

Genus	Vol. 21(1): 53-59	Wrocław, 30 III 2010
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*Bruchidius* associated with the Mimosoid *Dichrostachys cinerea* in Africa, with the description of a new species  
(Coleoptera: Chrysomelidae: Bruchinae)

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ABSTRACT. *Bruchidius rufoniger* is described from eastern and southern Africa. Its larvae feed in the seeds of a leguminous shrub, *Dichrostachys cinerea*. A total of four species are presently known to share the same host plant in Africa; an identification key based primarily on adult morphology is provided for these species, as well as drawings of male genitalia. Their respective distributions in Africa south of the Sahara widely overlap, *B. rufoniger* is however absent from the northern and western parts of the continent, and *B. mabwensis* (DECELLE) from the eastern part.

Key words: entomology, taxonomy, Coleoptera, seed beetle, *Bruchidius*, Afrotropical region, host plant, *Dichrostachys*.

INTRODUCTION

Three species of seed beetles are known to feed in the larval stage in seeds of the leguminous shrub (Mimosoideae) *Dichrostachys cinerea* (L.) WIGHT & ARN.: *Bruchidius dichrostachydis* DELOBEL & ANTON and *B. securiger* DELOBEL & ANTON are widely distributed in Africa south of the Sahara, whereas *B. mabwensis* (DECELLE, 1951) seems to be absent from the eastern part of the continent (DELOBEL & ANTON 2003). E. GROBBELAAR (South African National Collection of Insects, Pretoria) and M. DE MEYER (Royal Museum for Central Africa, Tervuren) kindly entrusted me with the study of specimens of a new species reared from *D. cinerea* seeds in South Africa and Congo, respectively. Material from other parts of the continent was found in the collections of the Muséum National d'Histoire naturelle, Paris, of the Oberösterreichisches Landesmuseum, Linz, and of the Museum für Naturkunde der Humboldt-Universität, Berlin.

All this material belongs to a species of *Bruchidius* identified in MNHN and RMCA collections as *Bruchidius atrorufus* DECELLE. DECELLE actually designated a holotype and several paratypes, but no description of the new species was ever published. The name *B. atrorufus* was therefore not nomenclaturally available, and must be regarded as a *nomen nudum*. Several of DECELLE's other invalid species were dealt with in a recent past, see ANTON & DELOBEL (2004) for *Caryedon*, and ANTON & DELOBEL (2003), DELOBEL & ANTON (2003), DELOBEL (2006), DELOBEL (2007) for *Bruchidius*.

DECELLE's invalid species name does not appear to have been used in the past in any scientific article. The choice of a different name, in order to avoid any confusion in the author's name and date of description, is therefore legitimate. In the present article, a new holotype and paratypes are designated, and a formal description is provided for the species. Pending a general reappraisal of the group based on a stable and indisputable phylogeny of European, Asian and African Bruchini (KERGOAT *et al.* 2005), I describe the species in the large, paraphyletic genus *Bruchidius*.

Abbreviations used: MNHN: Muséum National d'Histoire naturelle, Paris; OLML: Oberösterreichisches Landesmuseum, Linz; RMCA: Royal Museum for Central Africa, Tervuren; SANC: South African National Collection of Insects, Pretoria; ZMHB: Museum für Naturkunde der Humboldt-Universität, Berlin.

### ***Bruchidius rufoniger* n. sp.**

*Bruchidius atrorufus* DECELLE, nom. nud. - *in litt.*

#### TYPE MATERIAL

Holotype: Male, ETHIOPIA, "Museum Paris, Abyssinie, Schimper, 1850", "430/50" (on underside of dark cyan disk), MNHN. Paratypes: BOTSWANA: 1 male, Gaborone env., 6.ii.1997 (M. Snizek), dissected (Del. 04306), OLML. CONGO: 13 males, 19 females, Shaba, Luiswishi 17.v.1979, from *Dichrostachys glomerata* pods, (F. Malaisse), 1 dissected (Br.813), RMCA. ETHIOPIA, 2 males, 3 females, same data as holotype, two males dissected (slides Del. 00209 and Del. 13508), MNHN; 1 female, Blue Nile Gorge, 1100m, 10.xi.1971 (R.O.S. Clarke), RMCA. NAMIBIA: 10 males, 9 females, Waterberg, 20°30S, 17°14E, 16.viii.1994 (J. Deckert), ZMHB. SOUTH AFRICA: 3 females, 2 females, Hans Merensky Nat. Res., 23.41S, 30.40E, 02.iv.1997, ex green pods of *Dichrostachys cinerea*, AcSN 1935 (S. Nesor), SANC; 1 male (type of *B. atrorufus* designated by J. Decelle, 1967), Wonderbom, x.1931 (J. Ogilvie), dissected (Br.Pic.10); 1 female (paratype of *B. atrorufus*), Barberton, Transvaal, 27.vii.1920 (S.H. Skaife), RMCA; 1 male (paratype of *B. atrorufus*), same data, dissected (Br.Pic.53), MNHN. TANZANIA: 1 male, 1 female (paratype of *B. atrorufus*), Tanganyika (Conrads), male dissected (Br.Pic.47), MRAC; 1 female, same data, dissected (Br.Pic.18), MNHN. ZIMBABWE: 1 female, Khami Ruins, Bulawayo, 28.i.1998 (Ma. Halada), OLML; 1 female (paratype of *B. atrorufus*), Bulawayo, 8.viii.1920, RMCA.

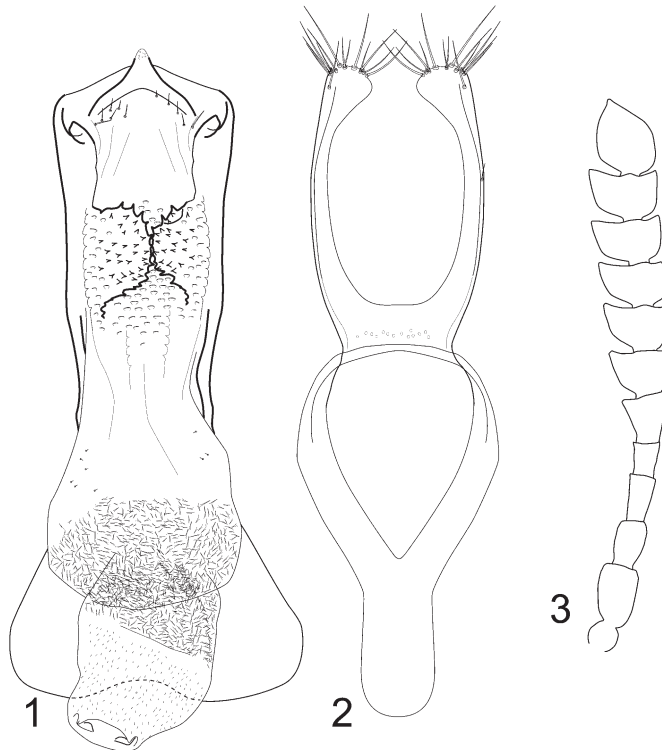
#### DESCRIPTION

Length (pronotum-pygidium): 2.4-3.0 mm; width: 1.4-1.6 mm.

Body moderately flattened, pygidium slanted about  $50^\circ$  from vertical. Integument mainly reddish brown, with darker (dark brown or black) areas: face, antennal segments (5)6-11, diffuse areas on pronotum, scutellum, elytral suture, humerus, elytral side (including a large spot beyond middle), two very small dots in third interstria, a larger dot in middle of 5<sup>th</sup> interstria, and apex of elytra except centre; thoracic sternites and base of ventrite 1; base of posterior femur, and last segment of all tarsi. Antennal base, last visible abdominal tergite (pygidium) and four anterior legs are normally lighter than rest of body. In light-coloured specimens, dark areas may become indistinct, whereas in dark specimens, pronotum and elytra may be entirely black, except for posterior corners of pronotum and a small elongated reddish area on elytral disk.

Vestiture made of long, scaly setae, well covering integument, mainly whitish to yellowish, darker (brownish) on dark areas; a pair of spots with denser whitish setae on pronotum disk; on last visible tergite, setation may be regular, but a small basal triangle of denser setae is visible in many specimens, extending more or less in a line towards apex; sometimes disk is covered with mixed whitish and dark setae.

Male. Head rather short; eyes moderately bulging, maximum head width 1.4 times width behind eyes; eyes separated by 0.32 times head width including eyes; face wide and rather short, with distance between posterior rim of eyes and apex of clypeus /



1-3. *Bruchidius rufoniger* morphology: 1 – median lobe, ventral view; 2 – lateral lobe and tegminal strut, ventral view; 3 – right antenna, dorsal view

distance between eyes = 2.1; eye deeply cleft, width at bottom of sinus composed of 6 ommatidia; carina on frons well defined, wide and shining, interocular tubercle distinct, large. Punctuation of face deep and strong, cuticle alutaceous, punctures becoming shallower towards clypeus, vanishing well before apex; labrum shining in apical half.

Antenna slightly shorter than pronotum length; antennal segments 1 to 4 submoniliform, 2 half as long as 3, 4 shortest, not widened, 5 widened apically, 6-10 strongly eccentric and transverse, cup-spaped, 11 oval ( $L/W = 1.4$ ). Length of antennomeres: 1.3; 1; 1; 0.8; 1.1; 0.9; 0.9; 0.8; 0.8; 0.9; 1.7 (Fig. 3).

Pronotum short campaniform, with greatest width at base ( $W/L = 1.48$ ), its sides straight basally, then broadly rounded, slightly expanded behind eyes, with shallow oblique impression on sides of basal lobe. Punctures on disc small, deep, separated by their own diameter or more, cuticle between them shining.

Elytra 1.1 times longer than combined width, their sides subparallel, maximum width before middle; disc flattened; a pair of sharp teeth at base of interstriae 3 and 4, about as close to each other as they are from elytral base. Striae on disc with very small punctures; interstriae flat, shining, with scaly microsculpture and a few punctures.

Hind femora moderately incrassated, at their widest about twice wider than mid femora; mesoventral margin with sharp preapical denticle; hind tibiae strongly widened apically, with dorsomesal and ventral carinae complete, lateral usually reaching base; apex of tibia with mucro a little shorter than width of tarsomere 1 at base; lateral denticle almost as long as mucro, and dorsal denticles long and acute, the longest (central) one about half as long as lateral denticle. First tarsomere ventrally with sharp denticle.

Abdomen with ventrite 5 not or very slightly emarginate, its length medially very slightly shorter than sternite 4; ventrite 1 basally without patch of short setae or other particular arrangement of setae. Last visible abdominal tergite subcircular, as wide at base as long, slightly convex basally, becoming more convex in apical fourth, its apex not turned under.

Genitalia: Median lobe (Fig. 1) short (maximum width excluding basal hood / total length = 0.27), apically widened; basal hood transverse, emarginate; ventral valve transverse, subtriangular, moderately sclerotized, its apex transparent, with numerous sensilla, bearing two lateral groups of 5-6 setae; dorsal valve not sclerotized; internal sac basally with a pair of small, squarish hinge sclerites, followed by a pair of very large burr-like structures and numerous ctenoid tubercles, followed by a smooth zone; saccus densely lined with sharp needles; distal bulb with minute needles. Basal strut without keel; lateral lobes cleft to more than 80% their length, pubescent; apex of parameres with about 15 long setae (Fig. 2).

Female. Similar to male, but darker, with contrast usually stronger between red and black areas; pygidium flattened over most of its surface, only apex briefly convex; ventrite 1 with a circular pit located at 3/4 of its length, from which arises a thin and stiff brush of long setae (visible only in well preserved specimens).

#### AFFINITIES

Confusion is possible with the highly variable *B. dichrostachydis* DELOBEL & ANTON, a species that feeds in seeds of the same host plant and with a geographic distribution

widely overlapping; elytral denticles are however much closer to base in *rufoniger* than in *dichrostachydis*, and female pygidium lacks the apical crest of closely spaced and stiff setae that are present in *dichrostachydis* (DELOBEL & ANTON 2003). Male genitalia are very distinctive and apparently unrelated to any other *Bruchidius* species, except for an undescribed species from Namibia [ZMHB].

#### ETYMOLOGY

Forged latin adjective (masculine), from *rufus*, reddish brown, and *niger*, black; a synonym of *atrorufus*.

#### HOST PLANTS

Larvae develop in the seeds of *Dichrostachys cinerea* (L.) WIGHT & ARN. (= *glomerata* = *nutans*) (Leguminosae, Mimoseae); the species is widespread in tropical Africa, from Senegal to Egypt and South Africa, in southern Asia and Australia (ILDIS, 2009).

#### DISTRIBUTION

Ethiopia, Tanzania, Zimbabwe, South Africa, Namibia, Botswana, Congo. Extensive samplings of *D. cinerea* pods in Senegal (DELOBEL & ANTON 2003), Burkina Faso (VARAIGNE-LABEYRIE & LABEYRIE 1981) and Ivory Coast (GILLON *et al.* 1992) failed to recover this species from the north-western parts of Africa.

#### A KEY TO ADULTS OF *BRUCHIDIUS* FEEDING IN THE SEEDS OF *DICHRSTACHYS CINEREA*

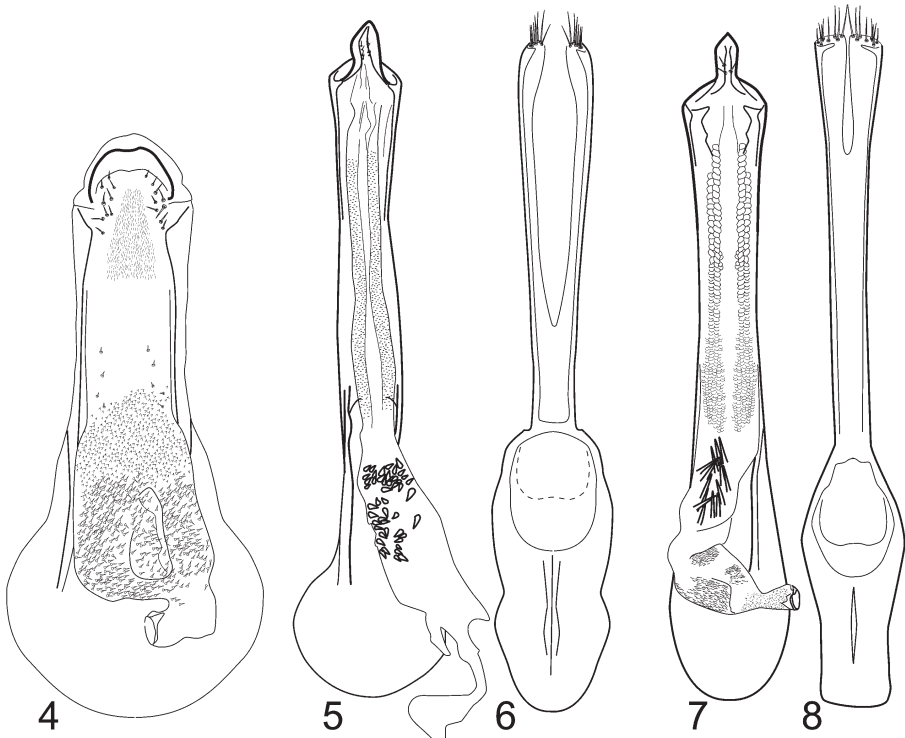
Identification of the four species so far known to feed in *D. cinerea* seeds is quite precarious without examination of male genitalia. The following key is primarily based on adult external morphology, but male genitalia should be studied for validation. Colour criteria are deliberately excluded because of the exceedingly wide variations observed. The key is meant to be used with wariness and discernment, i.e. solely to identify specimens reared from *D. cinerea*.

1. Apical mucro of posterior tibia not longer than lateral denticle; large species (2.6 to 3.6 mm long); median lobe short and stout (Fig. 1 & 4) ..... 2.
- Mucro of posterior tibia more than twice longer than lateral denticle; smaller species (2.0-2.6 mm long). Median lobe slender, ventral valve hastate (Fig. 5 & 7) ..... 3.
2. Denticles at base of elytral striae 3 and 4 much closer to each other than to base of elytra; in female, apical fourth of pygidium with a longitudinal crest of setae. Ventral valve broadly rounded, internal sac without hinge sclerites, saccus with a faintly sclerotized plate (Fig. 4). Senegal, Burkina Faso, Niger, Ivory Coast, Togo, Eritrea, Mozambique, South Africa, Namibia, Botswana .....  
..... *dichrostachydis* DELOBEL & ANTON

- Denticles at base of elytral striae 3 and 4 as close to each other as to base of elytra; in female, setation of pygidium uniform; ventral valve subtriangular, internal sac with hinge sclerites and two large burr-like sclerites (Fig. 1). Ethiopia, Tanzania, Zimbabwe, South Africa, Namibia, Botswana, Congo ..... *rufoniger* DELOBEL
- 3. Eyes large, globose, separated by only half their own width (front view); antennal segments 1-3 submoniliform, segment 4 about as long as wide; saccus with 26-58 small denticles, parameres fused on 1/4 their length (Fig. 5-6). Guinea, Ivory Coast, Nigeria, Congo, South Africa ..... *mabwensis* (DECELLE)
- Eyes smaller, separated by about their own width; antennal segments 3 and 4 subserrate, much wider than long; saccus with 8-15 large denticles, parameres fused on more than 2/3 their length (Fig. 7-8). Senegal, Ivory Coast, Rwanda, Zimbabwe, South Africa, Namibia, Botswana ..... *securiger* DELOBEL & ANTON

## CONCLUSION

The four species so far known to parasitize *D. cinerea* seeds belong to two distinct groups: *B. mabwensis* and *B. securiger* are small, stocky species, with quite similar



4-8. Other *Bruchidius* species (after DELOBEL & ANTON 2003, modified): 4 – Median lobe of *Bruchidius dichrostachydis*, 5, 6 – Median lobe and lateral lobe of *Bruchidius mabwensis*, 7, 8 – Median lobe and lateral lobe of *Bruchidius securiger*

genitalia; *B. dichrostachydis* and *B. rufoniger*, on the other hand, are larger and more slender species, with quite similar morphologies, even though the structure of the median lobe is quite distinctive in the latter species.

It is somewhat premature at the moment to discuss their geographic distribution. It seems however that three of them utilize their host plant over much of its range. *B. rufoniger*, a species absent from the northern half of the continent, appears as an exception in that respect. No host plant other than *D. cinerea* has been identified for any of the four species. The possible speciation mechanisms involving these four seed-beetles on a single host remain unknown. It may be hypothesized that ancestors of *dichrostachydis* and *rufoniger*, on one hand, and *mabwensis* and *securiger* on the other, have colonized their host plant on two (possibly three) different occasions. Geographic speciation may have been the main mechanism at work for subsequent speciation, but the phenomenon is obscured by present-day distribution over most of the continent. A better knowledge of species distribution, particularly in south-western and southern Asia, would certainly help shed a new light on the matter.

#### ACKNOWLEDGEMENTS

I express my most sincere gratitude to the curators of coleopteran collections in the following institutions: MNHN, Paris: H  l  ne PERRIN and Thierry DEUVE; OLML, Linz: Fritz GUSENLEITNER; RMCA, Tervuren: Marc DE MEYER; SANC, Pretoria: Elisabeth GROBBELAAR; ZMHB, Berlin: Hella WENDT.

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