

Three new *Bruchidius* species from Eastern and Southern Africa (Coleoptera: Chrysomelidae: Bruchinae)

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Abstract. Descriptions of three new species belonging to the Ethiopian fauna are presented: *Bruchidius nataensis* sp. nov. from Botswana, *B. pluridentatus* sp. nov. from Kenya, and *B. subtilis* sp. nov. from Kenya and South Africa. Their biology is unknown.

Key words. Coleoptera, Bruchinae, *Bruchidius*, seed beetles, entomology, taxonomy, Afrotropical Region

Introduction

The Oberösterreichisches Landesmuseum in Linz kindly entrusted me with a study of a large collection of African Bruchinae of major interest that was gathered in 1996 and 1997 by M. Snížek, M. and Ma. Halada. A number of these, belonging to species new to science, were described in previous papers (DELOBEL et al. 2013, 2015; DELOBEL & LE RU 2015). Several of these species were independently reared by B. Le Ru from seeds of various Acacieae (Fabaceae) in which they feed during their larval stage. Here I deal with three species that were not reared from their host plant, but captured as adults; two of them were also present in NCIP (Pretoria) and MNHN (Paris) collections. Even though their biology and (in two species) the females remain unknown, I consider it useful to describe in detail the available material, and compare it with previously described species. Morphological evidence indicates a more or less close relationship of the three new species with members of the *Bruchidius albosparsus* (Fåhraeus, 1839) (= *B. centromaculatus* (Allard, 1868)) species group. The group (ANTON & DELOBEL 2003) comprises small, stocky species with sub-vertical pygidium, short antennae and three-colored vestiture: brown, yellow and white (DELOBEL et al. 2015). All members of the group with known trophic biology feed in pods and seeds of legume plants (Fabaceae), and more specifically of the tribe Acacieae (genera *Vachellia* Wight & Arn. and *Senegalia* Rafin.).

Material and methods

Material was examined under a stereoscopic microscope (Wild MZ8), and photographs of body parts were taken with a hand-held camera. Measurements were taken using photo editing software. Male genitalia were cleared in hypertonic NaOH solution heated for one minute in a microwave oven at the lowest power setting (200 W), then temporarily or permanently mounted in water-soluble DMHF (dimethyl hydantoin formaldehyde) resin. Slides were examined under a light microscope (Leitz Laborlux K); digital photographs of microscope preparations were taken using a hand-held camera, then transferred to vectors in a graphic editing program. The same technique was applied to antennae. Genitalia were either glued in a drop of DMHF on a cardboard pinned under the specimen, or permanently mounted on slide in the same medium; in the latter case, a five-digit slide code is given in brackets, with the last two digits referring to the year of mounting. Total body length was measured from apex of pronotum to apex of elytra; body width and length and width of elytra are understood as the maximum values observed in a given specimen. 'W/L' and 'L/W' stand for width / length and length / width ratios. Length of each antennomere was measured along its mesal side (excluding antennomere stem), their width was measured at apex of segments. Lengths of antennomeres are given as the ratio of each segment length to the length of the pedicel and not that of the scape as the latter may be difficult to assess with precision in some specimens. Terminology follows KINGSOLVER (1970) and NILSSON & JOHNSON (1993).

Exact label data are cited for holotypes. A forward slash (/) separates different lines on a label and a double slash (//) separates different labels.

Specimens included in this study are deposited in the following institutional collections:

MNHN Muséum National d'Histoire Naturelle, Paris, France;

NCIP National Collection of Insects, Pretoria, Republic of South Africa;

OLML Oberösterreichisches Landesmuseum, Linz, Austria.

Results

Bruchidius nataensis sp. nov.

(Figs 1–3)

Type locality. Botswana, Central district, Nata.

Type material. HOLOTYPE: ♂ (dissected [01914]), 'BOTSWANA sep., / Nata / 9-14.i.1997 / leg. M. Snizek // Holotype // *Bruchidius / nataensis / A. Delobel des. 2015*' (OLML).

Description. Length: 2.8 mm; width: 1.7 mm.

Body moderately stout, pygidium slanted 5–10° from vertical. Integument reddish brown, elytra lighter, sternites testaceous to brown; basal segments of antenna testaceous, VIII–X dark brown to black, XI reddish; four anterior legs testaceous, darkened basally, posterior legs reddish brown; last visible tergite testaceous. Vestiture mixture of white, yellowish and brown setae; thin and light on head; on pronotum, sides white, disc with dense, yellowish scales and a longitudinal stripe of whitish setae; elytra mostly yellowish, with anterior half of interstriae 3 whitish, interrupted by small brown dot; brown dots also near middle of interstriae 7 and 9, and at apex of interstriae 8 and 9; last visible tergite uniformly yellowish, except for white small basal triangle.

Male. Head short, eyes strongly bulging, maximum head width about 1.5 times width behind eyes; eyes separated by 0.33 times head width including eyes; face wide, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 1.9; eye weakly cleft, width at bottom of sinus composed of eight ommatidia; frons with carina obsolete and large shining bulge posteriorly. Punctuation of face small and dense, clypeus alutaceous, with rounded apex. Antenna (Fig. 3) short, not reaching beyond posterior angle of pronotum; antennal segments I–IV submoniliform, V widened apically, longer than wide, apically about as wide as long, and following segments eccentric, transverse, XI apically rounded, 1.3 times longer than wide. Length of antennomeres: 1.3 : 1.0 : 0.9 : 0.9 : 1.1 : 1.0 : 1.1 : 1.1 : 1.0 : 1.0 : 1.6.

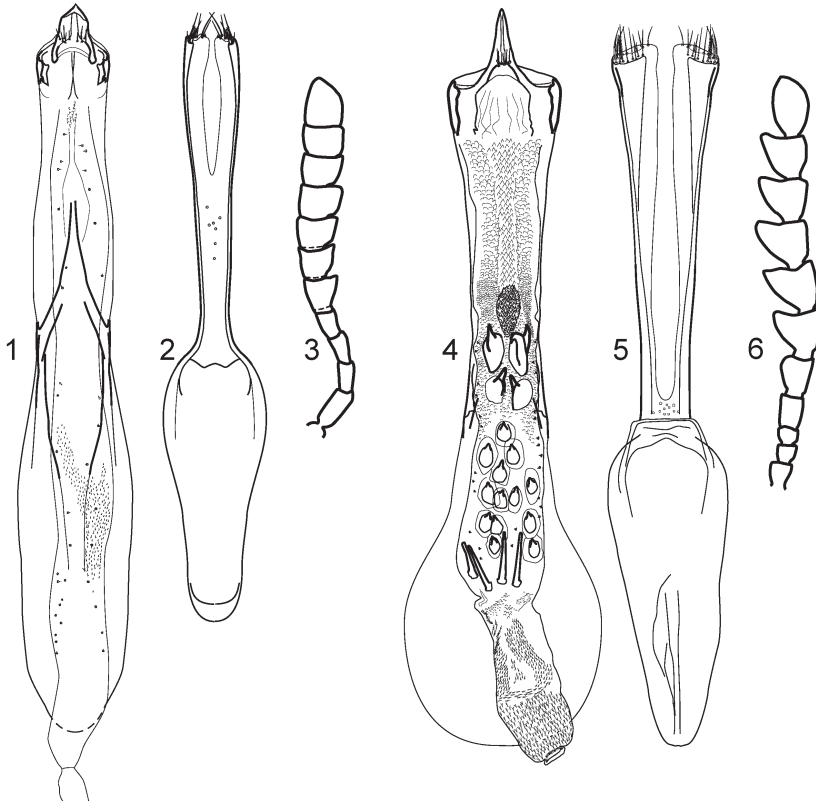
Pronotum trapezoidal, with sides straight, not expanded behind eyes, slightly wider at base than long ($W/L = 1.12$); oblique impression on sides of basal lobe very shallow; disc with deep ocellate, almost coalescent punctures. Elytra moderately elongated, 1.12 times longer than combined width, their sides convex, maximum width in basal third; disc convex, briefly flattened around scutellum; base of striae 3 and 4 with two comparatively large, obtuse teeth, closer to base of elytra than to each other. Striae on disc thin, diameter of punctures not larger than width of striae; interstriae with microsculpture and a few larger punctures. Hind femur moderately incrassate, 2.6 times wider than mid femur; mesoventral margin with small pre-apical denticle; hind tibiae apically moderately widened, with lateral, dorsomesal and ventral carinae complete; apex of tibia with mucro about half as long as width of tarsomere 1, lateral denticle about half mucro length, and dorsal denticles minute.

Abdomen with ventrite V emarginate, medially half as long as laterally; basal angle of ventrite I with depressed area bearing short, appressed setae. Last visible tergite shield-shaped, only slightly longer than wide ($L/W = 1.05$), moderately convex in apical half.

Genitalia. Median lobe (Fig. 1) elongated (maximum width excluding basal strut / total length = 0.11), not widened apically; basal hood narrow, not notched posteriorly; ventral valve wide, its apex obtuse, with two groups of five setae; hinge sclerites absent; internal sac almost entirely smooth, with only short scattered trichoid sensilla along median lobe sides, and some minute spines near middle; distal bulb smooth. Basal strut narrow, without dorsal keel; lateral lobes cleft to about 45% their length; apex of parameres not widened, each one bearing about 15 setae of various lengths (Fig. 2).

Female. Unknown.

Differential diagnosis. External morphology of the new species is similar to that of several Acaciae feeders, inside as well as outside the *B. albosparsus* species group (DELOBEL et al. 2015, DELOBEL & LE RU 2015). However, if we consider the peculiarities of aedeagus morphology (ventral valve shape in particular), *B. nataensis* seems related with two African species that do not belong to that group, and predate *Dichrostachys cinerea* (Wight & Arn.) seeds, namely *B. mabwensis* (Decelle, 1960) and *B. securiger* Delobel & Anton, 2003 (DELOBEL & ANTON 2003, DELOBEL 2010); both species however show larger and much more serrate antennae, and their internal sac is lined with numerous sclerites. It may be assumed that the new species belongs to a large clade of Bruchinae comprising the *B. albosparsus* and *B. ituriensis* species groups, as well as *B. securiger*, *B. mabwensis* and *B. meibomiaca* (DELOBEL et al. 2015). It is worth mentioning here that a similar ventral valve also exists in one Indian species with different external morphology, namely *B. mendosus* (Gyllenhal, 1839).



Figs 1–6. Genitalia and antenna of *Bruchidius* species: 1–3 – *B. nataensis* sp. nov. (1 – median lobe; 2 – lateral lobes; 3 – male antenna). 4–6 – *B. pluridentatus* sp. nov. (4 – median lobe; 5 – lateral lobes; 6 – male antenna).

Host plants. Unknown.

Etymology. The specific epithet (masculine adjective) refers to the type locality, Nata town in central Botswana.

Distribution. Botswana (Central District).

***Bruchidius pluridentatus* sp. nov.**

(Figs 4–6)

Type locality. Kenya, Taita-Taveta Co., Voi-Tsavu National Park.

Type material. HOLOTYPE: ♂ (dissected [01814]), 'S.E. KENYA / Voi (Tsavo) 23.3–4.4.1997 / leg. M. Snizek // Holotype // *Bruchidius pluridentatus* n. sp. / Delobel des. 2015' (OLML).

Description. Length: 2.9 mm; width: 1.6 mm.

Body moderately stout, last visible tergite slanted about 10° from vertical. Integument reddish brown to black, with four anterior legs and antennae testaceous; pronotum dark brown,

elytra reddish brown, more or less darkened at humerus, on sides and near apex; underside mostly black, but upper side of sternites and last ventrite testaceous. Vestiture well covering integument, particularly long and dense on pronotum, made of three-colored setae: whitish along pronotal mid-line, on interstriae 3 and 5, on underside and last visible tergite; yellowish on face, on rest of pronotum and interstriae 1, 2, 4 and 6; brown to black on isolated spot before apex of interstria 3, on humerus, on three spots on lateral sides of elytra (in basal fourth, at mid-length and near apex); apex of elytra with isolated brown spots.

Male. Head moderately elongated; eyes large, bulging, maximum head width 1.6 times width behind eyes; ocular sinus comparatively shallow; eyes separated by 0.29 times head width including eyes; face moderately wide, distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.46; eye moderately cleft, width at bottom of sinus composed of 6 ommatidia; post-ocular lobes narrow; front without carina, but with strong inter-ocular tubercle, shining; face with dense punctation, clypeus alutaceous. Antenna (Fig. 6) reaching elytral humerus; antennal segments I–III cylindrical, segment IV widened at apex, subtriangular, segment V–X strongly serrate, XI oval ($L/W = 1.7$). Length of antennomeres: 1.4 : 1.0 : 1.0 : 1.9 : 2.6 : 2.7 : 2.8 : 2.7 : 2.6 : 2.5 : 3.8.

Pronotum trapezoidal, slightly campaniform, with maximum width at base ($W/L = 1.2$), its sides almost straight, not widened behind eyes; with shallow oblique impression on each side of basal lobe; disc strongly alutaceous, with dense punctation. Elytra 1.13 times longer than wide together, their sides widened in basal fourth, then almost parallel; disc slightly convex; two small teeth at base of striae 3 and 4, closer to each other than to elytron base; humeral callus moderately developed, alutaceous; striae narrow, interstriae flat, with dense micropunctation, possible alignment of larger punctures obscured by dense vestiture. Hind femur well incrassate, three times wider than median femur; mesoventral margin with small acute preapical denticle; ventral carina of hind tibia complete, lateral and dorsomesal not reaching base; apex with mucro slightly shorter than tarsomere I width, lateral denticle about one-third mucro length, wider but hardly longer than dorsal denticles.

Abdomen with ventrite V strongly emarginated, medially almost entirely concealed under ventrite IV; ventrite I without particular arrangement of setae. Last visible tergite shield-shaped, 1.1 times longer than wide, with apex strongly turned under.

Genitalia. Median lobe (Fig. 4) moderately elongated (maximum width excluding basal strut / total length = 0.155), widened apically; basal hood narrow, not notched posteriorly; ventral valve narrowly subtriangular, its apex acute, with a median group of 8 setae; hinge sclerites absent; proximal part of internal sac densely lined with hyaline lamellae, followed by a number of large sclerites: first an ovoid burr-like mass, then four large curved thorns; median part of the sac smooth, with 13 curved spines and four pointed rods; distal bulb densely lined with minute needles that are rear facing in anterior part, and forward facing in apical third. Basal strut narrow, subtriangular, with large dorsal keel; lateral lobes almost entirely divided (cleft to about 95% their length); apex of parameres slightly widened, with about 20 setae each (Fig. 5).

Female. Unknown

Differential diagnosis. The shape of the aedeagus is similar to that found in several members of the *B. albosparsus* species group. One of these, *B. ishwaensis* (Decelle, 1958) also shows

small thorn-like sclerites in the internal sac, but it lacks the other types of sclerites (ovoid and rod-like). The peculiar ovoid burr-like sclerite is made up of numerous agglomerated teeth, quite distinct from other compound sclerites found in various members of the same species group, such as *B. aurivillii* (Blanc, 1889) and *B. elnairensis* (Pic, 1931). Rod- or hair-like sclerites of *B. pluridentatus* are similar to those found in *B. glomeratus* Delobel, 2015, but similar sclerites may also be found outside the *B. albosparsus* group, e.g., in some specimens of *B. ituriensis* (Decelle, 1958) and *B. snizeki* Delobel, Anton, Le Ru & Kergoat, 2013, which are both members of the *Bruchidius ituriensis* species group (DELOBEL et al. 2013).

Host plants. Unknown.

Etymology. The specific epithet (masculine adjective) *pluridentatus* (= more-teethed), refers to the different sizes and shapes of sclerites in the internal sac.

Distribution. Kenya (Taita-Taveta County).

Bruchidius subtilis sp. nov.

(Figs 7–9)

Type locality. Kenya, Taita-Taveta Co., Taveta, 750 m a.s.l.

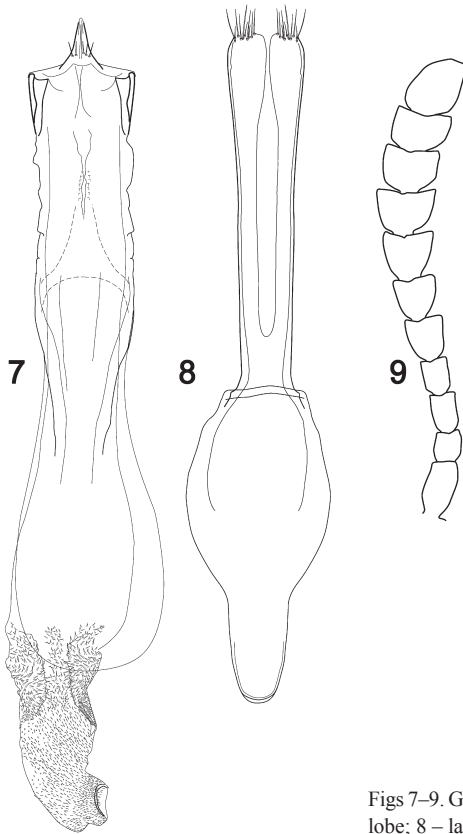
Type material. HOLOTYPE: ♂ (dissected [Br.M.P.55]), 'KENYA, Afr. Orient. Anglaise / Taveta / Alluaud & Jeannel / mars 1912 750m st. 65 // Holotype // *Bruchidius subtilis* n. sp. / Delobel des. 2015' (MNHN). PARATYPES: 3 ♂♂ (all dissected), 'Voi, 8-18.xi.1996, M. Snizek'; 2 ♂♂ (1 dissected), 1 ♀ (dissected), 'Voi, 22.xi-2.xii.1996, Mi. Halada'; 10 ♂♂ (7 dissected), 9 ♀♀ (1 dissected [02814]), 'Voi, 11-14.iv.1997, Ma. Halada'; 1 ♂, 'Voi, 11-14.iv.1997, M. Snizek'; 7 ♂♂ (4 dissected [02014, 02114, 06709]), 1 ♀, 'Voi, 23.iii-4.iv.1997, Ma. Halada'; 4 ♂♂ (1 dissected [02214]), 'Voi, 23.iii-4.iv.1997, M. Snizek'; 1 ♂ 3 ♀♀, 'Voi, 1-5.iv.1997, M. Snizek'; 1 ♂ (dissected [02714]), 3 ♀♀, 'Voi, 23.xi.1997, M. Snizek' (all in OLML); 1 ♂ (dissected [06009]), 'SOUTH AFRICA, KNP / Crooke's Corner nr Pafuri, 2.ii.1994, E. Grobbelaar (NCIP)'.

Description. Length: 3.0–3.2 mm; width: 1.6–1.8 mm.

Body moderately stout, last visible tergite slanted about 25° from vertical. Integument reddish brown, with four anterior legs and antennal segments I–VII testaceous, VIII darkened, IX–X dark brown to black, XI dark testaceous (black in four male paratypes); elytra more or less darkened at humerus, along suture, and near apex; sutural drop-shaped spot may be absent (in a single male), or spread over first three interstriae. Vestiture well covering integument, mostly sand-colored, lighter on sides of pronotum, along mid-line and sometimes a pair of small spots laterally; on elytra vestiture varies from almost uniformly light to black spotted; last visible tergite light, with white basal triangle.

Male. Head short, moderately constricted behind eyes; eyes large, bulging, maximum head width 1.4 times width behind eyes; ocular sinus comparatively shallow; eyes separated by only 0.32 times head width including eyes; face moderately wide, distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.0; eye moderately cleft, width at bottom of sinus composed of 7 ommatidia; post-ocular lobes hardly visible; frontal carina obsolete; inter-ocular tubercle distinct, shining; face with dense punctation, vanishing on alutaceous clypeus. Antenna (Fig. 9) not reaching to posterior angles of pronotum; antennal segments I–III subcylindrical, segment IV slightly widened at apex, segment V and following subrectangular, transverse, XI oval (L/W = 1.17). Length of antennomeres: 1.6 : 1.0 : 1.1 : 1.1 : 1.2 : 1.1 : 1.3 : 1.2 : 1.2 : 1.2 : 1.8.

Pronotum trapezoidal, with maximum width at base (W/L = 1.4), its sides almost straight,



Figs 7–9. Genitalia and antenna of *Bruchidius subtilis* sp. nov.: 7 – median lobe; 8 – lateral lobes; 9 – male antenna.

not widened behind eyes; without oblique impression on each side of basal lobe; disc strongly alutaceous, with dense shallow punctation. Elytra 1.04 times longer than wide together, their sides regularly widened to mid-length; disc regularly convex; two minute teeth at base of striae 3 and 4, closer to each other than to elytron base; humeral callus moderately developed, alutaceous; striae very shallow, interstriae flattened, with dense micro-punctation, without visible alignment of larger punctures. Hind femur moderately incrassate, more than twice wider than middle femur; mesoventral margin with small acute preapical denticle; hind tibia apically strongly widened, with ventral carina complete, lateral and dorsomesal strong, reaching base; apex of tibia with mucro as long as tarsomere I width, lateral denticle about half mucro length.

Abdomen with ventrite V moderately emarginated, its length medially less than half as long as laterally; ventrite I with large, pear-shaped patch of dense setae in basal half of ventrite. Last visible tergite shield-shaped, only slightly longer than wide, with apex moderately turned under.

Genitalia. Median lobe (Fig. 7) elongated (maximum width excluding basal strut / total

length = 0.16), subcylindrical; basal hood comparatively small, elongated oval, not notched posteriorly; ventral valve subtriangular, its apex acute, with a pair of lateral groups of 2–3 setae; no hinge sclerite; internal sac apparently smooth, but showing in fact over almost all its surface thin, slender and irregularly arranged hyaline tubercles (well visible in phase contrast); distally the internal sac is narrowed into a spiny constriction of the already described type; apical bulb lined with very thin backward needles, and a few trichoid sensilla. Basal strut moderately narrow, without dorsal keel, lateral lobes cleft to about 85% their length, pubescent; apex of parameres unmodified, with 10 setae (Fig. 8).

Female. Length (pronotum to apex of last visible tergite): 2.3–3.0 mm; width: 1.3–1.8 mm. Body color more contrasted than in male, with disc of last visible tergite black (almost entirely in some paratypes).

Differential diagnosis. The new species is closely related with *B. eminingensis* Delobel, 2015 (DELOBEL et al. 2015), but the median lobe is slightly thinner than in the latter species; the arrangement of spines in the distal area of the internal sac is also different, in particular the apical bulb is completely lined with minute spines, whereas it is almost completely smooth in *B. eminingensis*. It differs from *B. nongoniermai* Delobel, 2007, a species with similar median lobe (DELOBEL 2007), in the presence of hyaline tubercles that are densely packed in the anterior part of the internal sac. Lateral lobes are cleft to 60% in *B. nongoniermai*, to 65% in *B. eminingensis*, and to 85% in *B. subtilis*. The new species is also closely related with *B. horridus* Delobel & Le Ru, 2015; in both species the major part of the median lobe is lined with hyaline tubercles, but these are thick, wide and regularly arranged, like the bricks of a wall in *B. horridus* (very thin, narrow and irregularly arranged in *B. subtilis*); the presence of crenulated villi in the distal part of the internal sac of *B. horridus* is another highly distinctive character. In *B. horridus*, the vestiture of the lower part of the body and pronotum sides is white, its antennae are testaceous, with sometimes segments VIII–X darkened, not black as in *B. subtilis*.

The four species mentioned above are members of the *B. albosparsus* species group. They share almost identical habitus, with strong individual variations, so the identification of males is particularly challenging and in single females almost impossible if based solely on morphology.

Etymology. The specific epithet (masculine adjective) is a Latin word for ‘subtle, tricky’; it refers to the slight morphological differences with *B. eminingensis*.

Host plants. Unknown.

Distribution. Kenya (Taita-Taveta County), Republic of South Africa (Mpumalanga Province).

Conclusions

The three new species share major morphological traits with members of the recently defined *Bruchidius albosparsus* species group. Based on purely morphological evidence, I feel it’s legitimate to join them to the group, which would thus comprise 30 species (DELOBEL et al. 2015). Collection and rearing of additional material, as well as molecular phylogenetic analysis of this material, would definitely help to decide whether these new species do fall within the boundaries of the group.

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