Genit ♂ / Br 32 St. − BM Prep / 4243", specimen on pin, dissected by Decelle in 1965, NRS.

Additional material

ZIMBABWE: 1 male, 100km SW Harare, Chivhu, 22.1.98, Ma. Halada, genitalia dissected (Gen. prep. Delobel 06607), BZL.

Redescription

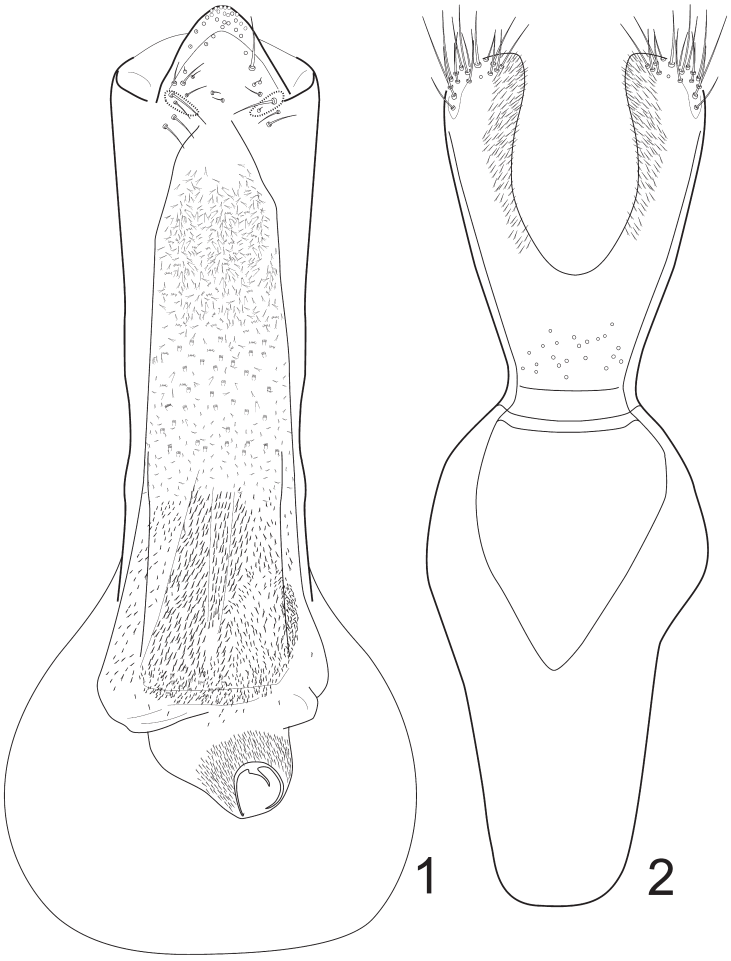
Length (pronotum-pygidium): 3.6 mm; width: 2.0 mm. Body oval, not very thick, with pygidium slanted about 60° from vertical. Integument black and red; legs: anterior and median legs reddish, except extreme base of median femora and last tarsal segment, blackish; posterior legs reddish brown except basal half of femora black, and tarsi brownish red; antennae uniformly reddish; elytra reddish on disc, with basal and lateral margins black, and apex dark reddish brown; ventral side black anteriorly, red from apical margin of ventrite 1; pygidium red. Vestiture made of whitish or yellowish scales and blackish or brown setae; major part of body covered with whitish scales, denser on pronotal midline and two spots on disc, and a basal triangle on pygidium; black setae are restricted to two spots on elytral intervals 3 (also 2, less markedly) and 9 (also 5 and 7, less markedly) (one at basal fourth, one stronger at middle), and to elytral apex; a few dark setae are mixed with whitish scales on pronotum disc, and form various darker patches on rest of pronotum.

Male. Head short; eyes moderately bulging, maximum head width 1.32 times width behind eyes; eyes separated by 0.30 times head width including eyes; distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.54;

eye cleft to 1/2 of its length, width at bottom of sinus composed of 7-8 ommatidia; maximum width of postocular lobes less than 1/4 eye width at sinus; carina on frons absent, interocular tubercule distinct, alutaceous. Punctation of face dense and strong, vanishing on clypeus.

Antenna short, hardly reaching to pronotal base; antennal segments 1-4 subcylindrical, with 2 and 3 almost equal, and 4 shorter, segments 5-10 widened at apex, segments 6-10 cup-shaped, asymmetrical, 7-10 wider than long, 11 short oval (L/W = 1.51). Length of antennomeres: 1.1 : 1 : 1.1 : 0.9 : 1 : 1 : 1.1 : 1 : 1 : 1.1 : 1.6.

Pronotum subtrapezoidal, with greatest width at base (W/L = 1.48), its sides basally slightly convex, then markedly rounded towards apex, slightly expanded behind eyes; with shallow oblique impression on sides of basal lobe. The whole pronotum with punctures strong, regular, locally coalescent, ocellate. Scutellum transverse.



1-2. male genitalia of *Bruchidius discoidalis*: 1 − median lobe; 2 − lateral lobe and tegminal strut

Elytra about as long as combined width, their sides convex, maximum width just beyond base; disc slightly convex; a distinct hump at base of interstriae 3 and 4, with two small teeth, twice closer to each other than to elytral base. Striae on disc thin, concealed under vestiture; interstriae flat, with micropunctation, without large punctures.

Hind femora moderately incrassated; mesoventral margin with preapical blunt point; hind tibiae apically strongly widened, with dorsomesal and ventral carinae complete, lateral obsolete in basal fourth; apex of tibia with mucro less than half as long as maximum width of tarsomere 1; lateral denticle slightly longer than mucro, and dorsal denticles short, about 1/3 of lateral denticle. First tarsomere very shortly pointed ventrally.

Abdomen with ventrite 5 hardly emarginate, its length medially about 3/4 of ventrite 4; ventrite 1 basally without visible patch of short setae. Pygidium subcircular (W/L = 0.97), with apical 1/4 convex but not turned under.

Genitalia : Median lobe (Fig. 1) moderately elongated, almost parallel-sided (maximum width excluding basal hood / total length = 0.22); ventral valve ogival, with apex rounded, with numerous sensilla, and two lateral groups of 8-9 setae of which 3-4 are much longer than the remainder; a pair of small, slanted, well sclerotized hinge sclerites; internal sac proximally lined with hyaline denticles of various shapes, becoming less and less dense distally; saccus densely lined with needles, distally mixed with ctenoid scales; distal bulb almost bare, with about 10 rows of small broad based needles arranged around C-shaped gonopore sclerite. Basal strut wide, without keel; lateral lobes comparatively short, cleft to 0.61 their length, pubescent on inner side; apex of parameres with 15 long setae (Fig. 2). Male genitalia of the specimen from Zimbabwe differ from type in the apparent lack of hinge sclerites; they are in fact very lightly sclerotized; ventral valve subtriangular, with concave sides (but the expression of this characters depends on the nature and amount of mounting medium used); it is otherwise perfectly identical with type.

Female unknown to me.

Affinities

Elytral pattern in this species is striking and quite characteristic, even though shared by other African species not closely related. Genital morphology relates this species to *pyrrhoceras* Fåhraeus.

Host plants

No identified larval host plant.

Distribution

South Africa, Zimbabwe

Bruchidius innocuus (Fahraeus), comb. nov.

Bruchus innocuus Fahraeus, 1871: 446.
Bruchus caffer Fahraeus, 1871: 448, **syn. nov.**

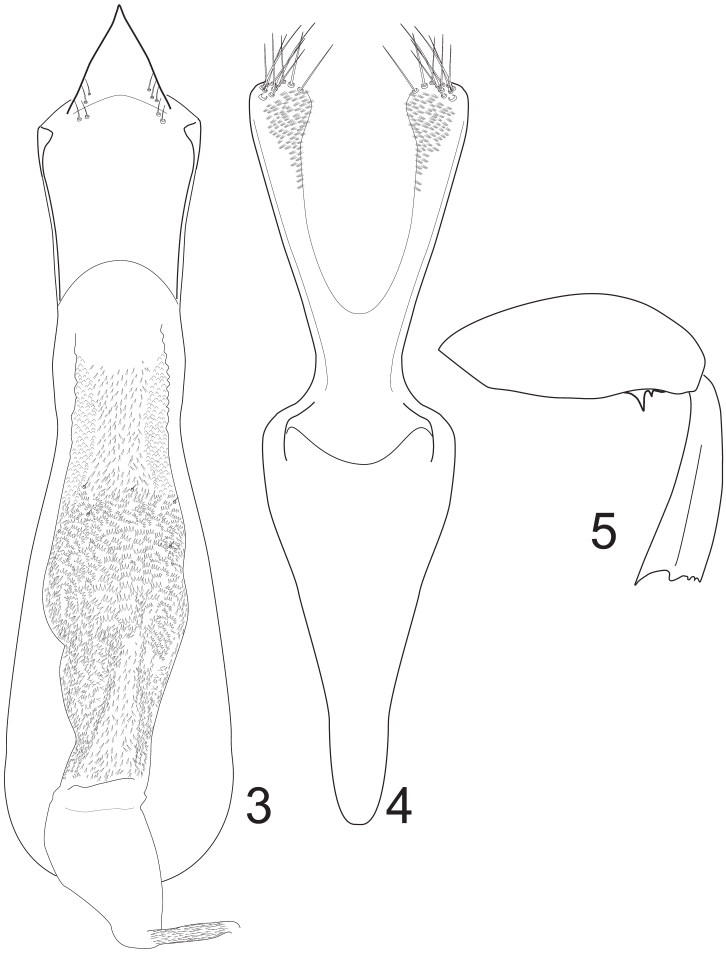
Type material

Holotype: Male, SOUTH AFRICA, “Caffraria – Type – Typus [red] – *innocuus* Fahraeus [hdw.] – 90/64”; two male paratypes, “Caffraria – I. Vahlb. – Paratypus [red] – 91/64”, “Caffraria – I. Vahlb. – Paratypus [red] – Genit ♂ / Br.St. 24 – 92/64 – BM Prep. / 4236”, NRS.

Holotype of *B. caffer* : Male, SOUTH AFRICA, “Caffraria – I. Vahlb. – Type – Typus [red] – *Bruchus caffer* Fhs [hdw.] – 83/64”.

Redescription

Length: 2.5 mm, width: 1.4 mm. Head bent downward, densely punctate, black, very finely pubescent, frons with carina; eyes crescentic, moderately convex. Antennae hardly reaching thorax base, outwardly widened, serrate, black, with 4 basal segments



3-5. *Bruchidius innocuus*: 3− median lobe; 4 − lateral lobe and tegminal strut; 5 – left posterior leg, rear view, showing femoral spines

reddish. Thorax conical, not shorter than wide at base, obliquely truncate apically, with distinct median lobes basally, its angles acute; dorsal side convex, roughly punctate, black, covered with grey pubescence, arranged in lines. Scutellum elongatedd, black, with grey pubescence.

Elytra in narrow contact with thorax, hardly wider than its base, widened behind shoulders, with apex individually rounded, twice longer than thorax, moderately convex, distinctly punctate-striate, testaceous red, with homogeneous grey pubescence, dark brown around scutellum and suture. Pygidium large, half elliptical, almost flat, punctate, pitch brown, with homogeneous grey pubescence. Ventral side of body convex, pitch brown, with grey pubescence. Legs testaceous red, with thin grey pubescence, the 4 anterior ones slender, tarsi brownish black, the posterior ones stronger, femora incrassated, with a tooth beneath before apex (Fig. 5), its base and tarsal apex darkened. Variety: posterior legs almost entirely black.

Genitalia: median lobe (Fig. 3) moderately elongated (maximum width excluding basal hood / total length = 0.18), slightly widened apically; basal hood elongated oval, not indented; ventral valve large, triangular, acute, bearing two lateral groups of 4-5 setae; no hinge sclerite; internal sac with an area lined with small tubercles and hyaline denticules, followed by large ctenoid scales; distal ampoule glabrous, gonopore not sclerotized, coming after a narrow duct lined with thin needles. Tegminal strut (Fig. 4) progressively narrowed to apex, apparently without keel; lateral lobes cleft to 75% their length, pubescent; apex of parameres with about ten long setae.

Female unknown to me.

Affinities

The presence of a large femoral spine, followed by a smaller one, links *B. innocuus* with *B. bilineatithorax* (Pic), *Bruchus sakeensis* (Pic) and one yet undescribed *Conicobruchus* species from Kenya. The shape of the pronotum, conical with sides slightly concave, also indicates a close relationship with *Conicobruchus* species that develop in the larval stage in various *Indigofera* pods.

Host plants

No identified larval host plant.

Distribution

South Africa.

Discussion

The above description also applies quite precisely to the type of *B. caffer*. A comparison of the two original descriptions brings to light only two differences between *caffer* and *innocuus*: the pronotum in *B. caffer* is described by Fahraeus as slightly shorter than wide basally (versus "not shorter than wide" for *innocuus*); also, legs in *B. caffer* are described as black, with femoral and tibial apices reddish (versus "testaceous red with dark brown tarsi" for *innocuus*). A precise measurement of thoracic dimensions

of types actually reveals that pronotum is 1.49 times wider than long in *B. innocuus*, against 1.51 times in *caffer*, a discrepancy that fits within the frame of individual variation. Similarly, true differences in leg colour are not detectable, particularly in the specimen qualified as a variety of *B. innocuus* in the original description. Hence the synonymy *Bruchus innocuus* = *Bruchus caffer*.

Bruchidius petechialis (Gyllenhal)

Bruchus petechialis Gyllenhal, 1833: 74.
Bruchidius petechialis: Van Tonder, 1985: 144.

Type material

Holotype: Male, SOUTH AFRICA, "c/o − Typus − Cap. b. Spei / Schupp.: - Ghl [hdw.] − 43/64", NRS.

Additional material

SOUTH AFRICA: 1 male, "Terra Caffrorum / E. & Zayher − 44/64 − *B. petechialis* Gyll. − Genit ♂ / Br.St.2 − BM Prep. 422/4", genitalia dissected by Decelle in 1965, NRS. NAMIBIA: 1 male, Kavango, Camp Popa, 18°07'S, 21°34S, 28.ii - 5.iii.1994 (U. Göllner), ZMB; 1 male, Windhoek, 4-5.xi.1991 (U. Göllner), identified as *Bruchidius petechialis* by H. Wendt, 1999, ZMB.

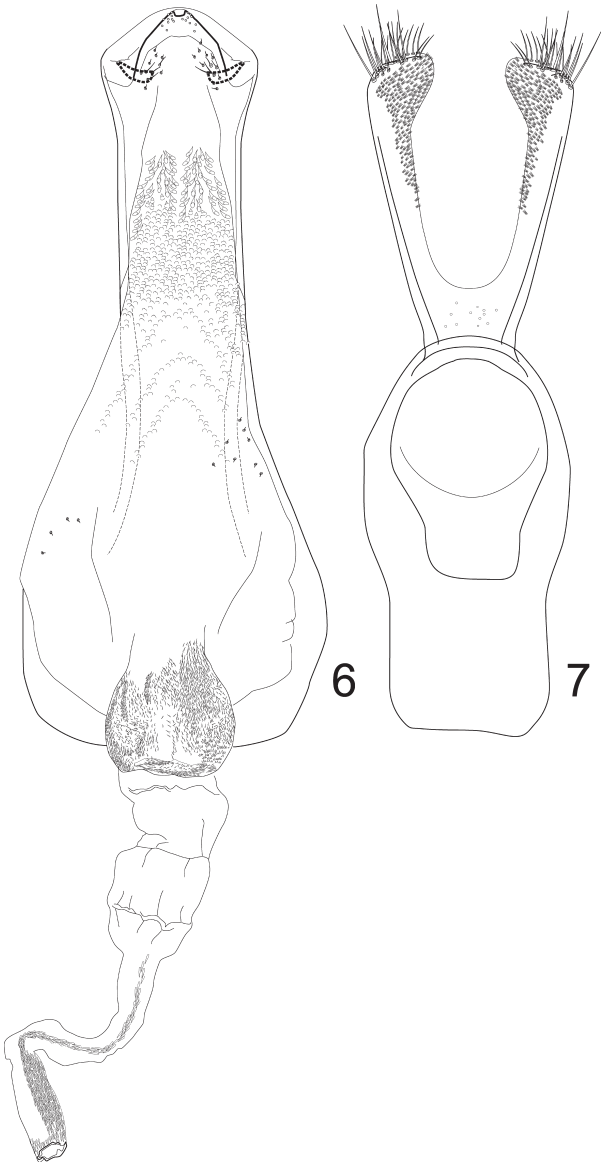
Redescription

Length: 4.1 mm; width: 2.2 mm. Body ovate. Integument of lighter specimens uniformly reddish brown, with antennae, fore and middle legs yellowish, maxillary palps brown; darker specimens with integument black on ventral side (including centre of all abdominal sternites) and face. Vestiture mostly white, dense, covering integument, recumbent; areas of denser white hair: on pronotum two small spots and area in front of scutellum, scutellum, scutellar area of elytra, longitudinal line on pygidium, wider at base and apex, sometimes obsolescent in centre. A few patches of darker (golden to blackish) hair on elytra: just behind base on interstriae 2 and 4, behind middle on interstriae 2 and 4, and to elytral side, apex of elytra; on pygidium, a circular-shaped area at apex, more or less interrupted by white line, and sometimes extending two lateral arms towards base.

Male. Head long, hardly constricted behind eyes; eyes almost flat, maximum head width 1.1 times width bedind eyes; ocular sinus very shallow; eyes separated by 0.36 times head width including eyes; postocular lobes wide; carina on frons distinct but shallow; no distinct interocular tubercule. Antenna reaching to pronotal base; antennal segments 1-4 subcylindrical, segment 5 slightly widened at apex, segment 6 and following subserrate, 11 oval. Segment 1 and 3 about 1.2 as long as 2, segment 4 slightly shorter than 2, 5 as long as 2, 6 longer than 5, 7-10 approximately equal, segment 11 about 1.2 times as long as wide. Face elongated, distance between posterior rim of eyes and apex of clypeus / maximum head width = 0.86.

Pronotum with greatest width at base, campaniform when seen perpendicularly to disc, but sides almost straight when seen parallel to anterior foramen. Pronotum laterally expanded behind eyes, with small irregular teeth more or less concealed in hairs.

Elytra short, 1.1 times as long as their combined width. Sides convex; disc flat to 2/3 of elytral length; at base of interstriae 3 and 4 two small teeth on moderate protuberance, the teeth about 3 times closer to each other than to elytral base.



6-7. male genitalia of *Bruchidius petechialis* : 6 − median lobe; 7 − lateral lobe and tegminal strut

Striae on disc punctured; punctures with setae and wider than striae, distance between punctures about 1.5 times their diameter; interstriae flat, with strong micropunctation. Legs. Hind femora moderately incrassated, at their widest 2.3 times wider than mid femora; mesoventral margin with sharp preapical denticle; hind tibiae simple with ventral and dorsomesal carinae complete, lateral not reaching base; apex of tibia with mucro small, about 3 times shorter than lateral denticle, about as long as dorsal denticles.

Abdomen simple; sternite 1 without area or brush of denser or longer setae; sternite 5 not emarginate; pygidium large and wide, slightly wider than long, slightly convex in first half, convexity steadily increasing towards apex.

Genitalia: median lobe (Fig. 6) moderately stout (maximum width excluding basal hood / total length = 0.21), expanded at apex; basal hood of moderate size, not apically notched; ventral valve well sclerotized, subtriangular, with apex blunt and transparent, surrounded by numerous sensilla, and two lateral groups of 10-14 setae of various lengths; a pair of small, transverse, arcuate, well sclerotized hinge sclerites; internal sac proximally with dense bundles of hyaline spines, gradually becoming semi-circular, serrate scales, then blunt tubercles; saccus smooth, with a few short sensilla; distal bulb elongatedd, its basal part lined with various needles, apical 2/3 bare, ending into a long cylindrical tube bearing dense lines of minute pointed scales. Basal strut very wide, without keel; lateral lobes cleft to 0.81 their length, pubescent on inner side; apex of parameres with about 21 setae (Fig. 7).

Affinities

B. petechialis has very close affinities with *Tuberculobruchus rufulus* (Fåhraeus), including in genital morphology; it is however immediately distinguishable by the presence of the very long ejaculatory duct. This peculiar structure is obscured in Decelle's preparation (Br.St.2) because it is coiled around the saccus; it is nevertherless identical with the structure described here. The collections of the NRS harbour a specimen labelled *B. petechalis var. immaculata*; this specimen differs only from *B. petechialis* in the absence of brown pattern on pygidium; the name is apparently a *nomen nudum*.

Biology

Reared from seeds of various acacias, namely *Acacia karroo*, *A. rehmanniana*, *A. senegal rostrata* (Van Tonder, 1985), *A. tortilis* (Van Tonder, 1985; Miller, 1996), *Acacia tortilis heteracantha*, though infrequently (Ernst *et al*., 1989); also reared from *Dichrostachys cinerea* (Ernst *et al*., 1990).

Distribution

Botswana (Ernst *et al*., 1990), Namibia, South Africa.

Bruchidius pyrrhoceras (Fåhraeus)

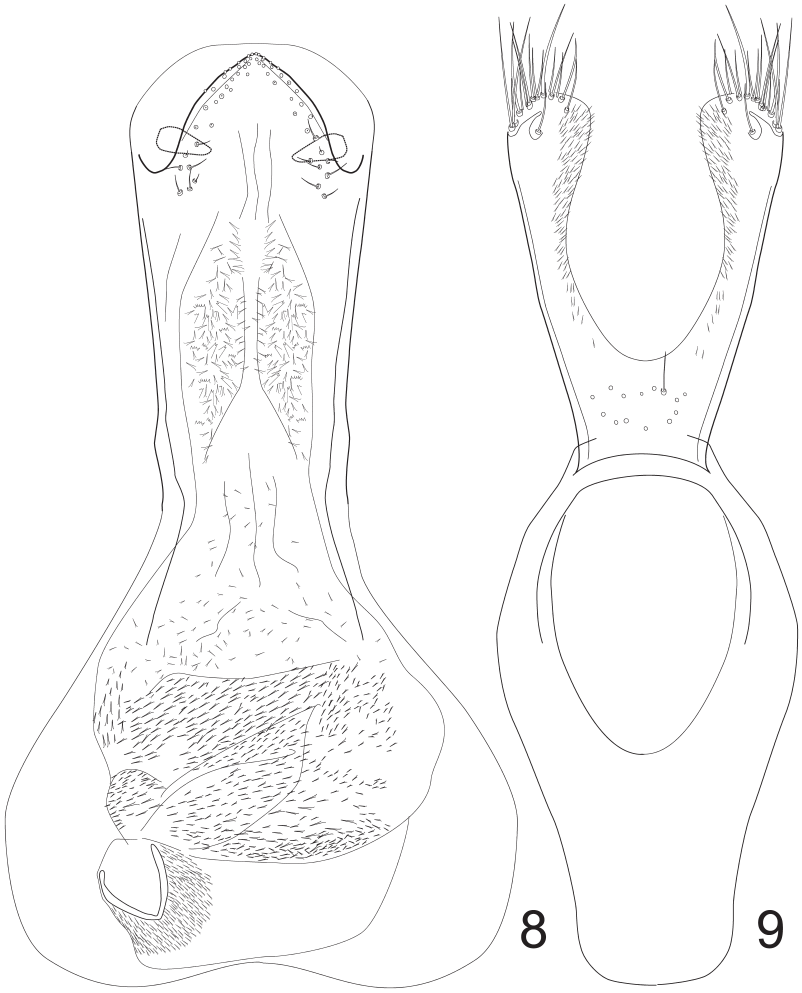
Bruchus pyrrhoceras, Fåhraeus 1839: 108.
Bruchidius pyrrhoceras: Ernst *et al.*, 1990: 49.

Type material

Holotype: Male, SOUTH AFRICA, “Typus − Caffraria / Ecklon & Zeyher − 470/64”, specimen pinned through right elytron and posterior coxa, antennal segments missing beyond 8th; male paratype, “Paratypus − Caffraria / Ecklon & Zeyher − 471/64”, pinned through right elytron and ventrite 1, genitalia dissected (Gen. prep. Delobel 06707), NRS.

Redescription

Length (pronotum-pygidium): 4.0 mm; width: 2.3 mm. Body elongated oval, rather flattened dorso-ventrally, pygidium slanted about 60° from vertical. Integument mainly black, with anterior and median legs entirely red brown (darker towards base),



8-9. male genitalia of *Bruchidius pyrrhoceras*: 8 − median lobe; 9 − lateral lobe and tegminal strut

posterior legs red brown except basal half of femora, black; antennae red-brown; a small red spot behind eyes; apex of ventrite 5 red, upper parts of ventrites 2-5 brown; pygidium blackish brown except lateral parts of base, reddish. Vestiture varied, dark brown (sometimes looking black), whitish, and various tinges of light yellowish red; lighter areas are often a mixture of whitish, yellowish and light red setae: basal lobes of pronotum, base of elytra, two spots on pronotal disc, upper angles of meso- and meta-thoracic episterns; rest of pronotal disc dark brown, scattered with light scales; on elytra, light scales are arranged in irregular strips, apex almost entirely dark; pygidium similar, with narrow longitudinal line of white scales. On ventral side, vestiture light, except upper centre of metathoracic epistern and a strip on upper part of ventrites, light brown; on posterior tibiae, a subbasal strip of dark setae.

Male paratype. Head subcylindrical; eyes almost flat, maximum head width 1.08 times width behind eyes; eyes separated by 0.29 times head width including eyes; distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.86; eye cleft to 0.6 of its length, width at bottom of sinus composed of 8-9 ommatidia; maximum width of postocular lobes equal to 1/3 eye width at sinus, with thin punctation; carina on frons shallow but very distinct, shining, interocular tubercule indistinct. Punctation of face irregular, strong and contiguous, apical half of clypeus with fine microsculpture.

Antenna short, hardly reaching to pronotal base; antennal segments 1-4 subcylindrical, with 4 very short, segments 5-8 slightly widened at apex, segment 8-10 cup-shaped, asymmetrical, 6-10 wider than long; 11 short oval (L/W = 1.54). Length of antennomeres in paratype: 1.3 : 1 : 1.2 : 1 : 1.1 : 1.1 : 1.2 : 1 : 1 : 1.1 : 1.7.

Pronotum with greatest width at base (W/L = 1.54), its sides basally slightly convergent, straight, then more strongly convergent, expanded behind eyes; with oblique impression on sides of basal lobe. Disc with strong, deep, ocellate punctures, and dense smaller punctures on intervals.

Elytra 1.07 times longer than combined width, their sides very convex, maximum width at or beyond middle; disc markedly flattened; at base of interstriae 3 and 4 a distinct hump with hardly visible teeth. Striae on disc thin and deep; interstriae flat, with micropunctation, without larger punctures.

Hind femora moderately incrassated, strongly channelled ventrally at apex; mesoventral margin with strong and acute triangular tooth located well before apex; hind tibiae apically strongly widened, with dorsomesal and ventral carinae complete, lateral not reaching base; apex of tibia with mucro about as long as half of maximum tarsomere 1 width; lateral denticle about 1.5 times mucro length, and dorsal denticles1/4th of lateral denticle. First tarsomere ventrally with short acute tooth.

Abdomen with ventrite 5 not emarginate, its length medially about equal to that of sternite 4; ventrite 1 basally without patch of short or erect setae. Pygidium almost circular (W/L = 0.98), with apical 1/6 convex medially, but not really turned under.

Genitalia: median lobe (Fig. 8) rather short (maximum width excluding basal hood / total length = 0.26); basal hood apically emarginated; ventral valve hardly sclerotized, wide, ogival, with numerous sensilla, specially at apex, and 7-8 lateral setae of various lengths; a pair of medium-sized, well sclerotized hinge sclerites; internal sac

proximally with numerous hyaline scales and spines, partly ctenoid, then an area with only very few spines; saccus lined with numerous needles, without trace of sclerotized plate. Basal strut large, without keel; lateral lobes cleft to 0.75 their length; apex of parameres with 9 longer setae and a row of about 6 shorter ones (Fig. 9).

Affinities

Related to *discoidalis* and *petechialis* through the presence of small hinge sclerites in aedeagus, but distinct from these by the strong femoral spine.

Host plants

Reared from seeds of *Acacia karroo* (Ernst *et al*., 1990)

Distribution

Botswana (Ernst *et al*., 1990), South Africa.

Bruchidius submaculatus (Fåhraeus)

Bruchus submaculatus: Fåhraeus, 1839: 50.
Bruchidius submaculatus: Nongonierma, 1978: 181.
Bruchus rubicundus Fåhraeus, 1839: 102, **syn. nov.**
Bruchidius rubicundus: Ernst *et al*., 1989: 294.

Type material

Holotype: Male, SOUTH AFRICA, "Typus − Terra Caffrorum/Ecklon& Zeyher [hdw.] − 457/64 − 322/81 − Riksmuseum Stockholm" (pin through abdomen and apex of right elytron, not dissected. Paratype: Female, same data as holotype, "158/64 − 323/81" (poor condition, abdomen crushed, glued, pinned through right elytron and left posterior coxa, rest of leg missing), not dissected, NRS.

Type of *B. rubicundus*: Male holotype, "Typus − Terra Caffrorum / Ecklon & Zayher [hdw.] − rubicundus Fåhr [hdw.] − 467/64 [pink label] − Genit ♂ / Br. St. 31 [Decelle's hdw.] − BM Prep. / 4242" (good condition, removed from original pin and glued on cardboard), NRS.

Additional material

KENYA: 16 specimens, Taveta, ex *Acacia laeta*, 3°23,431'S 37°42,935'E, 839m, i.2002 (gen. prep. Delobel 02602 and 02702); 4 specimens, Marigat, 00°20.823'N, 35°56.010'E, ex *Acacia senegal*, 18.vi.2007 (gen. prep. 09607); 3 specimens, Olepolos, 01°29.799'S, 30°37.304'E, ex *Acacia thomasii*, v.2002 (gen. prep. 03706); 3 specimens, Olepolos, 01°29.799'S, 30°37.304'E, ex *Acacia polyacantha*, v.2002 (gen. prep. 14502); 4 specimens, Oltepesi, 01°32.513S, 36°33.124E, ex *Acacia thomasii*, xi. 2002 (gen. prep. 04403); 1 specimen, Masii, 01°24.466S, 36°29.889E, ex *Acacia brevispica brevispica*, vi.2002 (gen. prep. 14402); 4 specimens, Garissa, 00°28.651S, 39°33.092E, ex *Acacia mellifera*, i.2003; 3 specimens, Baringo, 00°35.168N, 36°00.921E, ex *Acacia senegal*, 18.vi.2007 (gen. prep. 12908); 1 female, Manyani, 03°09'450S, 38°29'708E,

ex *Acacia nilotica*, 29.vi.2007; 2 specimens, Taita, 03°26.292S, 38°21.955E, ex *Acacia polyacantha*, 28.vi.2007 (gen. prep. 17107), all specimens collected by B. LeRÜ, MNHN, CBGP.

Length (pronotum-pygidium): 3.4 mm; width: 1.8 mm.

Body shape: ovate, rather elongated, pygidium slanted 50° to 60° from vertical.

Integument colour: various tinges of russet or auburn, elytra, base of pygidium, upper part of ventrites (except posterior fringe) lighter; thoracic sternites and face almost black, apex of clypeus orange; legs: anterior and median legs orange, posterior legs light reddish-brown with base of femora blackish; antennal segments 1-5 orange, rest darker; pronotum lighter on sides than medially. Vestiture of thick whitish to greyish scales and thin, brownish setae; small brownish spots on interstriae 3, 5, 7, and 9: an irregularly transverse line at anterior 1/4, second 1/3, and just before apex. On abdomen, setae dense and long, extending well beyond posterior rim of tergite.

Male. Head short, with eyes bulging, maximum head width 1.3 times width behind eyes; eyes separated by 0.31 times head width including eyes; distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2,3; eye cleft to 1/4th of its length, width at bottom of sinus composed of 6 ommatidia; maximum width of postocular lobes equal to 1/3th eye width at sinus, with long white setae; no carina on frons, but frons elevated along midline, interocular tubercule distinct. Punctation of face strong and dense, clypeus alutaceous, its apex straight.

Antenna short, hardly reaching to pronotal base; antennal segments 2-4 subcylindrical, almost equal in length, segments 5-10 widened at apex, segments 7-10 cup-shaped, asymmetrical, about as wide as long, 11 oval (L/W = 1.43). Length of antennomeres: 1.5 ; 1 ; 1 ; 0.9 ; 1.1 ; 1.1 ; 0.9 ; 1.1 ; 1.1 ; 1.1 ; 2.

Pronotum subtrapezoidal, its sides regularly arched, slightly more convex anteriorly, hardly widened behind eyes, with greatest width at base (W/L = 1.46); with distinct oblique impression on sides of basal lobe. Sculpture of pronotum: disc strongly alutaceous, with large and strong punctures, separated by about half their diameter, becoming coriaceous on sides.

Elytra about as long as combined width, their sides convex, maximum width before middle; base of disc flattened; at base of striae 3-5 a pair of strong teeth, separated by 1/3 of distance from elytral base. Striae on disc deep and thin; interstriae wide and flat, with micropunctation, with lines of punctures.

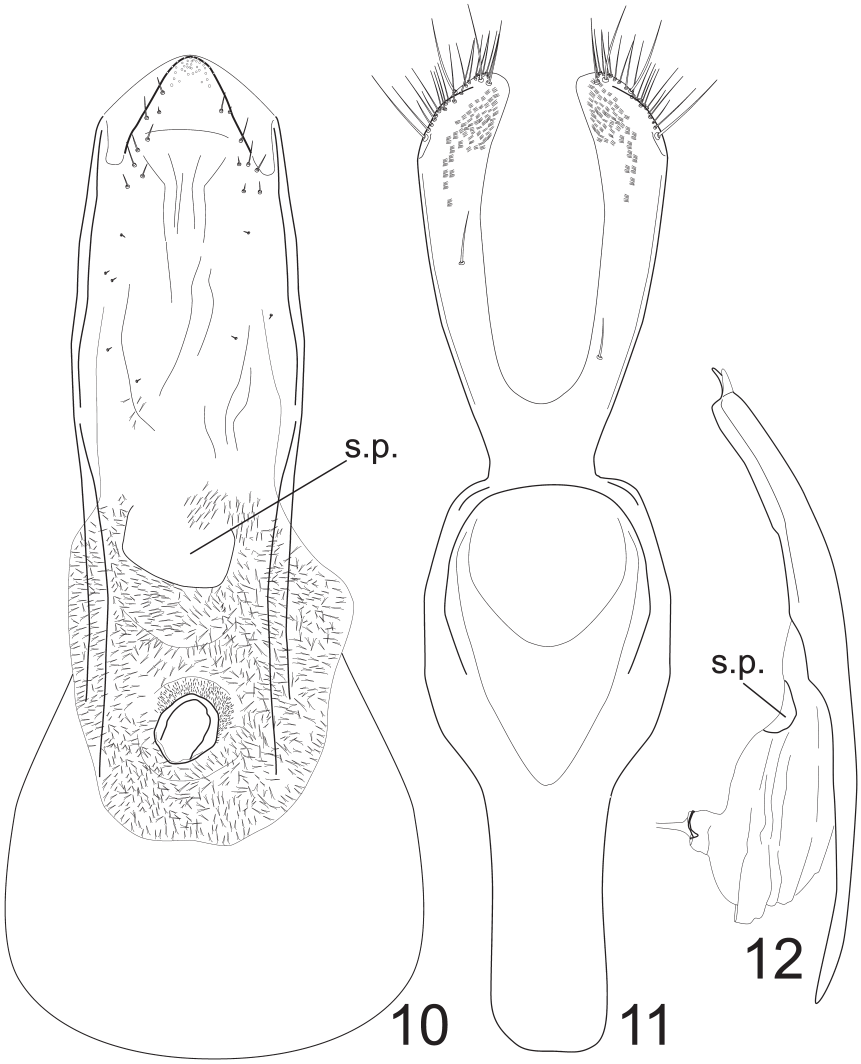
Hind femur moderately incrassated, 2.2 times wider than median femur; mesoventral margin with small preapical denticle; hind tibia short, apically strongly widened, with dorsomesal and ventral carinae complete, lateral present only on basal 2/3; apex of tibia with mucro shorter than width of tarsomere 1 at base; lateral denticle wide, reaching slightly beyond mucro, and dorsal denticles 1/3 of lateral denticle. First tarsomere ventrally with small sharp denticle.

Abdomen with ventrite 5 not emarginate, its length medially about twice that of sternite 4; ventrite 1 with small brush of erect setae at apical 1/4. Pygidium subcircular (W/L = 0.9), slightly elongatedd apically, flat, with apex slightly convex.

Genitalia: median lobe (Fig. 10) moderately short (maximum width excluding

basal hood / total length = 0.23); basal hood rather narrow; ventral valve sclerotized, subtriangular, with numerous sensilla at apex, and 7-8 lateral setae of various lengths; no hinge sclerites; internal sac proximally with very few spines; saccus lined with numerous needles, and a well defined sclerotized plate (Fig. 12). Basal strut narrow, without keel; lateral lobes cleft to 84% their length; apex of parameres with a larger number of setae (Fig. 11).

Female similar to male, without small brush of erect setae at apical 1/4 of first ventrite, rim of ventite 5 not emarginated, pygidium apex not turned under.



10-12. male genitalia of *Bruchidius submaculatus*: 10 − median lobe; 11 − lateral lobe and tegminal strut; 12 – side view, showing position of sclerotized plate (s.p.)

AFFINITIES

The name *submaculatus* was erroneously used in recent phylogenetic studies for specimens from Senegal (KERGOAT *et al*., 2005, 2007). These insects should in fact be ascribed to *B. submaculatus* var. *cadenati* PIC, 1951. DECELLE (see NONGONIERMA, 1978 and RASPLUS, 1989) raised PIC's variety to the rank of species, a status however not recognized by UDAYAGIRI and WAHDI (1989). Specimens of *B. cadenati* can be easily differentiated from the true *submaculatus* by the strong widening of its pronotum apex; they are otherwise undistinguishable. KERGOAT *et al.* (2007) showed the close relationship existing between *cadenati* and *submaculatus* (under "*B. rubicundus"*). *B. cadenati* appears as a northern, light-coloured vicariant of *B. submaculatus*, with a distribution restricted to Sahelian regions (from Mauritania to Ethiopia) and Arabia; larval diets of the two species are largely overlapping.

VARIATION

Males of the Kenyan series have identical genitalia, except for very minor individual variation in the number of setae on ventral valve, and apparent density of needles in the saccus. The apparent density of needles depends on the way the saccus is more or less contracted during the process of mounting: as shown in Fig. 12, the saccus does not unfold as easily in *B. submaculatus* as in many other species, and the gonopore lies on top of the saccus in slide preparations. A wide variation occurs among specimens in the number of setae of the ventral valve and of parameres: among 9 examined male genitalia, the former varies from 3 to 11 (mean: 8), the latter from 14 to 23 (mean: 19). The type of *Bruchus rubicundus* (slide Br.St.31), with respectively 7 and 18 setae, falls within the range of Kenyan specimens. External morphology also slightly differs among individuals: pronotum is slightly wider in front in specimens from Taveta, and posterior tibial mucro length may also vary. The most striking variation is however found in body color: light colored specimens have light orange or reddish elytra covered with yellowish and light grey pubescence, and a few small dark spots. Darker specimens have a dark auburn cuticle (sometimes with a bluish tinge), and on elytra whitish setae form elongated spots on interstriae. Often specimens reared from a single seed sample exhibit similar colors, but in some cases, a single sample yielded specimens of different color types (e.g. specimens from Oltepesi or Olepolos). This is a clear indication that color is subject to wide individual variation, and that this variation is largely unrelated to host plant and geographical origin. The type of *B. rubicundus* is not more than a reddish (light) form of *B. submaculatus*, hence the synonymy *B. submaculatus* Fåhraeus = *B. rubicundus* Fåhraeus.

HOST PLANTS

As indicated in the list of specimens examined, we reared *B. submaculatus* from seeds of several acacias in Kenya: *A. brevispica brevispica, A. laeta, A. mellifera, A. nilotica, A. polyacantha, A. senegal, A. thomasii*. The following authors provide additional host plant data: *A. ataxacantha, gourmaensis, macrostachya, samoryana* (NONGONIERMA, 1978), *Acacia galpinii, burkei, nigrescens* (VAN TONDER, 1985; RASPLUS, 1989), *Acacia tortilis heteracantha* (ERNST *et al*., 1989), *Acacia malacocephala,*

A. caffra (Ernst *et al*., 1990), *Acacia gerrardii* (Mucunguzi, 1995). In addition, it was reported from seeds of *Albizia lebbeck* (Varaigne-Labeyrie & Labeyrie, 1981) and *Cathormion altissimum* (Rasplus, 1989; Gillon et al., 1992). Older reports (Decaux, 1890; Zacher, 1936; Peake, 1952;) cannot be regarded as reliable (see Van Tonder, 1975, p 145). The record of *Albizia lebbeck* as a host by Varaigne Labeyrie & Labeyrie and Rasplus is doubtful, these authors possibly refer to the undescribed *B. albizziarum* (*nomen nudum*), a species closely related with (or identical to) *B. terrenus* Sharp (see Kergoat *et al*., 2007)

Distribution

Egypt, Sudan, Burkina-Faso, Ivory Coast, Congo, Kenya, Tanzania, Uganda, Republic of South Africa, Botswana. Records from the Sahelian region and West Africa need be confirmed, they may refer to *B. cadenati*; the old Egyptian record (Decaux, 1890) is very doubtful as the species was not recovered in that country by Shaumar (1963).

CONCLUSION

B. innocuus differs from other species studied here through external and genital morphology. It shares characters with species currently ascribed to genus *Conicobruchus*. The other five species belong to a large clade of species associated mainly with "derived mimosoids" (Kergoat *et al*., 2005, 2008). According to the phylogeny proposed by the authors, specimens of *submaculatus* (under "*B. rubicundus"*) reared from *Acacia laeta, mellifera, polyacantha*, and *thomasii* in Kenya and *B. cadenati* (under *"B. submaculatus"*) reared from *Acacia ataxacantha, dudgeoni, macrostachya*, *polyacantha*, and *senegal* in Senegal are grouped with *B lerui* Delobel in a subclade identified as the "*B. rubicundus* group". The group should be renamed "*B. submaculatus* group". Because the three remaining species share the presence of hinge sclerites, it may be assumed that they belong to a different group, the outline of which remains to be defined.

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