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New African seed beetles associated with *Indigofera* (Coleoptera: Chrysomelidae: Bruchinae)

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Abstract. Seven new species were reared from pods and seeds of *Indigofera* from Kenya, Tanzania, Ivory Coast and Senegal. Host plant data are provided: adults of *Bruchidius astragalinae* were reared in Senegal from seeds of *Indigofera astragalina*, *B. fuligineus* in Kenya from seeds of *I. emarginella*, *B. kidevuensis* in Tanzania from *I. basiflora* seeds, *B. lubaicus* in Ivory Coast from *I. polysphaera* and *I. pulchra* seeds, *B. malindiensis* in Kenya from *I. schimperi* seeds, *B. sokokensis* in Kenya from *I. vohemarensis* seeds, *B. subdolus* in West Africa and East Africa from seeds of *I. schimperi* and *I. tinctoria*. We propose drawings of male genitalia of *Bruchidius adouanus* (Pic, 1929), *Bruchus obscurus* var. *densepubens* Pic, 1929, *Bruchus obscurus* var. *skaifei* Pic, 1928, and *Bruchus sakeensis* (Pic, 1953) for comparison purposes.

Key words: entomology, taxonomy, *Bruchidius*, new species, Afrotropical region, host plant, *Indigofera.*

INTRODUCTION

In a recent paper (Delobel & Le Rü 2010), we described a small group of species that feed in the seeds of various Fabaceae (Leguminosae) belonging to tribe Indigofereae in Africa and Asia, the *Bruchidius albopubens* species group. In the past, species associated with Indigofereae were usually assigned to genus *Conicobruchus*, erected by Decelle in 1951 for *Bruchus strangulatus* Fahraeus, 1839. Larvae of *Conicobruchus strangulatus* and a few closely related species are however known to feed in pods of various species of *Crotalaria,* a genus that does not belong to Indigofereae, but to a distinct tribe, Crotalarieae. Several species reared from *Indigofera* pods definitely show morphological similarities with *C. strangulatus*, in particular a trapezoid

or compressed pronotum, with more or less concave sides. Recent studies based on molecular data analysis (Kergoat *et al*. 2005, 2008) clearly demonstrate however the paraphyly of *Conicobruchus*. These studies place two seed beetles associated with *Indigofera*, namely *Conicobruchus albopubens* (Pic, 1931) and *Bruchidius nodieri* (Pic, 1943), in a large clade of African and Palaearctic species belonging to three different genera: *Bruchidius, Callosobruchus* and *Decellebruchus* (Kergoat *et al*. 2008), *C. strangulatus* being unrelated to the former clade. This situation stresses the need for a general revision, not only of *Conicobruchus*, but also of the large genus *Bruchidius* as a whole. As a preliminary step towards this revision, we propose the description of species reared from *Indigofera* pod samples collected in Kenya, Tanzania, Ivory Coast and Senegal. These samples yielded a surprisingly large number of seed beetle species; among these, seven are new to science, and are described here. We choose to describe these species in the genus *Bruchidius*, pending an expected general revision. On the other hand, in order to avoid unnecessary and transitory taxonomical modifications, no change of status or combination is proposed here for several species or varieties that were assigned to genera *Bruchus* or *Acanthoscelides* by M. Pic, even though they obviously belong to the same clade as species treated here under *Bruchidius*. These, and other related African species, will be dealt with in a wide phylogenetic appraisal based on biological, morphological and molecular data. Botanical names and inclusion of individual species into Sections of genus *Indigofera* follow the latest available version of ILDIS World Database of Legumes (ILDIS, 2009). Abbreviations used: CBGP, Centre de Biologie et Génétique des Populations, Montpellier; MNHN, Muséum National d'Histoire Naturelle, Paris; NHRS, Swedish Museum of Natural History; Stockholm, OÖLM, Oberösterreichisches Landesmuseum, Linz.

Bruchidius astragalinae sp. nov.

Bruchidius nodieri (Pic, 1943): Kergoat *et al*. 2005: 605 (misidentification).

Type material

Holotype: Male, SENEGAL, "Région de Thiès, Nianing, gousses *Indigofera astragalina,* 4.xii.1999, H. & A. Delobel coll.", "Holotype", "*Bruchidius astragalinae* n. sp., A. Delobel des. 2010", MNHN. Paratypes: 5 males (2 dissected, gen. prep 02799, 01404), 18 females (2 dissected, gen. prep. 04199, 01904), same data as holotype; 3 females, Yène, *Indigofera astragalina,* 21.xii.1999; 4 males, 19 females, M'Bour, Malaise trap, xi.1994, xii.1994, i.1995; 15 females, sweeping on low vegetation, xi.1994, ii.1995, iii.1995, same collectors, MNHN.

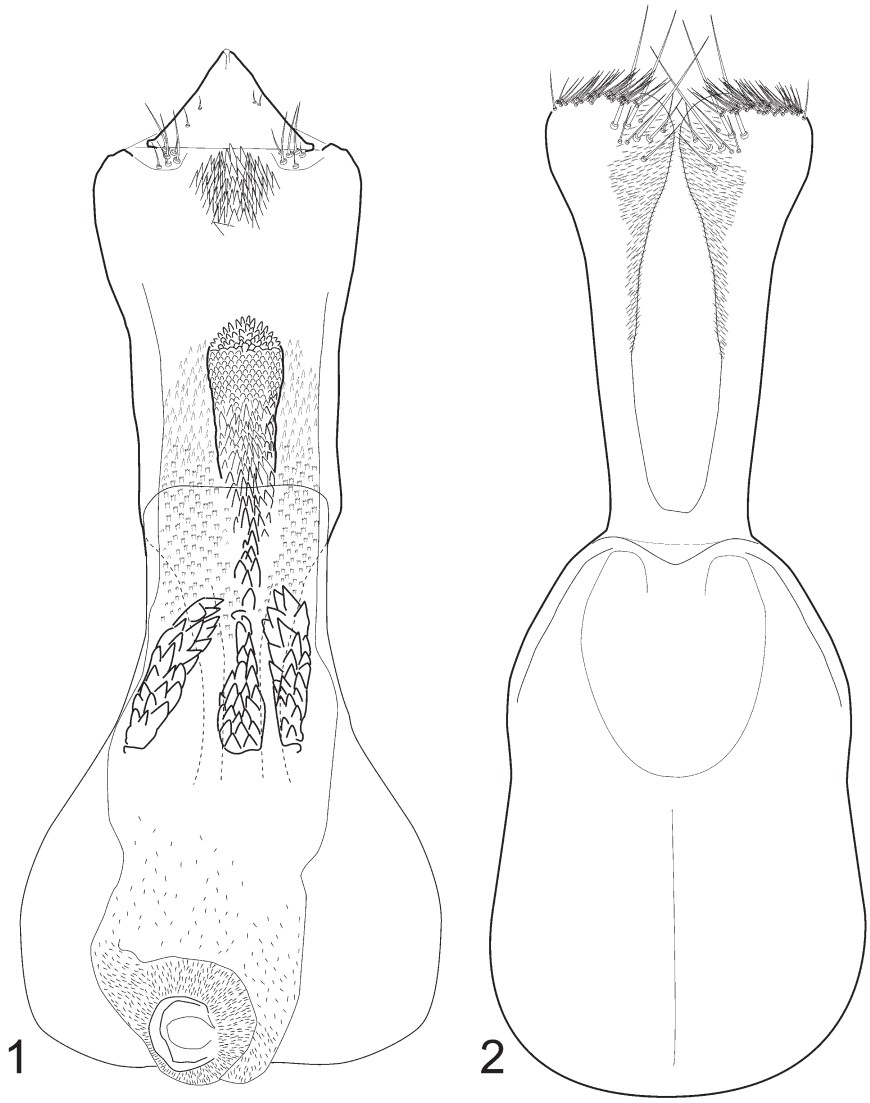
Description

Length (pronotum-pygidium): 1.9-2.8 mm; width: 1.3-1.5 mm.

Body stout, rather thick, last visible tergite slanted about 20° from vertical in male, 60° in female. Integument of head and thorax black, elytra (except darkened base), legs and ventrites reddish, and antennal base reddish ventrally; base of legs and apex of last visible tergite darkened; in darker specimens, abdomen and most of

pygidium are black, with elytra more or less blackened, leaving at least a reddish spot in the centre of each elytron. Vestiture of short and scaly whitish setae, not completely covering integument, with denser areas: post-ocular lobes, patch behind eyes, upper part of thoracic sternites.

Male. Head moderately elongated; eyes bulging, maximum head width 1.6 times width behind eyes; eyes separated by 0.17 times head width including eyes; face long and narrow, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 4.8; eyes cleft to about 2/3 their length, width at bottom of sinus com-



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

posed of 5-6 ommatidia; maximum width of postocular lobes equal to 2/3 eye width at sinus, with coarse sculpture; carina on frons acute and shining, interocular tubercle inconspicuous. Punctation of face deep, irregular, extreme apex of clypeus shining.

Antennae reaching to basal fourth of elytra; antennal segments 1 to 3 subcylindrical, with second shorter than third, 4 markedly widened apically, segments 6-11 serrate, wider than long, 11 oval (L/W = 1.9). Length of antennomeres: 1.7 : 1 : 1 : 1.7 : 1.8 : 2 : 2 : 1.7 : 1.8 : 1.7 : 3.

Pronotum narrowly conical (W/L = 1.34), its sides strongly convergent, straight basally then concave, slightly compressed before apex, not expanded behind eyes, without oblique impression on sides of basal lobes. Sculpture dense and ocellate, very shallow, stronger on sides.

Elytra 1.2 times longer than wide together, their sides subparallel; disc very briefly flattened; no tooth at base of interstriae 3 and 4 ; striae wide, with large punctures; interstriae narrow, with strong microsculpture.

Legs moderately slender, posterior femora little widened; mesoventral margin with minute, obtuse preapical denticle; hind tibiae moderately widened apically, mesodorsal carina strong, and lateral complete, ventral not complete; apex of tibia with mucro as long as lateral denticule, the latter projecting beyond mucro; dorsal denticles very short; a brush of long whitish erect setae from middle of dorsal side of tibia to slightly before apex; first tarsomere without ventral denticule.

Ventrite 5 emarginated, its length medially about 1/3 sternite 4; first ventrite basally without patch of short setae. Last visible abdominal tergite ("pygidium") almost circular (l/L = 0.9), apical third strongly convex and apex turned under.

Genitalia. Median lobe 0.9 mm long (Fig. 1), rather short and stout (maximum width excluding basal hood / total length = 0.26), with apex widened; basal hood rather large, slightly emarginated apically in slide preparation; ventral valve triangular, with apex a right angle, transparent, with a few sensillae, bearing two lateral groups of 6 long and 2 short setae; no hinge sclerites; internal sac lined with thin spicules becoming larger and ctenoid distally, with a central elongated structure made apically of numerous tiny and densely packed tubercles (10-12 in a row), becoming larger and more acute distally; central part of internal sac with three strongly sclerotized rods; distal bulb with a few needles, gonopore C-shaped, well sclerotized, surrounded by small needles; basal strut very wide, subrectangular, with faint keel; lateral lobes (Fig. 2) cleft to 90% their length, pubescent; apex of parameres with three long setae and a fringe of short dense setae.

Female. Usually darker than male; however, even in females with entirely black elytra, legs and antennal base are never completely darkened; antenna shorter (segment 4 hardly longer than 3), last visible tergite an elongated triangle, slanted about 30° from horizontal. Females are usually longer than males, measuring up to 3.7mm.

Biology

Reared from seeds of *Indigofera astragalina* DC. (Leguminosae, Fabaceae, Indigofereae, Section Hirsutae of genus *Indigofera*).

Distribution
Senegal.

Etymology
Latin genitive of the host plant's specific name.

Discussion
This species is closely related to *C. nodieri*, from which it differs in tegument colour, in a whiter and longer setation on thorax and elytra; in males, posterior tibiae bear a long brush of setae that is absent or very faint in *C. nodieri*, and last visible tergite is more clearly convex apically in *C. astragalinae*. Male genitalia are very similar, with internal sac of *B. astragalinae* showing a wider, stouter central structure, made of more numerous and more prominent tubercles; its lining is made of thin spicules instead of rather large teeth in *B. nodieri*. In addition to *B. astragalinae* and *B. nodieri*, a central column of densely packed tubercles is found in the internal sac of a number of closely related species; it is particularly well developped in *Bruchus incaeruleus impressicollis* (Pic, 1924), *Bruchidius nigricornis* (F., 1801) and *Bruchidius pilosus* (Boheman, 1829), poorly defined and loose in *Bruchus obscurus* var. *densepubens* Pic, 1929, replaced by an elongated sclerotized plate in *Bruchidius adouanus* (Pic, 1929), *Bruchus obscurus* var. *longithorax* Pic, 1934 and *B. lubaicus*; the same structure may be identified as well in members of the *B. albopubens* species-group (Delobel & Le Rü 2010).

***Bruchidius fuligineus* sp. nov.**

Type material
Holotype: Male, KENYA, "Naro Moru River Lodge, ex *Indigofera emarginella*, 00°09.278'S, 37°00.706'E, 1956m, 17.i.2008, B. Le Rü coll.", "Holotype", "*Bruchidius fuligineus* n. sp., A. Delobel des. 2010", MNHN. Paratypes: 31 males (two dissected, gen. prep. 11708, 11908), 53 females (one dissected, gen. prep. 11808), same data as holotype (B. Le Rü), MNHN.

Description
Length (pronotum-pygidium): 2.0-3.6 mm; width: 1.2-1.9 mm.

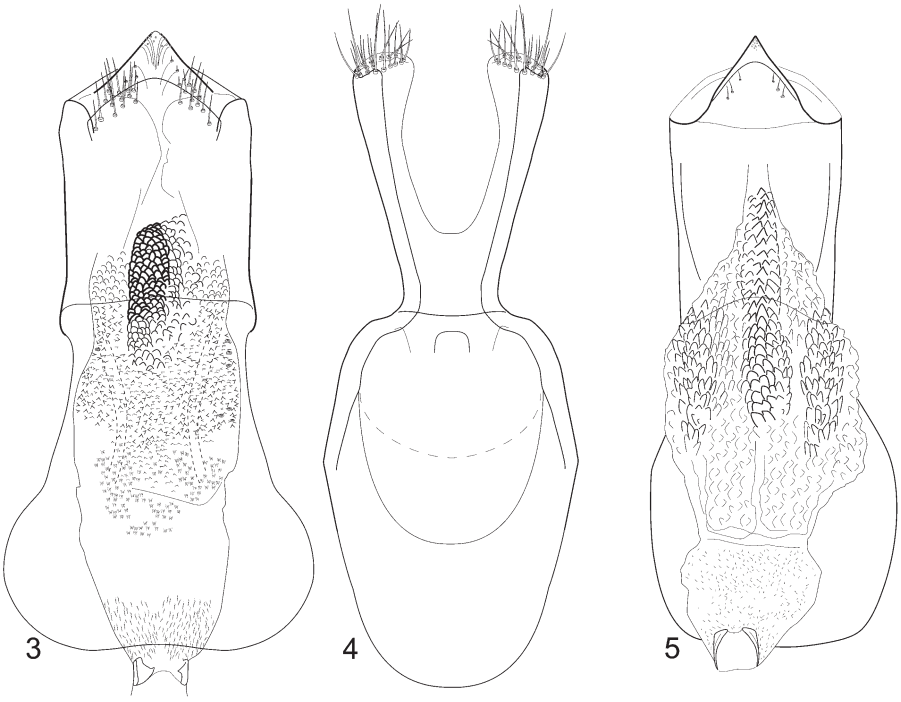
Body stout, rather thick, pygidium slanted about 30° from vertical. Integument entirely black, including anterior legs and antennal base. Vestiture very thin and short, white and golden red, not covering integument, with scaly and denser areas: patch behind eyes, pronotum sides and upper part of thoracic sternites, a short line of golden red setae on prescutellar area; setae white on scutellum, elytra with dark setae, hardly visible on black background; in male, a large patch of long white setae on dorsal side of posterior tibia, extending from middle of tibia to just before apex, absent in female; in male, last visible tergite with densely spaced golden red setae except very small patch of white setae at base, in female, setae sparse apically, not covering shining integument; ventrites with a mixture of dense golden red and white setae.

Male. Head elongated; eyes moderately bulging, maximum head width 1.35 times width behind eyes; eyes separated by 0.31 times head width including eyes; face long and narrow, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 3.21; eye cleft to about 0.6 their length, width at bottom of sinus composed of 6 ommatidia; maximum width of postocular lobes equal to 2/3 eye width at sinus, with coarse sculpture; carina on frons long, well defined, shining, interocular tubercle absent. Punctation of face deep, ocellate, contiguous, except on extreme apex of clypeus.

Antenna short, hardly reaching to pronotal base; antennal segments 1 to 3 subcylindrical, 4 as long as wide apically, segments 4-6 regularly widened, 5-7 cup-shaped, 8-10 subrectangular, wider than long, 11 oval (L/W = 1.6). Length of antennomeres: 1.5 : 1 : 1.6 : 1.2 : 1.7 : 1.7 : 1.8 : 1.7 : 1.6 : 1.6 : 2.6.

Pronotum long, narrowly conical (W/L = 1.33), its sides straight, converging on basal 3/4, constricted at apical 1/4, then parallel, not expanded behind eyes; rather strongly humped, slightly and briefly depressed towards apical fourth (side view). Sculpture strong and irregular, with depressed subcircular antescutellar area; a short apical collar with very fine punctation.

Elytra 1.17 times longer than combined width, their sides convex, maximum width at basal third; disc flattened; no tooth at base of interstriae 3 and 4. Striae on disc deep and thin, with small punctures; interstriae shining, with strong sculpture.



3-5. male genitalia of Bruchinae: 3 − median lobe of *Bruchidius fuligineus*; 4 − lateral lobe and tegminal strut of *B. fuligineus*; 5 − median lobe of *Bruchus obscurus* var. *densepubens*

Hind femora moderately incrassated, 3.2 times longer than wide; mesoventral margin with small preapical denticle; hind tibiae strongly widened apically, with four carinae: ventral, dorso-mesal, and lateral complete, ventro-lateral not reaching apex, defining with ventro-mesal carina a long flattened area; apex of tibia with mucro about as long as 2/3 width of first tarsomere in middle; lateral denticle slightly smaller than mucro, and dorsal denticles very small; first tarsomere ventrally with short denticle.

Abdomen with ventrite 5 emarginated, its length medially about half as long as sternite 4; ventrite 1 basally without patch of short setae. Last visible abdominal tergite shield-shaped, with uniformly spaced punctures and apex not turned under.

Genitalia. Median lobe 0.8 mm long (Fig. 3), rather short and stout (maximum width excluding basal hood / total length = 0.31), parallel-sided before apex; basal hood slightly emarginated apically in slide preparation; ventral valve widely triangular, well sclerotized, with apex obtuse, transparent, with numerous sensillae, bearing two lateral groups of 12-13 setae; dorsal valve without sclerotized ring; a pair of faintly sclerotized areas in lieu of hinge sclerites; internal sac basally with weak ornamentation, then a mass of round, densely fused tubercles; saccus lined with numerous spines; distal bulb with wide based needles arranged around gonopore. Basal strut large (Fig. 4), without keel; lateral lobes short, cleft to 70% their length, pubescent; apex of parameres with numerous long setae.

Female. Similar to male, but antennal segment 4 about as long and wide as 3, ventrite 5 as long as 4, last visible tergite with golden red setae becoming gradually sparser towards apex, showing shining cuticle. Hind tibia without brush of setae, with ventro-lateral carina not reaching apex, defining with ventro-mesal carina a long flattened area.

Etymology

From latin adjective *fuligineus*, colour of soot, which refers to the black and shiny aspect of elytra.

Host plants

Larvae develop in the seeds of *Indigofera emarginella* A.Rich. (Leguminosae, Fabaceae, Indigofereae, Section *Indigofera* of genus *Indigofera*); the species is widespread in Africa south of the Sahara (except South Africa).

Discussion

The elytral disc of a limited number of specimens shows a more or less extensive area covered with white setae; they are otherwise identical with dark specimens and obviously conspecific. *B. fuligineus*, through the presence of a small column of packed tubercles in the internal sac, belongs to a large and difficult group of black specimens with a central longitudinal column of densely packed sclerotized tubercles. *B. fuligineus* may be mistaken for darker specimens of *Bruchus confusus* var. *densepubens* Pic, 1929, but males of the latter species have no tibial brush, and the pygidium of females is more densely covered with scaly setae. The median lobe of *B. fuligineus* is particularly stout, and the central colum of tubercles particularly short, as compared with *densepubens* (Fig. 5).

Distribution

Kenya.

Bruchidius kidevuensis sp. nov.

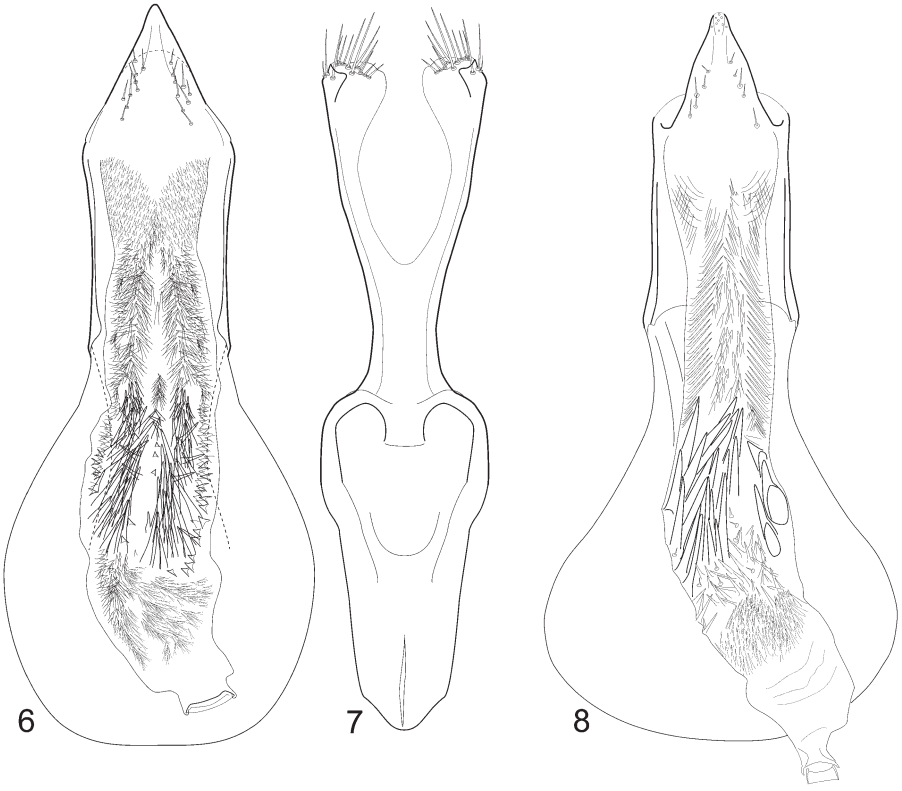
Type material

Holotype: Male, TANZANIA, "Kidevu 1818m / ex *Indigofera basiflora*, 03°09.402'S, 36°41.058'E/ 26.ii.2008, B. Le Rü coll.", "Holotype", "*Bruchidius kidevuensis* n. sp., A. Delobel des. 2010", dissected (gen. prep. 04108), MNHN.

Description

Length (pronotum-pygidium): 3.1 mm; width: 1.6 mm.

Body moderately elongated, rather thick, pygidium slanted about 30° from vertical. Integument black, except legs orange (but tarsi largely black); four basal antennal segments orange with dorsal black spots. Vestiture dense, mostly yellowish dorsally, white ventrally; on pronotum, white setae on prescutellar area and laterally; on scutellum and sutural area of elytra, setation denser, more scaly and whiter; last visible tergite with



6-8. male genitalia of *Bruchidius*: 6 − median lobe of *B. kidevuensis*; 7 − lateral lobe and tegminal strut of *B. kidevuensis*; 8 − median lobe of *B. massaicus*

white scaly setation, denser along longitudinal midline; no particular arrangement of setae on ventrites.

Male. Head short; eyes rather strongly bulging, maximum head width 1.4 times width behind eyes; eyes separated by 0.37 times head width including eyes; face short and wide, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.2; eye deeply cleft, width at bottom of sinus composed of only 4 ommatidia; maximum width of postocular lobes equal to 1/3 eye width at sinus; carina on frons shallow, faint, interocular tubercle indistinct.

Face and clypeus strongly alutaceous, with strong, irregular punctures. Antenna short, hardly reaching to pronotal base; antennal segments 1-3 subcylindrical, 3-6 regularly widened, 7-10 wider apically than long, subserrate, 11 oval (L/W = 1.4). Length of antennomeres: 1.2 : 1 : 1.4 : 1.3 : 1.5 : 1.7 : 1.6 : 1.6 : 1.6 : 1.5 : 2.2.

Pronotum narrowly conical, with greatest width at base (W/L = 1.24), its sides straight except slight lateral compression just before apex, not expanded behind eyes; its basal half strongly swollen and protruding, without distinct impression on sides of basal lobe; large, deep coalescent punctures on sides, smaller and shallower on discal (humped) part.

Elytra 1.15 times longer than combined width, their sides subparallel; disc flattened, with deep and rugose sculpture at base; no tooth at base of interstriae 3 and 4. Striae on disc moderately deep, with small punctures; interstriae flat, with strong microsculpture.

Hind femora slightly incrassated, at their widest 2.7 times longer than wide ; mesoventral margin without preapical denticle, but two small notches; hind tibiae apically strongly widened, with dorsomesal, lateral and ventral carinae complete; apex of tibia with short mucro about as long as third of tarsomere 1 width at middle; lateral denticle about half mucro length, and dorsal denticles minute. First tarsomere ventrally with small acute tooth.

Abdomen with ventrite 5 slightly emarginate, its length medially about 2/3 of sternite 4; ventrite 1 basally without particular arrangement of setae. Last visible abdominal tergite shield-shaped, convex apically but not turned under.

Genitalia. Median lobe 0.9 mm long (Fig. 6), rather elongate (maximum width excluding basal hood / total length = 0.20), widened before apex; basal hood narrow, not emarginate; ventral valve unusually long, acutely triangular, its apex transparent, with numerous sensillae, bearing two lateral groups of 9-10 setae; dorsal valve without sclerotized ring; no hinge sclerites; internal sac very densely lined with spines, basally weakly sclerotized, then of increasing size and sclerotization, saccus with numerous strong teeth; distal bulb with smaller spines, gonopore with gutter-like, c-shaped sclerite. Basal strut (Fig. 7) with very faint keel; lateral lobes cleft to 63% their length; apex of parameres with apical pubescent widening, bearing 5 long setae and about 10 shorter ones.

Female. Unknown.

Etymology

Named after the town of Kidevu in Tanzania.

Host plants

Larvae develop in the seeds of *Indigofera basiflora* J.B.Gillett (Leguminosae, Fabaceae, Indigofereae, Section Simplicifoliae of *Indigofera*). This spiny species is restricted to Somalia-Masai dry grasslands of Tanzania (ILDIS, 2009).

Discussion

B. kidevuensis belongs to a group of species in which the internal sac is devoid of central sclerotized column or blade, with a large triangular ventral valve; it is closely related to *Bruchidius massaicus* Decelle, 1973 from Kenya and Tanzania, from which it may be easily distinguished by its larger size, yellowish and denser dorsal vestiture (thin and white in *massaicus*), posterior legs reddish (entirely black in *massaicus*); the internal sac of *massaicus* (Fig. 8) also bears less numerous but larger denticles than *kidevuensis*.

Distribution

Tanzania.

***Bruchidius lubaicus* sp. nov.**

Bruchidius lubaicus Decelle *in litt*.: Gillon *et al*. 1992.

Type material

Holotype: Male, IVORY COAST, "Lamto, 18.xii.1981, ex *Indigofera polysphaera*", "Holotype", "*Bruchidius lubaicus* n. sp., A. Delobel des. 2010", dissected (gen. prep. 18207), CBGP. Paratypes: 1 male, same data as holotype; 1 male, 1 female, Lamto, 16.xii.1981; 2 females, Lamto, 2.xii - 3.i.1983, CBGP, MNHN.

Description

Length (pronotum-pygidium): 2.0 mm; width: 1.0 mm.

Body ovate, pygidium slanted about 40° from vertical. Integument entirely black or piceous, including anterior legs and antennal base. Vestiture of rather homogeneous thin and short white setae, poorly covering integument; only slightly denser on pronotum sides, much denser on antescutellar lobes and scutellum; ventrally denser and longer on upper part of meso- and metapleurae.

Male. Head elongate, with narrow face; eyes slightly bulging, maximum head width 1.3 times width behind eyes; eyes separated by 0.28 times head width including eyes; distance between posterior rim of eyes and apex of clypeus / distance between eyes = 3.2; eye cleft to 3/4 of its length, width at bottom of sinus composed of 3-4 ommatidia; maximum width of postocular lobes equal to 2/3 eye width at sinus; carina on frons faint, shiny, interocular tubercle indistinct. Punctation of face and clypeus irregular and shallow. Antenna short, hardly reaching to pronotal base; antennal segments 1-3 subcylindrical, 4-5 trapezoidal, wider apically than long, 6-10 subserrate, 11 oval (L/W = 1.7). Length of antennomeres: 1.1; 1; 0.9; 0.9; 1.2; 1.2; 1.2; 1.2; 1.2; 1.4; 1.7.

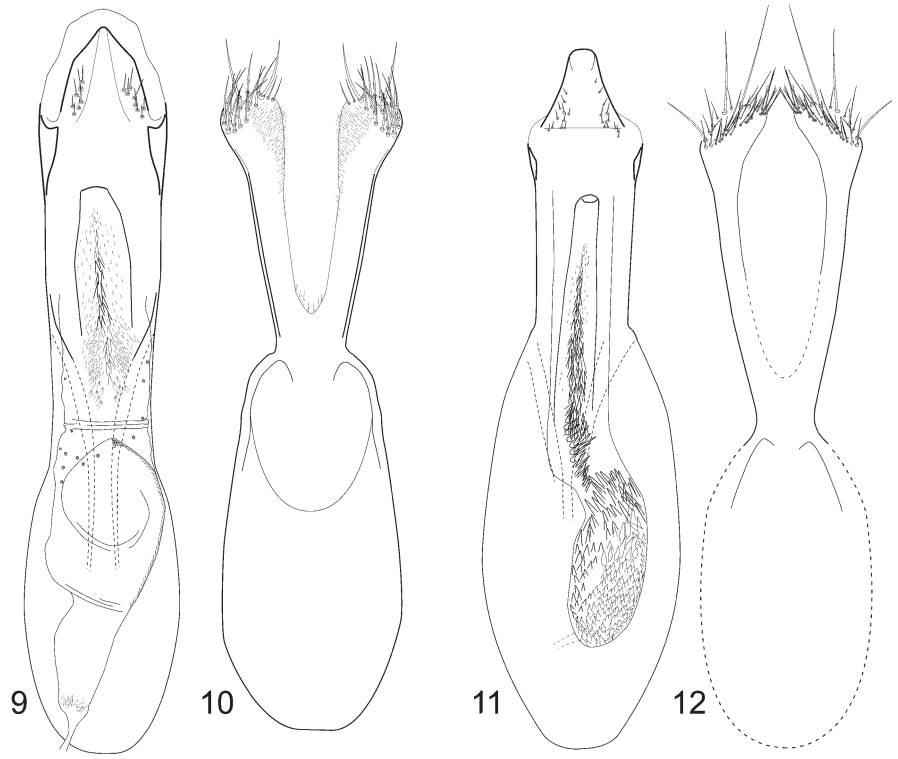
Pronotum trapezoidal, longer than wide (W/L = 1,15), its sides perfectly straight, without oblique impression on sides of basal lobe. Punctation strong, ocellate and almost coalescent.

Elytra 1.16 times longer than combined width, their sides convex; disc flattened; without distinct tooth at base of interstriae 3 and 4. Striae on disc strong and deep; interstriae shiny, with irregular microsculpture.

Hind femora moderately incrassated; mesoventral margin with small acute preapical denticle; hind tibiae widened; apex of tibia with mucro about as long as lateral denticle, dorsal denticles long and acute, about half as long as mucro; apex of hind tibia dorsally with small brush (measuring about 0.2 of tibia length) of long setae. First tarsomere ventrally with small denticle.

Abdomen with ventrite 5 slightly emarginated, its length medially about 3/4 of ventrite 4; central part of ventrites with long, wavy, suberect setae. Pygidium shield-shaped (W/L = 0.86), with apex convex but not really turned under.

Genitalia. Median lobe 0.8 mm (Fig. 9), rather narrow (maximum width excluding basal hood / total length = 0.18), not apically widened; basal hood narrow, ovate, not indented; ventral valve subtriangular, with apex obtuse, transparent, bearing two lateral groups of 7-8 setae; hinge sclerites absent; anterior part of internal sac with a moderately



9-12. male genitalia of *Bruchidius*: 9 − median lobe of *B. lubaicus*; 10 − lateral lobe and tegminal strut of *B. lubaicus*; 11 − median lobe of *B. adouanus*; 12 − lateral lobe and tegminal strut of *B. adouanus*

sclerotized elongated plate bearing spicules of increasing size; saccus almost glabrous, showing a subcircular structure; distal bulb with a small number of needles; gonopore without sclerotized frame; basal strut (Fig. 10) large and transparent, strongly convex, without keel; lateral lobes cleft to 1/3 their length, pubescent; apex of parameres with numerous (about 25) setae.

Female. Similar to male, hind tibia without subapical brush, pygidium without glossy area.

Host plants

Examined material was reared from *Indigofera polysphaera* and *I. pulchra* in Ivory Coast (Gillon *et al*. 1992). Both species belong to Section Simplicifoliae of *Indigofera*.

Discussion

B. lubaicus shows close morphological affinities with *B. adouanus* (Pic, 1929) from Ethiopia. Main differences between male genitalia of the two species are as follows: ventral valve (Fig. 11) acutely triangular (trapezoid in *adouanus*); central sclerotized blade short and wide (long and narrow in *adouanus*); saccus almost entirely glabrous (lined with numerous strong teeth in *adouanus*); lateral lobes (Fig. 12) with narrowly rounded tip (tip wide and flat in *adouanus*). *Bruchus obscurus* var. *longithorax* Pic, 1934 belongs to the same group of species, and shows the same colour pattern; it may be distinguished from both *adouanus* and *lubaicus* through the shape of its pronotum, particularly elongated.

Distribution

Ivory Coast.

***Bruchidius malindiensis* sp. nov.**

Type material

Holotype: Male, KENYA, "Malindi / ex *Indigofera schimperi*, 33m / 03°08.054'S, 40°08.098'E / 31.xii.2007, B. Le Rü coll.", "Holotype", "*Bruchidius malindiensis* n. sp., A. Delobel des. 2010", MNHN. Paratypes: 5 males (one dissected, gen. prep. 03508), 13 females, same data as holotype, MNHN.

Description

Length (pronotum-pygidium): 2.0-2.1 mm; width: 1.0 mm.

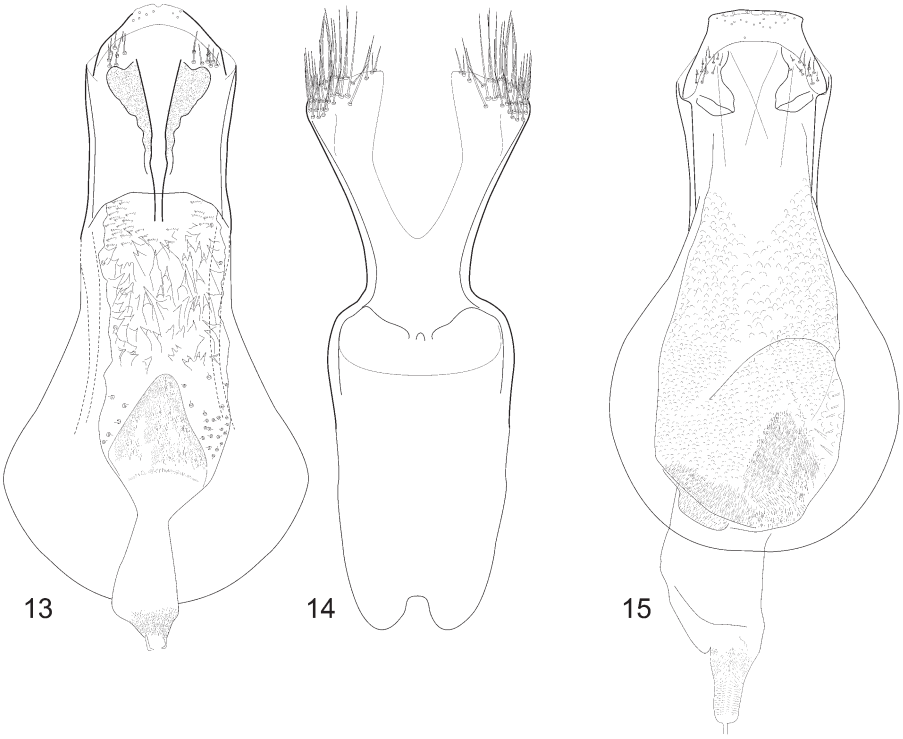
Body elongated, rather thick, pygidium slanted about 30° from vertical. Integument black, legs pale testaceous, except four anterior tarsi black, posterior tarsi darkened, antennal segments 1-4 testaceous, blackened dorsally, segment 5 dark brown. Vestiture made of yellowish grey scales dorsally, whitish ventrally and on last visible tergite; patches of denser setation behind eyes, on antescutellar area, with a faint longitudinal line reaching apex of tergite.

Male. Head short; eyes moderately bulging, maximum head width 1.32 times width behind eyes; eyes separated by 0.36 times head width including eyes; face long and narrow, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.45; eye cleft to about 3/5 its length, width at bottom of sinus composed of 6 ommatidia; maximum width of postocular lobes equal to 1/3 eye width at sinus; carina on frons long, shining but faint, interocular tubercle indistinct. Cuticle of face and clypeus alutaceous, with coarse punctation. Antenna short, hardly reaching to pronotal base; antennal segments 1-4 subcylindrical, segments 5-7 of increasing width, 8-10 subrectangular, 11 oval (L/W = 1.46). Length of antennomeres: 1.1 : 1 : 1 : 0.7 : 0.7 : 0.8 : 1 : 1.1 : 1 : 1 : 1.9.

Pronotum narrowly conical (W/L = 1.25), its sides straight, not compressed laterally, not expanded behind eyes, without oblique impression on sides of basal lobe. Sculpture of pronotum made of shallow, irregular punctures, notably deeper on disc.

Elytra 1.21 times longer than combined width, their sides moderately convex, maximum width beyond middle; disc strongly convex; no tooth at base of interstriae 3 and 4 . Striae on disc wide, with strong punctures; interstriae with strong microsculpture.

Hind femora moderately incrassated, at their widest 1.44 times wider than mid femora; mesoventral margin with small preapical denticle; hind tibiae apically strongly



13-15. male genitalia of Bruchinae: 13 − median lobe of *Bruchidius malindiensis*; 14 − lateral lobe and tegminal strut of *B. malindiensis*; 15 − median lobe of *Bruchus obscurus* var. *skaifei*

widened, with dorsomesal and ventral carinae complete, lateral not reaching base; apex of tibia with mucro a little longer than width of tarsomere 1 at base; lateral denticle about half mucro length, and dorsal denticles half as long as lateral denticle. First tarsomere ventrally with short acute denticle.

Abdomen with ventrite 5 emarginated, its length medially about half of ventrite 4; ventrite 1 basally without particular arrangement of setae. Last visible abdominal tergite shield-shaped (L/W = 1.16), strongly convex but with apex not turned under.

Genitalia. Median lobe 0.63mm long (Fig. 13), moderately stout (maximum width excluding basal hood / total length = 0.25), with sides almost parallel; basal hood subcircular, not emarginated; ventral valve well sclerotized, wide, rounded, its apex irregular, transparent, with numerous sensillae, and bearing two lateral groups of 7 setae; dorsal valve without sclerotized ridge; a pair of long, narrow, granular hinge sclerites; internal sac basally with a few ctenoid scales followed by a zone with weakly sclerotized spines; saccus smooth, with numerous sensillae, and a cecum or axillary cavity that lies as a dorsal fold in resting position, this cecum densely lined with needles; distal bulb with very thin needles, gonopore with two small circular sclerites. Basal strut (Fig. 14) without keel, its apex strongly emarginated and produced ventrally; lateral lobes cleft to 72% their length, pubescent; apex of parameres with numerous long setae.

Female. Similar to male, but last ventrite as long as ventrite 4, last visible tergite less convex, almost flat.

Etymology

From Malindi, a town on the northern Kenyan coast.

Host plants

Larvae develop in the seeds of *Indigofera schimperi* Jaub. & Spach (Leguminosae, Fabaceae, Indigofereae, Section Alternifoliae of genus *Indigofera*); the species is widespread in southern and eastern Africa (also in Saudi Arabia and Yemen).

Discussion

B. malindiensis is very closely related to *Bruchus obscurus* var. *skaifei* Pic, 1928 from Zimbabwe. Both species show quite similar male genitalia, in particular they share a wide, rounded ventral valve, the presence of hinge sclerites, of a subtriangular cecum in saccus, and of short lateral lobes as compared with basal strut size. The shape and/or ornamentation of these different elements differ however markedly in the two species (Fig. 15). *B. malindiensis* also differs from *B. skaifei* in the absence of tibial brush in male, and of speculum in female (apical third of male tibia with brush of long setae in *skaifei* male and large squarish glossy surface in apical half of last visible tergite in *skaifei* female).

Distribution

Kenya.

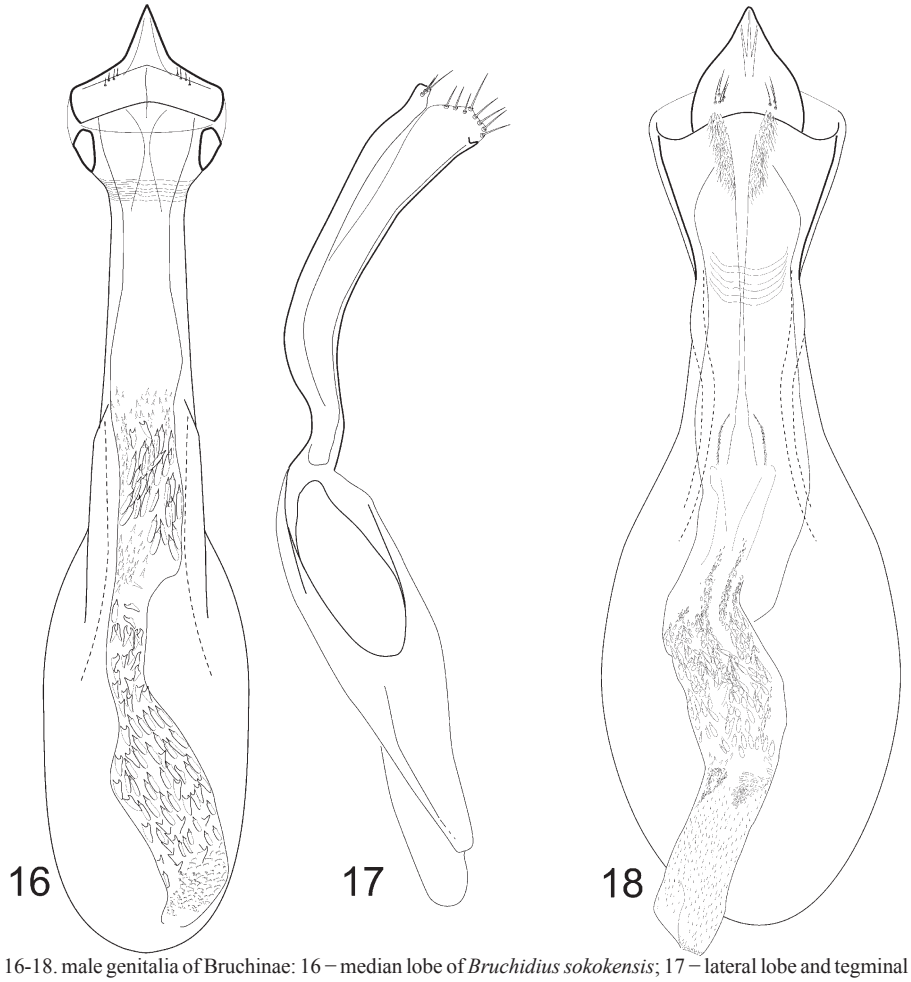
***Bruchidius sokokensis* sp. nov**

Type material

Holotype: Male, KENYA, "Sokoke forest / ex *Indigofera vohemarensis* 20m / 03°18.329'S, 39°59.074'E**,** 29.xii.2007", "Holotype", "*Bruchidius sokokensis* n. sp. / A. Delobel des. 2010", MNHN. Paratypes: 1 male, dissected (gen. prep. 03908), 1 female, same data as holotype, MNHN; 11 males, 13 females, Voi, Tsavo, 11.iv-14.iv 1997; 1male, 3 females, same but 23.iii-4.iv.1997, Ma. Halada; 1 male, 2 females, same but 22.xi-2.xii.1996, M. Snizek; 1 female, same but 8-18.xii.1997, OÖLM.

Description

Length (pronotum-last visible tergite): 1.8-2.4 mm; width: 1.0-1.2 mm.



16-18. male genitalia of Bruchinae: 16 − median lobe of *Bruchidius sokokensis*; 17 − lateral lobe and tegminal strut of *B. sokokensis*; 18 − median lobe of *Bruchus sakeensis*

Body rather thick, last visible tergite slanted about 45° from vertical. Integument orange brown, with head (especially face) and posterior legs darkened. Four anterior legs testaceous. Vestiture made of slightly scaly white setae, denser and well covering integument in the following areas: sides and basal lobes of pronotum, a poorly defined dorsal line on disc, scutellum, basal part of elytral suture; setation slightly heterogeneous on interstriae, in particular third interstria with denser white setae.

Male. Head with eyes strongly bulging, maximum head width 1.5 times times width behind eyes; eyes separated by 0.22 times head width including eyes; face narrow: distance between posterior rim of eyes and apex of clypeus / distance between eyes = 3.4; eye cleft to a little more than half its length, width at bottom of sinus composed of 5 ommatidia; postocular lobes less wide than the diametre of one ommatidia; frontal carina moderately strong, wide, shiny, interocular tubercle indistinct. Punctation of face strong and irregular, often merging; clypeal apex shiny. Antenna rather short, reaching elytral base; segments 1-3 of equal width, 3 shortest, 4 notably larger than 3, triangular, segments 6-10 serrate, 4-10 wider than long, 11 ovate (L/l = 1,7). Length of antennomeres: 1.3 ; 1.0 ; 0.7 ; 1.0 ; 1.1 ; 1.3 ; 1.6 ; 1.6 ; 1.6 ; 1.7 ; 2.7.

Pronotum trapezoid, wider at base (l/L = 1.16), its lateral sides very slightly concave basally, then straight, moderately converging, not widened behind eyes; with shallow oblique impression on sides of antescutellar lobes. Disc with large, rather shallow, sometimes contiguous punctures, integument shiny.

Elytra 1.25 times longer than wide together, their lateral sides evenly curved, with maximum width at apical third; disc convex ; no denticle at base of interstriae 3 and 4; striae rather poorly defined, shallow, with punctures slightly larger than stria width; interstriae glossy, strongly alutaceous.

Posterior femora moderately widened; mesoventral side with two preapical slanted teeth, the first of which is larger and acute, the second much shorter and more obtuse; both are often partly concealed by setae; posterior tibiae moderately widened apically, without brush of elongated setae, dorsomesal and ventral carinae complete, strong, lateral carina absent in basal fourth; apex of tibia with mucro almost as long as 1st tarsomere width in middle; lateral denticle 1/3 as long as mucro, dorsal denticles very short.

Ventrite 5 moderately indented, its length in middle equal to 2/3 sternite 4; first ventrite without brush of short or scattered erect setae. Last visible tergite subtriangular (l/L = 1.1), its apical 1/4 convex, and apex moderately turned under.

Genitalia. Median lobe 0,70 mm long (Fig. 16), slender (maximum width excluding basal hood / total length = 0.16), notably widened apically; basal hood narrow, not cleft apically; ventral valve transverse, hastate, with acute apex, bearing two lateral groups of 4 setae; latero-apical part of median lobe with a pair of subcircular sclerites (not hinge sclerites); wall of median lobe faintly sclerotized in its apical 1/3; internal sac with a dense cluster of spicules, the base of which is about three times longer than point, saccus lined with the same type of spicules, but arranged into longitudinal rows; the gonopore is apparently not sclerotized, before it lays an area bearing various spicules, needles and multifid scales. Tegminal strut (Fig. 17) narrow, with dorsal carina extending beyond apex; lateral lobes strongly bent ventrally, cleft to 80% their length; paramere apex with a small number (7-8) of small setae.

Female. Similar to male, but setae more scaly, better covering integument, specimens in good condition show small spots of dark setae in the 3rd interstria (slightly beyond base and towards posterior third) and on humerus, as well as a pair of white spots on pronotal disc. Antennae shorter, segments 1-4 subcylindrical, 4 not larger than 3, segments 6-10 less assymetrical than in male. Ventrite 5 longer medially than 4; last visible tergite without glossy area.

Etymology

Specific name derived from the type locality, Sokoke Forest.

Host Plants

Larvae develop in ripe pods of an Indigofereae known as *Indigofera vohemarensis* Baill. That plant is widespread in East Africa, from Ethiopia to Mozambique and in the eastern part of Congo; it seems actually distinct from the true *I. vohemarensis*, an endemic of Madagascar (ILDIS, 2009). It belongs to Section Monanthae of genus *Indigofera*.

Discussion

B. sokokensis belongs to a small group of species with a large, triangular femoral spine, followed or not by smaller spines, in which females are devoid of pygidial speculum and males lack tibial brush. *Bruchidius bilineatithorax* (Pic, 1952) and *Bruchidius innocuus* (Fahraeus, 1871) from South Africa, and *Bruchus sakeensis* (Pic, 1953) from Congo and Rwanda, belong to this group. Male genitalia of *B. sakeensis* are quite different, particularly by the presence of a much larger keel on basal strut, and subtriangular ventral valve (Fig. 18). The basal strut of *B. innocuus* does not show any keel, and the ventral valve is perfectly triangular (Delobel & Le Rü, 2009). *B sokokensis* shows a strong similarity in external morphology with *B. bilineatithorax*, but pronotum and elytra of the former are completely devoid of dark spots or lines; head and pronotum shape, particularly the narrow face, and elongated pronotum, are also quite distinctive; Pic's type of *B. bilineatithorax* is a female, and its male genitalia are unknown to me.

Distribution

Known from the coastal forest of Sokoke, Kilifi district, and from the Voi area, in the Tsavo National Park, southern Kenya.

***Bruchidius subdolus* sp. nov.**

Type material

Holotype: Male, KENYA, "Rongai / ex *Indigofera schimperi* / 01°21.412'S, 36°45.639'E / 13.vi.2008 B. Le Rü coll.", "Holotype", "*Bruchidius subdolus* n. sp. / A. Delobel des. 2010", MNHN. Paratypes: 2 males (gen. prep. 03809), 2 females, same data as holotype; 1 male, Kenya, Kiboko / ex *Indigofera tinctoria* / 02°20.604'S, 37°70.100'E /937m, 5.vi.2008, B. Le Rü, dissected (gen. prep. 12308), MNHN.

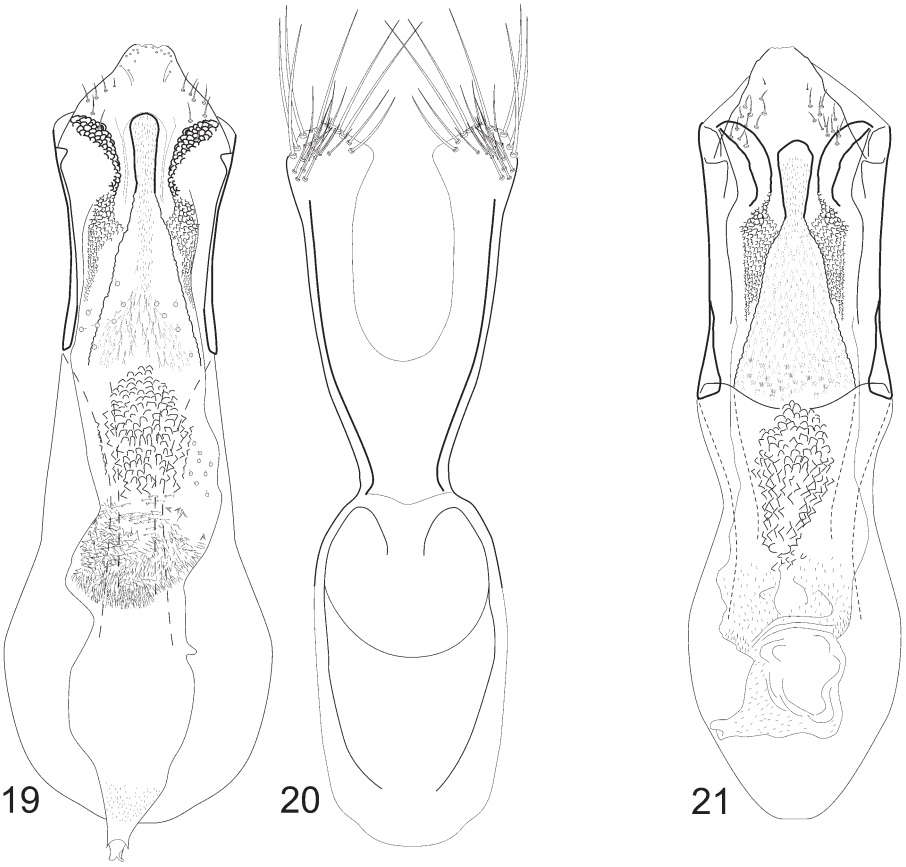
Additional material

SENEGAL: 1 male, “Sangalkam, viii.1967”,”Muséum Paris, Mission IFAN Muséum, A. Descarpentries, T. Leye et A. Villiers”, “Genit. Br.M.P.80”, “*Bruchidius confusus* mihi, J. Decelle det, 1976», MNHN. GAMBIA: 7 males, 2 females, Kombo S. Mary, Kotu point, 17.xi, 24.xi, 1.xii.1976; 1 male, 1 female, Kombo North, Bijilo Forest Park, 21.xi.1976, G. Wängsjö, NHRS. BURKINA FASO: 1 male, 15km SW Bobo-Dioulasso, 11°2N, 4°21W, env. Dar Salami, 3.xi.2003, H. Perrin, MNHN.

Description

Length (pronotum-pygidium): 2.0-2.1 mm; width: 1.1 mm.

Body moderately elongated, rather slim, pygidium slanted about 30° from vertical. Integument entirely black, except for antennal segments 2 and 3, with a dark reddish tinge ventrally. Vestiture of thin, long, whitish setae, appressed but not hiding integument. Setae denser, slightly scaly on prescutellar area as an elongated patch not extending



19-21. male genitalia of *Bruchidius subdolus*: 19 − median lobe of Kenyan paratype; 20 − lateral lobe and tegminal strut of Kenyan paratype; 21 − median lobe of West African specimen

beyond 1/4 of pronotum length; small areas of denser setation on sides of basal lobes and on pronotal sides, particularly behind eyes. No particular arrangement of setae on ventrites, except for a few erect setae on apical fringe of ventrites 3 and 4.

Male. Head short; eyes moderately bulging, maximum head width 1.2 times width behind eyes; eyes separated by 0.32 times head width including eyes; face long and narrow, with distance between posterior rim of eyes and apex of clypeus / distance between eyes = 2.7; eye deeply cleft, width at bottom of sinus composed of five ommatidia; maximum width of postocular lobes equal to 1/4 eye width at sinus; carina on frons very faint, interocular tubercle indistinct. Punctation of face strong, irregular, contiguous, less so on clypeus. Antenna short, reaching pronotal base; antennal segments 1 to 3 subcylindrical, 4 wider than 3, 5 wider than 4, 4-10 wider than long, 6-10 cup-shaped, assymetrical, 11 oval (L/W = 1.4). Length of antennomeres: 1.7 : 1 : 1.3 : 1 : 1.4 : 1.6 : 1.6 : 1.6 : 1.7 : 1.6 : 2.6.

Pronotum trapezoidal (W/L = 1.31), its sides almost straight, slightly campaniform, not expanded behind eyes; not humped, with shallow oblique impressions on sides of basal lobe. Disc with strong coalescent punctures, becoming more shallow and irregular towards apex, deeper and larger in basal corners.

Elytra 1.18 times longer than combined width, their sides slightly convex, maximum width at anterior 1/3; disc flattened; no teeth at base of interstriae 3 and 4. Striae on disc deep, with strong punctures; interstriae with strong micropunctation, devoid of large puntures except at base of interstriae 8 and 9.

Hind femora not much incrassated, at their widest 1.3 times wider than mid femora; mesoventral margin with a few notches and a small preapical denticle; hind tibiae apically strongly widened, with dorsomesal and ventral carinae complete, lateral almost reaching base; apex of tibia with mucro about half as long as width of tarsomere 1 at middle; lateral denticle as long as mucro, and dorsal denticles half as long as mucro, first tarsomere ventrally with sharp denticle. A small brush of white long setae on apical fourth of dorsal side of posterior tibiae, extending from a little beyond middle to just before apex.

Abdomen with ventrite 5 emarginate, its length medially about half of ventrite 4; ventrite 1 basally without patch of short setae. Last visible abdominal tergite shield-shaped (L/W = 1.06) with apex convex, not turned under.

Genitalia. Median lobe 0.66 mm long (Fig. 19), stout (maximum width excluding basal hood / total length = 0.24), almost parallel-sided; basal hood narrow, oval, not emarginate; ventral valve large, subtrapezoidal, moderately sclerotized, with apex truncate, transparent, with numerous sensillae, bearing two lateral groups of 5-7 setae; dorsal valve not sclerotized; a pair of large, arcuate hinge sclerites, made of densely packed, strongly sclerotized tubercles gradually decreasing in size distally; internal sac basally with an elongated plate bearing densely appressed, partly ctenoid spicules, followed by a zone with strong elongated spines, then densely lined with hyaline tubercles; dorsally a mass of needles and small spines; distal swelling almost smooth, a few minute needles before hardly sclerotized gonopore; basal strut (Fig. 20) without keel; lateral lobes cleft to 75% of their length, pubescent; apex of parameres with 9 long and about 20 shorter setae.

Female. Similar to male, but antennae slightly shorter, pygidium slanted about 60° from vertical, with a pair of very small rounded, perfectly delimited glossy areas. Pygidium slightly narrower (W/L = 0.80), with apex almost flat, not turned under.

Etymology

From latin adjective meaning “misleading”, “cunning”.

Host plants

Larvae develop in the seeds of *Indigofera schimperi* A. Rich. (Leguminosae, Fabaceae, Indigofereae, Section Alternifoliae of genus *Indigofera*) and *I. tinctoria* L. (section Indigofera of genus *Indigofera*).

Discussion

This new species has no known close relative among *Indigofera*-feeding *Bruchidius*. It may be distinguished from species with a similar colour pattern, for example *Acanthoscelides sublineatus* (Pic, 1943) from Congo, by the general aspect of its body, rather flattened instead of stout and rather thick, and the shape of its pronotum (slightly campaniform, not apically compressed). The Paris Museum collections contain a West African specimen bearing a *B. confusus* identification label by J. Decelle; this author however did not provide a diagnostic description that meets the requirements of the Code of Nomenclature; the name *confusus* is therefore a *nomen nudum*. This and other West African material differ only marginally from *B. subdolus* from Kenya; main differences are as follows: smaller size, pronotum outline slightly campaniform, details of male genital morphology, and shape, size and ornamentation of posterior glossy areas in females. In particular, the surface of hinge sclerites in West African males is smooth, without any sign of tubercles (Fig. 21); Namibian specimens are intermediate for this character. Pending detailed investigation into the different geographical populations, we consider them as belonging to a single species.

Distribution

Burkina Faso, Gambia, Kenya, Namibia, Senegal.

Acknowledgements

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