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Two new species of *Garreta* Janssens, 1940 (Coleoptera: Scarabaeidae: Scarabaeinae) from Southern Africa

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Abstract

Two new, putative, closely-related species of dung beetles are described in the genus *Garreta* Janssens, 1940 (tribe Gymnopleurini). *Garreta australugens* new species, is known from various dung types in the southeast lowlands of Africa (validated for South Africa, Mozambique and Zimbabwe with a probable record from Botswana). It is, here, separated at species level from its putative closest relative, *Garreta lugens* (Fairmaire, 1891), recorded from the lowlands of northeast Africa (validated for Kenya with additional records from Ethiopia, Somalia and Tanzania). These two taxa were formerly considered to comprise a single species. All specimens in the type series of *Garreta namalugens* new species, were recorded at low altitude in arid, rocky mountains from west central to northwest Namibia, mostly on dung in communal middens of the Rock Hyrax (*Procavia capensis* (Pallas, 1766)).

Key words: dung beetle, Namibia, *Garreta*, new species, northeast Africa, Scarabaeinae, southeast Africa

Introduction

The genus *Garreta* Janssens, 1940, is widespread in the Afrotropical and Oriental regions where species are found in forest, savanna and grassland habitats. Currently, a total of 24 species are recognized as valid (Schoolmeesters 2017) of which 10 are defined for the Oriental region (Pokorný & Zidek 2016) and 14 are restricted to Africa south of the Sahara Desert (Schoolmeesters 2017). However, the validity of *Garreta fastiditus* (Harold, 1867) and the accuracy of its South African type locality are questionable (P. Moretto, pers. comm.). As many *Garreta* species are similar in appearance, a recent revision of several Afrotropical species groups used microsculpture of the exoskeleton as a major character to differentiate between taxa (Moretto & Génier 2015).

Because of the limited differences between species it is difficult to determine any group structure for the genus on the basis of morphology. Therefore, the revision of Moretto & Génier (2015) is, perhaps, the first to imply species groups for some African members of *Garreta*. Of 13 valid African species (*G. fastiditus* excluded), three belong to the shaded woodland and forest-distributed *laetus* group (*G. caffer* Fåhraeus, 1857; *G. laetus* (Hope, 1842); *G. nyassicus* (Kolbe, 1897)) (Moretto & Génier 2015; Davis *et al.* 2002—*G. caffer* cited as *G. azureus* (Fabricius)) and three to the savanna-distributed *nitens* group (*G. nitens* (Olivier, 1789), *G. rutilans* (Castelnau 1840), *G. wahlbergi* (Fåhraeus, 1857)) (Moretto & Génier 2015). The savanna-distributed, *G. lugens* (Fairmaire, 1891), is treated as a species apart from the *nitens* and *laetus* groups by Moretto & Génier (2015). No group affiliations have been defined for the five remaining African species, currently listed as valid by Schoolmeesters (2017) (*G. basilewskyi* (Balthasar, 1961); *G. crenulatus* (Kolbe, 1895); *G. diffinis* (Waterhouse, 1890); *G. malleolus* (Kolbe, 1895); *G. matabelensis* (Janssens, 1938); *G. unicolor* (Fåhraeus, 1857)).

Based on differences in microsculpture and geographical distribution, the present paper describes a further two new species that are considered to be allied to *Garreta lugens*. *Garreta australugens* new species, is known from the dry to moist, lowland savanna of southeast Africa and has, previously, been misidentified as *Garreta lugens*, a species that is now held to show a range restricted to mostly dry savanna of northeast Africa. The present paper validates the occurrence of *G. australugens* new species, in South Africa, Mozambique and Zimbabwe although a citation from Botswana (Moretto & Génier 2015) requires confirmation. The occurrence of *G. lugens* is validated

for Kenya with additional records cited for Ethiopia, Somalia and Tanzania (Moretto & Génier 2015). *Garreta namalugens* new species, shows a known range restricted to arid, stony, mountain savanna in west central to northwest Namibia.

Type specimens are curated in the following collections:

SANC South Africa, Gauteng, Pretoria, South African National Collection of Insects (Riaan Stals)
TMSA South Africa, Gauteng, Pretoria, Ditsong National Museum of Natural History (Ruth Müller)
UPSA South Africa, Gauteng, Pretoria, University of Pretoria (Christian Deschodt)

Taxonomy

Garreta australugens Davis & Deschodt, new species

Figs 1–4

Description of holotype. Holotype ♂: 20.3 x 11.6 mm (length with head extended x maximum width). Habitus uniformly charcoal black.

Head. Clypeus with four well defined denticles; middle two denticles larger and separated by right-angled gap; clypeal surface with large, irregular granules that are close together but clearly separated by dense microgranulation.

Pronotal disc. Surface of pronotum with small more or less rounded and irregularly spaced granules that are separated by less than one or two granule diameters; area between granules, micro-granular giving a shagreened appearance. Longitudinal midline almost indiscernible. Two very short diagonal grooves (basal impressions) on each side of midline at the base of pronotum.

Elytra. Surface sculpture of elytral interstriae similar to pronotum, i.e. large granules separated by one to three granule diameters; area between granules very finely microgranular with a shagreened appearance. First elytral striae next to midline with widely spaced and very faint punctures; all other striae apunctate, narrow, unclear and shagreened.

Anterior legs. Narrow and slightly curved inwards.

Aedeagus. Similar to other species of *Garreta* (Fig. 3).

Sexual dimorphism. Inward curving front legs of male type material narrower than those of females. Terminal spur of front legs acute in females and more blunt in males.

Variability. The colour of paratype specimens is uniform with no variation; size of paratype specimens varies from slightly smaller to slightly larger than the holotype.

Etymology. The name is a combination of the specific name of its closest relative *Garreta lugens* and its southern distribution.

Type specimens examined. Holotype ♂: "Wildlife College, Site 3, S24°32'27" E31°20'23", 23-25.xi.2009, C. Du Toit & C. Jacobs.", in SANC. Paratypes: 2 spec. same data as holotype, in UPSA; 1 spec. "S.Afr.; Transvaal, Pafuri, 29.3.73., Potg.&Scholtz", in TMSA; 1 spec. "Bubye River S.Rhodesia 29/10/73, N.J.Duke", in TMSA; 2 spec. "2553a. Satara, KNP, 19.I.82, Various soil and vegetation types, Doube & Macqueen, COLS01270", in SANC; 1 spec. "329, GORONGOSA N.P., Mozam. 11-28.I.72, Bornemissza & Kirk, COLS08747", in SANC; 1 ♂ spec. "BIRCHENOUGH BRIDGE, Rhod. (60 kms E) 18.I.74, H.H. Aschenborn, COLS08748", in SANC. All SANC specimens (except holotype) have two additional determination labels: *Garreta lugens* (Fairmaire, 1891), det. CSIRO, DBRU and *Garreta lugens* (Fairmaire, 1891), det. ALV Davis, 2013.

Differential diagnosis. This new species can be easily separated from *Garreta lugens* by pronotal granulation; granules are clearly separate and more or less round in *Garreta australugens* new species, whereas those of *G. lugens* are often connected forming irregular shapes.

Garreta namalugens Davis & Deschodt, new species

Figs 1–6

Description of holotype. Holotype ♂: 14.1 x 8.7 mm (length with head extended x maximum width). Habitus uniformly charcoal with dark blue or green undertone; undertone occasionally cupreous.

Head. Clypeus with four denticles; right angled gap between middle two denticles; outside denticles rounded; clypeal surface with irregular granules, which are close together but clearly separated from one another.

Pronotum. Pronotum surface very finely shagreened with small, discrete granules that are separated by more than one granule diameter. Sculpture-free longitudinal midline extends from the basal margin halfway up the disc of the pronotum.

Elytra. Elytral interstriae with similar surface sculpture to the pronotum, i.e. very finely shagreened with small granules that are separated by more than one granule diameter. Striae are narrow, unclear, shagreened and apunctate.



FIGURE 1. Habitus of (A) *Garreta australugens* Davis & Deschodt, new species (holotype), (B) *Garreta lugens* (Fairmaire, 1891) and (C) *Garreta namalugens* Davis & Deschodt, new species (holotype). Scale bar is 2 mm.

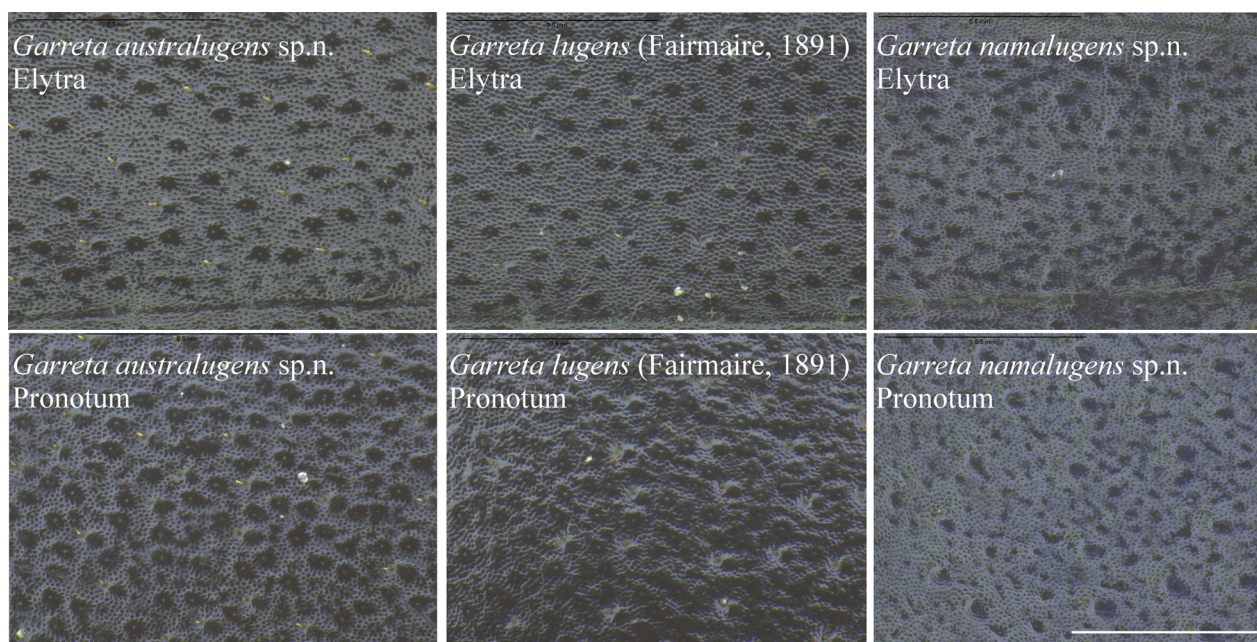


FIGURE 2. Elytral and pronotal sculpture of *Garreta australugens* Davis & Deschodt, new species, *Garreta lugens* (Fairmaire, 1891) and *Garreta namalugens* Davis & Deschodt, new species. Scale bar is 0.5 mm.

Anterior legs. Narrow and strongly curved inwards.

Aedeagus. Similar to other species of *Garreta* (Fig. 3).

Sexual dimorphism. Inward curving front legs of male type material are narrower than those of females. Terminal spur of front legs acute in females and more blunt in males.

Variability. Very little size variation between the paratype specimens; colour varies from dark blue or green undertone to cupreous.

Etymology. The name is a combination of the specific name of its closest relative *Garreta lugens* and the Nama people of Namibia.

Type specimens examined. Holotype ♂: "NamibRand Nature Reserve, S24.885184° E16.065035°, 14.iii.2017, 1184m, Deschodt & Davis, Fresh Hyrax dung", in SANC. Paratypes: 18 spec. same as holotype, 10 in UPSA [9 kept in 99% Ethanol to allow for possible future molecular work], 5 in TMSA, 3 in SANC; 6 spec. "Spitzkoppe S21.829723° E15.181811°, 17-19.iii.2017, Deschodt & Davis", 2 in UPSA, 2 in TMSA, 2 in SANC; 1 spec. "Losberg, NamibRand Nature Reserve, S25.073295° E16.048717°, 15.iii.2017 Deschodt & Davis, Hyrax dung midden", in UPSA; 1 spec. "NAMIBIA: KAOKOLAND, Otjihipa Mountains, base camp at 780 m, 17° 16.4'S 12° 28.8'E, 16-19.iii.2005°E.Holm *et al.* ", in SANC.

Differential diagnosis. *G. namalugens* new species, shows slightly smaller body-size than *Garreta australugens* new species and *Garreta lugens*; it also lacks the basal impressions on each side of the midline of the pronotum that are present in *G. australugens* new species and *G. lugens*.

Habitat and distribution. The holotype and two paratype specimens of *Garreta australugens*, new species were sampled using a composite bait of pig, cattle and elephant dung on finer-grained, gabbro-derived soils in dry, open woodland at the South African Wildlife College on the west border of the Kruger National Park (Davis *et al.* 2012). Further paratype specimens are known from lowland localities in dry areas of northeast South Africa and southeast Zimbabwe as well as moist areas of central Mozambique. Specimens cited as *G. lugens* from South Africa, Mozambique and Botswana (Moretto & Génier 2015) are probably also *G. australugens* new species, although re-examination is required to validate their identity.

The authors recorded *Garreta namalugens* new species, flying abundantly on March 13-15th 2017, circa two weeks after substantial rainfall in Namibrand Nature Reserve. Activity was observed throughout the day. Live individuals were seen flying into crevices between huge granite boulders at the edge of the Nubib Mountains, presumably, in search of fresh dung of the Rock Hyrax (*Procavia capensis* (Pallas, 1766)). Bodies of dead individuals were excavated from silt under the accumulated dung in Hyrax middens. Although *G. namalugens* new species, was also attracted to pitfall traps baited with pig dung in the mountains, none was observed to fly into the

adjacent sandy plains in order to feed on the dung of large herbivorous mammals, comprising either substantial, coarse-fibred, zebra droppings, or, dung pellets dropped by gemsbok or springbok. As regards species in the tribe Gymnopleurini, only *Gymnopleurus andreaei* Ferreira, 1954, and a few *G. humanus* Macleay, 1821, were observed on herbivore dung on the plains (ALVD and CMD, pers. observ.). So far, records for *G. namalugens* new species, have only been validated for west central Namibia with a single specimen from the Kaokoveld in northwest Namibia.

The three species comprising *Garreta australugens* new species, *G. lugens* and *G. namalugens* new species, appear to represent a radiation between, now, geographically isolated, mostly dry lowlands in southwest, southeast and northeast Africa. However, confirmation of close relationships needs to be made using a molecular systematic analysis.

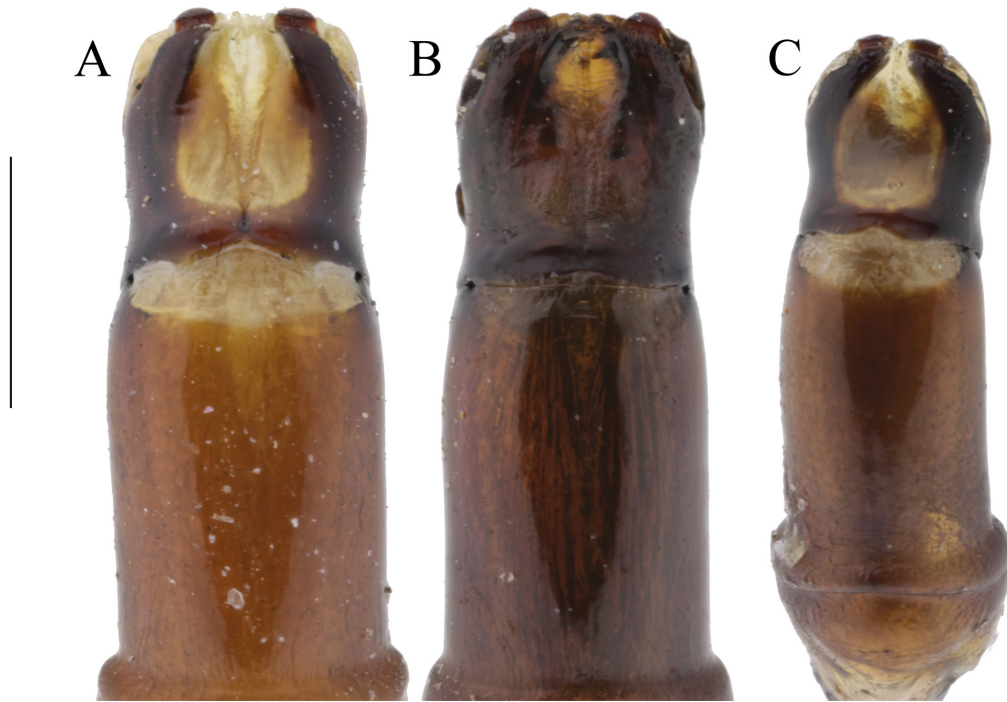


FIGURE 3. Aedeagi of the holotype of (A) *Garreta australugens* Davis & Deschodt, new species, (B) *Garreta lugens* (Fairmaire, 1891) and (C) *Garreta namalugens* Davis & Deschodt, new species . Scale bar is 1 mm.

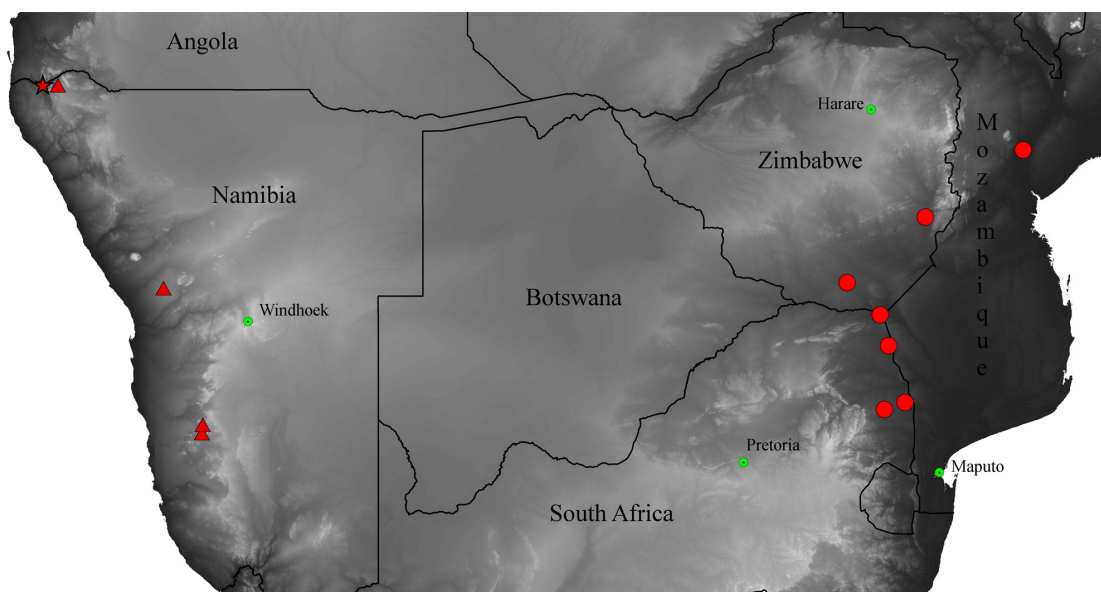


FIGURE 4. Map showing the distribution of *Garreta australugens* Davis & Deschodt, new species (red circle) and *Garreta namalugens* Davis & Deschodt, new species (red triangle); Kaokoveld (red star).



FIGURE 5. *Garreta namalugens* Davis & Deschodt, new species, seen rolling and fighting over fresh dung pellets of the Rock Hyrax (*Procapra capensis* (Pallas, 1766)). Note some dried out dung pellets that are being ignored by the beetles. Image taken by CMD at Namibrand Nature Reserve, March 14, 2017.



FIGURE 6. Habitat of *Garreta namalugens* Davis & Deschodt, new species. Note the white urine streaks on the boulders indicating the presence or past presence of Rock Hyrax (*Procapra capensis* (Pallas, 1766)). Image taken by CMD at Namibrand Nature Reserve, March 14, 2017.

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