

Review of the *Gymnopleurini* (Coleoptera: Scarabaeidae: Scarabaeinae). IV. African species of *Garreta* Janssens, with description of a new species from Guinea

Svatopluk POKORNÝ¹ & Jiří ZÍDEK

jrzidek@gmail.com

Gymnopleurini, *Garreta*, new species, description, African checklist, table of characters, Guinea

Abstract. Presented are a description of *Garreta bechynei* sp. nov. from Guinea, a checklist, a table of characters, and remarks on the criteria used for separating species-level taxa. *Garreta basilewskyi* (Balthasar, 1961) is synonymized with *G. crenulatus* (Kolbe, 1895), and the recently proposed synonymy of *G. azureus* (Fabricius, 1801) with *G. nitens* (Olivier, 1789) is rejected.

INTRODUCTION

Including the new species described below, the genus *Garreta* Janssens contains 13 Afrotropical and 10 Oriental species, with a few crossing from the Oriental region into the southeastern Palearct. There is no overlap between the Afrotropical and Palearctic / Oriental species. Mittal (2011) and Chandra & Gupta (2014) treated the eight Indian species, Davis et al. (2008a) commented on distributions, ecology and taxonomy of the Afrotropical species, Moretto & Génier (2015) revised most of the Afrotropical species, and Pokorný & Zidek (2016) reviewed the Asian species and provided a key to them. Of the 33 names in the below African checklist only 13 are deemed valid, the others are treated as either synonyms or varieties. With the exception of *G. laetus olivaceus* of Moretto & Génier (2015), taxa explicitly identified by the describers as subspecies are absent, but the varieties must be due to their pre-1961 vintage regarded as of subspecific rank (ICZN 1999, Article 45.6.4). In this paper they are treated as synonyms of the nominotypical taxa, however, because they concern iridescent species in which temperature-induced changes in ultrastructure of the exocuticle result in altered reflected colors, generally bluish in cooler, greenish in warmer, and coppery in intermediate conditions (Davis et al. 2008b and references therein). The polychromaticity is not accompanied by any discernible morphological changes and is not strictly clinal either, because altitude, exposure, year-to-year temperature variation and perhaps other factors are involved.

MATERIAL AND METHODS

Collections housing type and other specimens pertinent to this study are given in the below checklist by the following codens (chiefly after Arnett et al. 1993):

BMNH	Natural History Museum, London, UK;
ISNB	Institut Royal des Sciences Naturelles, Brussels, Belgium;
MNHB	Museum für Naturkunde Leibniz-Institut, Berlin, Germany;
MNHN	Muséum National d'Histoire Naturelle, Paris, France;
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium;
NHMB	Naturhistorisches Museum, Basel, Switzerland;
NHMW	Naturhistorisches Museum, Vienna, Austria;

NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden;
NMPC	National Museum (Natural History), Prague, Czech Republic;
OXUM	Oxford University Museum of Natural History, UK;
SAMC	South African Museum, Cape Town, RSA;
ZMUC	Zoological Museum of Copenhagen University, Denmark.

Other abbreviations:

HT = holotype, LT = lectotype, NT = neotype, PLT = paralectotype, PT = paratype;
CAR = Central African Republic, DRC = Democratic Republic of the Congo, RC = Republic of the Congo, RSA = Republic of South Africa, ncr = new country record.

Specimens, including aedeagi, were photographed by a mirrorless Nikon 1-V1 camera with a Nikon FT1 adapter, Nikkor 40 mm / 2.8 micro AF-S DX lens and, added for the aedeagi, Kenko TCx2 Pro 300 N-AF DGX teleconverter. Illustrated are the dorsal habitus, metasternal process and, where available, the parameres, and figures are for convenience listed also in Table 1. Except for the new species and *G. diffinis* (Waterhouse, 1890) used for comparison, full ventral views have been omitted because they are not necessary for identifications and would unduly increase the number of figures. Invalid names in the checklist are offset by m-dashes.

Some of the names in Janssens' (1940) synonymies that look like homonyms are excluded from the checklist, because the literature reveals them to be merely references to taxa previously described by other authors.

TAXONOMY

***Garreta bechynei* sp. nov.**

(Fig. 1)

Type locality. N'Zérékoré, se. Guinea.

Type material. HT (♀) labelled in black print on red background, stating: "HOLOTYPE / *Garreta bechynei* sp. n. / Det. Pokorný & Zidek / 2018". Locality printed in black on white background, stating: "Exoed. Mus. G. Frey / Franz. Guinea 1951 / W. Afr. leg. Bechyne" // N'Zérékoré / 6.7.51". Slashes separate label lines.

Description. Length 18 mm, nearly parallel-sided, glossy. Head and pronotum deep bluish green, elytra deep chestnut brown, venter black, femora black, tibiae and tarsi dark brown.

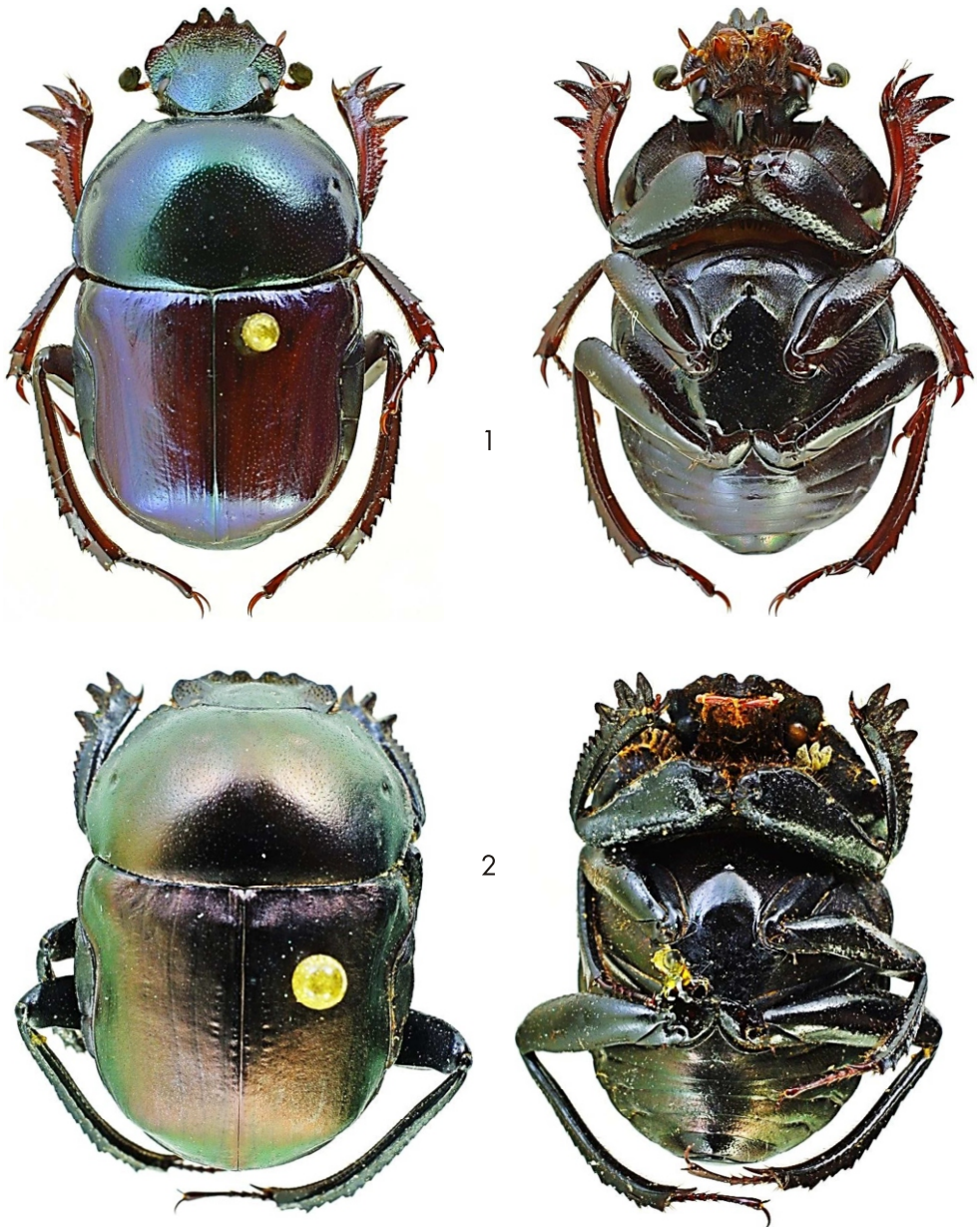
Head. Clypeus with teeth upturned, medial teeth twice as long as lateral teeth, tips of medial teeth rounded, tips of lateral teeth pointed, space between medials V-shaped, space between medials and laterals broadly U-shaped. Clypeus / gena suture well defined, elevated. Genae anteriorly angular but not pointed, lateral margins rounded, gradually converging toward eyes. Clypeus – frons – vertex confluent, flat, granulose. Clypeus and genae granulose densely, on frons and vertex granules spaced farther apart and effaced. Antenna with stalk brown and club dark gray.

Pronotum weakly transverse, bordered all around and densely punctate throughout, with front margin straight, front angles drawn into short, sharp, forward-directed points, lateral margins evenly rounded and smooth, hind angles obtuse, and base without medial fossae.

Elytra with striae shallow and intervals flat, both punctate as densely but not as deeply as pronotum. Lateral striae (4-7) much less distinct than those on disc (1-3). Humeri weakly inflated, confined to sixth interval.

Pygidium semilunate, bordered all around, finely and densely punctate.

Venter. Metasternum with medial part perfectly flat, lacking longitudinal groove, and only



Figs. 1-2. Dorsal and ventral habitus of: 1) *Garreta bechynei* sp. n. HTf*, length 18 mm, NMPC. 2) *Garreta diffinis* (Waterhouse) HTf*, length 13 mm, BMNH.

sparsely punctate; on sloping lateral parts punctures somewhat denser and with short gray setae; anterior process triangular, with sharply defined straight lateral edges and a small triangular apex delimited from remainder of process by a transverse impression. Abdominal ventrites microgranulose throughout, resulting in shagreened appearance.

Legs. Profemur robust, coarsely granularugose proximally and coarsely punctate posteroventrally; meso- and metafemora punctate and setose antero- and posteroventrally, setae short and gray. Profibia tridentate without basal interspace between first and second teeth, third (proximal) tooth shorter than and more removed from second, with interspace bearing two minute denticles; 5-6 coarser lateral serrations present in proximal half of length; medial margin smooth; dorsal carina punctate throughout course, enters bases of third and second teeth and does not reach first tooth; ventral carina present throughout length but shallowly punctate only distally, does not enter bases of third and second teeth and terminates at base of first tooth. Meso- and metatibiae each with two transverse carinae. Terminal tarsomeres as long as tarsomeres 2-4 combined; tarsal claws about half as long as terminal tarsomere.

Differential diagnosis. The new species is particularly close to *G. diffinis* (Waterhouse, 1890), the holotype female (Fig. 2) of which comes from an unspecified location in the Senegambia Confederation farther to the northwest, in the past uniting the countries of Senegal and Gambia. It is a smaller and more rotund species that differs from *G. bechynei* sp. n. in having a pale yellow antennal club, pronotal base with a pair of medial fossae, and an obliquely forward-sloping, densely punctate metasternal process with an apex also discrete, but distinctly smaller than that in the new species. Other African species that have the apex delimited by a transverse impression are *G. malleolus* (Kolbe, 1895), *G. nitens* (Olivier, 1789) and *G. rutilans* (Castelnau, 1840), in all of which the shape and punctuation of the process are reminiscent of *G. diffinis*, but the apex proper is either much larger (*G. malleolus*, *G. nitens*) or on the contrary even smaller (*G. rutilans*) than in *G. diffinis*. Moreover, *G. nitens* and *G. rutilans* have pronotal basal fossae, and *G. malleolus*, which lacks the basal fossae, is an opaque, coarsely punctate, dark gray species of the Rift Valley lakes region. For reasons noted in the Introduction, the bicolored condition of the *G. bechynei* sp. n. holotype is considered unlikely to represent a species-level character. Whether the color of the antennal club can be regarded as a character is not known.

Etymology. Named after Jan Karel Bechyně, an expatriate Czech coleopterist who collected the unique specimen.

CHECKLIST OF AFRICAN SPECIES

Notations in brackets: M+G = Moretto & Génier (2015). Unauthored synonymies are Janssens' (1940), checked by us. Distributions are after Janssens (1940), Moretto & Génier (2015) and additional material examined.

Garreta Janssens, 1940: 9, 22; type sp. *Ateuchus azureus* Fabricius, by original designation (Janssens 1940: 22, as *Scarabaeus azureus*).

azureus (Fabricius, 1801: 57), as *Ateuchus*; ZMUC, LTm* + 3 PLTm**, type loc. "Guinea" (actually Ghana, M+G); [syn. with *G. nitens* by M+G].

DISTRIBUTION: Angola, Burundi, Cameroon, DRC, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Mozambique, RSA (Natal), Rwanda, Sierra Leone, Tanzania, Uganda, Zimbabwe.

– *basilewskyi* (Balthasar, 1961: 96), as *Gymnopleurus* (*Garreta*); MRAC, PTm* + PTF* at NMPC; type loc. Tshuapa, DRC; = *G. crenulatus*, **syn. nov.**

bechynei **sp. nov.**; NMPC, HTF*, type loc. N'Zérékoré, Guinea.

DISTRIBUTION: Guinea.

caffer (Fähræus, 1857: 181), as *Gymnopleurus*; NHRS, type locality "Caffraria". DISTRIBUTION: Angola, Namibia, RSA, Tanzania.

– *coeruleovirens* (Kolbe, 1897: 138), as var. of *Gymnopleurus splendens* Castelnau; MNHB, type loc. Lake Nyasa, Tanzania; = *G. nitens*

– *consanguineus* (Kolbe, 1895: 334), as *Gymnopleurus*; MNHB, type loc. W of Lake Victoria, Tanzania; = *G. malleolus*

crnulatus (Kolbe, 1895: 333), as *Gymnopleurus*; MNHB, type loc. N of Lake Albert (Uganda?).

DISTRIBUTION: DRC, Ghana (ncr), Rwanda, Sudan (ncr), Uganda.

– *cupreovirens* (Kolbe, 1895: 333), as *Gymnopleurus*; MNHB, type loc. S of Lake Victoria, Tanzania; = *G. laetus* [*G. laetus* ssp. *olivaceus* in M+G]

– *cupreus* (Kolbe, 1914: 318), as var. of *Gymnopleurus azureus*; ISNB, type loc. "Kiwa See?" [Lake Kivu]; = *G. laetus* [syn. by M+G]

– *delagorguei* (Waterhouse, 1890: 370), as *Gymnopleurus*; BMNH, type loc. "Port Natal"; = *G. unicolor*

diffinis (Waterhouse, 1890: 372), as *Gymnopleurus*; BMNH, type loc. "Senegambia".

DISTRIBUTION: sw. DRC ("Kuilu" = Kwilu River?), Gabon, Gambia, Senegal.

– *ebenus* (Janssens, 1938: 43, 59), as var. of *Gymnopleurus (Paragymnopleurus) azureus*; ISNB, type loc. "N.W. Tanganika"; = *G. laetus* [syn. by M+G]

fastidius (Harold, 1867: 74), as *Gymnopleurus*; MNHN, type loc. "Cape of Good Hope".

DISTRIBUTION: Mozambique, RSA, Zimbabwe.

– *gracilipes* (Kolbe, 1897: 138), as var. of *Gymnopleurus splendens* Castelnau; MNHB, type loc. SE of Lake Victoria, Tanzania; = *G. nitens*

– *hilaris* (Hope, 1842: 494), as *Gymnopleurus*; OXUM, type loc. Sierra Leone; = *G. nitens* [syn. by Gillet 1911]

– *insidiosus* (Péringuey, 1901: 66, 69), as *Gymnopleurus*; SAMC, type loc. Harare, Zimbabwe; = *G. laetus* [*G. laetus* ssp. *olivaceus* in M+G]

– *janthinus* (Castelnau, 1840: 71), as *Gymnopleurus*; MNHN, type loc. Tripoli, Libya; = *G. nitens*

– *kilimanus* (Kolbe, 1897: 138), as var. of *Gymnopleurus splendens* Castelnau; MNHB, type loc. Kilimanjaro, Tanzania; = *G. nitens*

laetus (Hope, 1842: 494), as *Gymnopleurus*; OXUM, type loc. Cape Palmas, Liberia.

DISTRIBUTION: Benin, Burkina Faso, Cameroon, CAR, Chad, DRC, Eritrea, Ethiopia, Ghana, Guinea, Kenya, Liberia, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, Togo, Uganda.

– *laevis* (Arrow, 1900: 23), as *Gymnopleurus*; BMNH, type loc. Somalia; = *G. lugens* [var. of *G. nitens* in Janssens 1940; syn. with *G. lugens* by M+G]

lugens (Fairmaire, 1891: 284), as *Gymnopleurus*; NHMW, type loc. Somalia.

DISTRIBUTION: Botswana, Ethiopia, Kenya, Mozambique, RSA, Somalia, Tanzania.

malleolus (Kolbe, 1895: 334), as *Gymnopleurus*; MNHB, type loc. E of Lake Tanganyika (Tanzania?).

DISTRIBUTION: Burundi, DRC, Mozambique, Rwanda, Tanzania, Uganda, Zimbabwe.

matabelensis (Janssens, 1938: 44, 60), as *Gymnopleurus (Paragymnopleurus)*; ISNB, type loc. Matabele, Zimbabwe.

DISTRIBUTION: Zimbabwe.

nitens (Olivier, 1789: 159), as *Scarabaeus*; MNHN, type loc. Senegal.

DISTRIBUTION: Angola, Benin, Burkina Faso, Cameroon, CAR, Chad, DRC, Eritrea, Ethiopia, Ghana, Guinea, Guinea Bissau, Ivory Coast, Liberia, Kenya, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, RSA, Rwanda, Senegal, Sierra Leone, Sudan, Tanzania, Uganda, Zambia.

– *nyassicus* (Kolbe, 1897: 137), as var. of *Gymnopleurus caffer*; MNHB, type loc. Lake Nyasa; = *G. caffer* [var. of *G. caffer* in Janssens 1940; revalidated and elevated to sp. by M+G]

DISTRIBUTION: Kenya, Mozambique, Tanzania.

– *olivaceus* (Quedenfeldt, 1884: 269), as *Gymnopleurus*; MNHN, type loc. Angola; = *G. laetus* [revalidated as ssp. of *G. laetus* by M+G]

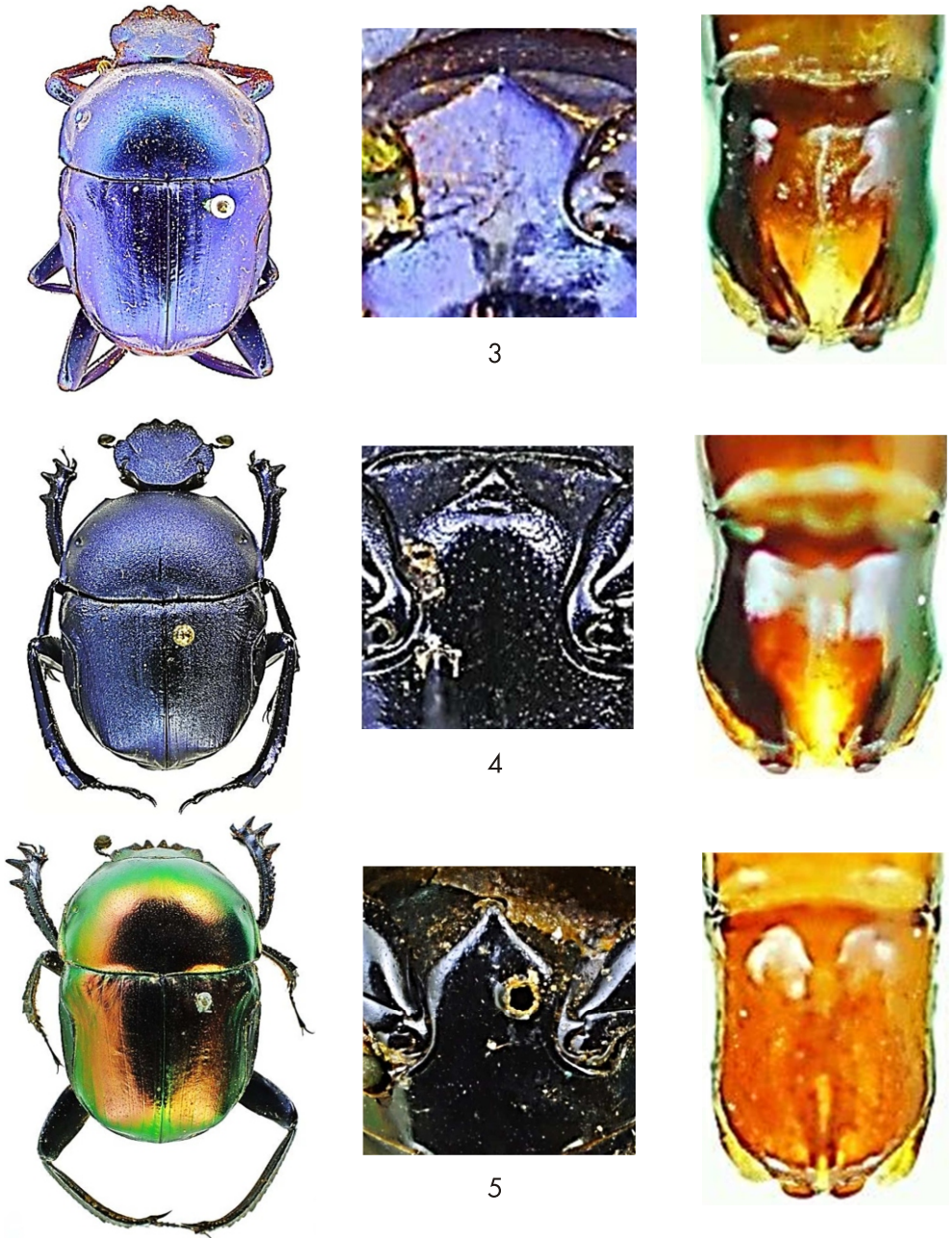
DISTRIBUTION: Angola, DRC, Malawi, Mozambique, RC, Tanzania, Zambia, Zimbabwe.

– *profanus* (Latreille, 1827: 281), as *Gymnopleurus*; MNHN. [Unavailable name, M+G]

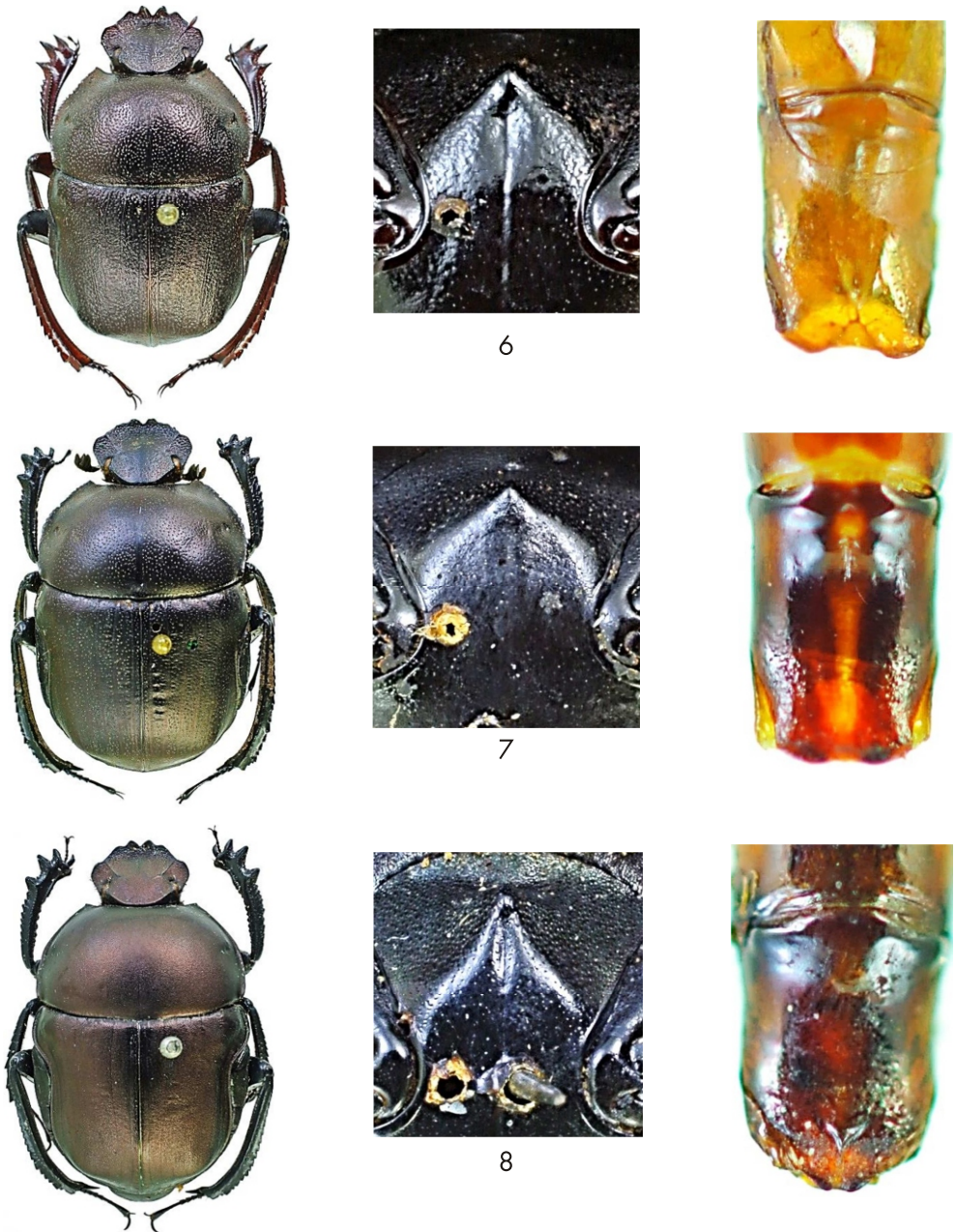
- *rubrocupreus* (Janssens, 1938: 43, 59), as var. of *Gymnopleurus* (*Paragymnopleurus*) *azureus*; ISNB, type loc. NW Tanganyika (Tanzania); = *G. laetus* [syn. by M+G]
rutilans (Castelnau, 1840: 71), as *Gymnopleurus*; MNHN, type loc. Sennaar, Sudan. [syn. of *G. nitens* in Janssens 1940; revalidated by M+G]
 DISTRIBUTION: Botswana, e. RSA, Sudan, Zimbabwe.
 – *splendens* (Castelnau) sensu Péringuey (1901: 67); OXUM, type loc. Sennaar, Sudan; = *G. rutilans* [syn. by M+G]
unicolor (Fåhræus, 1857: 182), as *Gymnopleurus*; NHRS, type loc. "Caffraria".
 DISTRIBUTION: Mozambique, RSA, Zimbabwe.
 – *viridimicans* (Kolbe, 1897: 137), as var. of *Gymnopleurus azureus*; MNHB, type loc. SW of Lake Albert, DRC; = *G. laetus* [syn. by M+G]
 – *wahlbergi* (Fåhræus, 1857: 183), as *Gymnopleurus*; NHRS, type loc. "Caffraria"; = *G. nitens* [var. of *G. nitens* in Janssens 1940; sp. revalidated by M+G]
 DISTRIBUTION: Botswana, Mozambique, RSA, Swaziland, Zimbabwe.
 – *zumpfi* Frey, 1967: 404, 405; NHMB, type loc. Rüstenburg, Northern Province, RSA; = *G. nitens* [= *G. wahlbergi* in M+G].

Garreta sp. and figure	pronotum		elytra		metasternal process	
	sculpture	basal fossae	striae	intervals	shape and surface	apex
<i>G. azureus</i> Fig. 3	punctate	present	punctate	punctate	anchor-shaped, flat, sparsely punctate, faint medial carina	undivided, tip knobbed
<i>G. bechynei</i> Fig. 1	punctate	absent	punctate	punctate	triangular, flat, sparsely punctate, without medial groove	divided, tip medium-size
<i>G. caffer</i> Fig. 8	punctate and granulorugose	absent	punctate	punctate and granulorugose	pear-shaped, punctate, short and deep medial groove	undivided, tip knobbed
<i>G. crenulatus</i> Fig. 7	punctate, lateral margin crenulate	absent	impunctate	punctate	anchor-shaped, punctate, long medial groove	undivided, tip knobbed
<i>G. diffinis</i> Fig. 2	punctate	present	punctate	punctate	anchor-shaped, sparsely asperate and granulate	divided, tip small
<i>G. fastiditus</i> Fig. 9	granulate	absent	punctate	granulorugose	anchor-shaped, granulate, medial groove not reaching apex	undivided, tip rounded
<i>G. laetus</i> Fig. 5	punctate	absent	punctate	punctate	pear-shaped, punctate, shallow medial groove	undivided, tip knobbed
<i>G. lugens</i> Fig. 10	punctate	present	punctate	punctate	anchor-shaped, coarsely punctate, without medial groove	undivided, tip sharp
<i>G. malleolus</i> Fig. 11	granulate, disc punctate	absent	impunctate	punctate and granulate	anchor-shaped, densely punctate, shallow medial groove	divided, tip large
<i>G. matabelensis</i> Fig. 13	punctate and granulate	absent	punctate	granulate	anchor-shaped, punctate, anterolateral margin incomplete	undivided, tip rounded
<i>G. nitens</i> Fig. 4	granulate, disc granulorugose	present	punctate	punctate and granulorugose	anchor-shaped, densely punctate, without medial groove	divided, tip large
<i>G. rutilans</i> Fig. 12	granulorugose, granulate and punctate	present	punctate	punctate	anchor-shaped, finely punctate, inclined margins granulate	undivided, tip knobbed
<i>G. unicolor</i> Fig. 14	granulate	absent	punctate	granulate	anchor-shaped, granulate, shallow medial groove	undivided, tip rounded

Table 1. Distribution of characters in species of African *Garreta*.



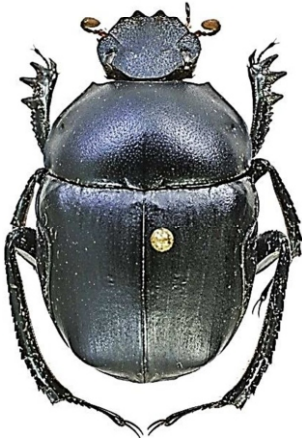
Figs. 3-5. Habitus (left), metasternal process (center) and parameres (right) of: 3) *Garreta azureus* (Fabricius), PLTm*, ZMUC (photo ZMUC). 4) *G. nitens* (Olivier), length 18 mm, BMNH. 5) *G. laetus* (Hope), HTm*, length 17 mm, OXUM.



Figs. 6-8. Habitus (left), metasternal process (center) and parameres (right) of: 6) *Garreta basilewskyi* Balthasar, PTF*, length 17.5 mm, NMPC (aedeagus from teneral PT, NMPC), = *G. crenulatus* (Kolbe). 7) *G. crenulatus* (Kolbe), length 21 mm, BMNH. 8) *G. caffer* (Fähræus), length 22 mm, BMNH.



9



10



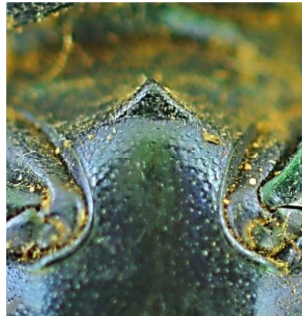
11



Figs. 9-11. Habitus (left), metasternal process (center) and parameres (right) of: 9) *Garreta fastiditus* (Harold), length 21 mm, BMNH. 10) *G. lugens* (Fairmaire), length 18 mm, BMNH. 11) *G. malleolus* (Kolbe), length 18 mm, BMNH.



Figs. 12-14. Habitus (left), metasternal process (center) and labels / parameres (right) of: 12) *Garreta rutilans* (Waterhouse), PLTm*, length 15 mm, OXUM. 13) *G. matabelensis* (Janssens), LTm*, ISNB (photo ISNB). 14) *G. unicolor* (Fåhræus), length 18 mm, BMNH.



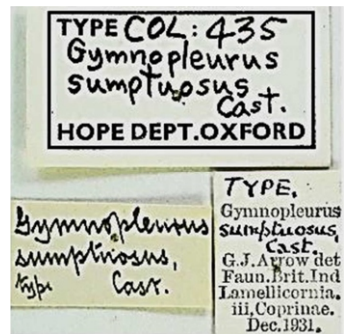
15



16



17



Figs. 15-17. OXUM types of *Garreta*: 15) *G. wahlbergi* (Fåhræus), length 18.5 mm, NMPC, = *G. nitens* (Olivier). 16) *G. splendens* (Castelnau) HT sex indet., length 14 mm, OXUM, = *G. sumptuosus* (Castelnau). 17) *G. sumptuosus* (Castelnau) HTF*, length 17 mm, OXUM. Labels show Hope's slanted and Arrow's upright longhand.

DISCUSSION

Janssens (1940) did not see the type of *Gymnopleurus laetus* (Fig. 5) and left its generic affiliation unresolved, which accounts for his inclusion of *G. cupreovirens*, *G. diffinis*, *G. insidiosus*, *G. olivaceus*, *G. rubrocupreus* and *G. viridimicans* as varieties under *G. azureus*. Of these taxa only *G. diffinis* is deemed valid, the others are synonyms of *G. laetus*. Since the designation of *Ateuchus azureus* as the type species of *Garreta* was original (ICZN 1999 art. 68.2) and the species is deemed valid, the ICZN art. 70.3 invoked by Moretto & Génier (2015: 21) to designate *Gymnopleurus laetus* the type species is not applicable. Their statement that *G. laetus* is *G. azureus* of authors concerns merely misidentifications that do not invalidate the original type-species designation.

Garreta olivaceus is here regarded as a synonym rather than a subspecies of *G. laetus* because of the iridescence and polychromaticity noted in the Introduction. The sculpture of the pronotum is the same, that of the elytra is more effaced on the disc of *G. laetus* but in principle similar to *G. olivaceus*, and the color is subject to perception dependent on lighting. According to the distribution map of Moretto & Génier (2015: fig. 53), *G. laetus olivaceus* (type from Angola) is the southern subspecies and in their fig. 18 its elytra is opaque grayish green, whereas in their fig. 3 the habitus is bronze, nearly as deep bronze as in the holotype of *G. laetus laetus* (from Cape Palmas, Liberia) in their fig. 47. Viewed in high-intensity, broad-spectrum dispersed light, the holotype of *G. laetus* is metallic green with deep bronze hue on the disc (Fig. 5 in this paper).

Examination of NMPC paralectotypes of *G. basilewskyi* Balthasar, 1961 (Fig. 6) reveals that they do not differ in any regard from *G. crenulatus* (Kolbe, 1895) (Fig. 7), and Balthasar's species is therefore synonymized. In *G. crenulatus* the depth of the medial groove of the metasternal process varies from population to population, but its length remains fairly constant. For instance the specimen shown in Fig. 7 is from Ghana and its medial groove is rather shallow, but its length is similar to that in *G. basilewskyi* paralectotype from DRC shown in Fig. 6.

Janssens (1940: 32) listed *G. splendens* (Castelnau) sensu Péringuey, *G. rutilans* (Castelnau) and *G. wahlbergi* (Fähræus) under *G. nitens* (Olivier), the former two as synonyms and the latter as a variety. We have been unable to determine from the SAMC catalogue which specimens Péringuey (1901) used to redescribe *G. splendens*, and therefore have to rely on his statement (p. 67) "metasternum produced in a sharp triangular tubercle deeply impressed at the base ...", indicating that his *G. splendens* is *G. rutilans* (Fig. 12), a valid species whose apical tubercle of the metasternal process is much smaller than the apical triangle in *G. nitens* (Fig. 4). The countries listed by Péringuey are Zimbabwe, Botswana and eastern RSA (KwaZulu-Natal), which makes the distribution of *G. rutilans* much wider than just Sudan where the type series came from. It should be noted that the specimen labeled as LT in fig. 43 of Moretto & Génier (2015) is in reality the OXUM PLT shown here in Fig. 12.

In contrast, we see no reason for separation of *G. wahlbergi* (Fig. 15) from *G. nitens*, as the diagnosis of Moretto & Génier (2015: 11) appears to be well within the limits of intraspecific variation. The main character listed in that diagnosis seems to be the shape of the protibial fossa for articulation of the tarsus and spur, but we cannot detect any difference in the shape of the fossa in their illustrations (figs. 21-22), and due to frequent wear caused by burrowing habits find this character impractical. The NHRS types that we have been able to see do not differ any from *G. nitens*, and we therefore agree with Janssens (1940) in that *G. wahlbergi* is either a variety or a synonym of *G. nitens*. The distribution of *G. wahlbergi* is said to span Botswana, Mozambique, Swaziland and Zimbabwe, to which can be added also northeastern and central RSA.

It corresponds well to the distribution of *G. nitens*, which is the most widespread Afrotropical species. Turning to the redescription of *G. wahlbergi* by Péringuey (1901: 68), who had specimens from northern Namibia and Zimbabwe, we cannot help wondering which species he was describing, because from his statement “the triangular process of the metasternum has no transverse impression nor is the metasternum itself grooved” it is obvious that it was not *G. wahlbergi* / *G. nitens*. We speculate it could be *G. lugens* (Fairmaire) (Fig. 10), *G. matabelensis* (Janssens) (Fig. 13) or *G. unicolor* (Fähræus) (Fig. 14).

One matter that could be found confusing and deserves a comment is the combination “*Garreta nitens* var. *coeruleovirens* (Kolbe, 1897)” used by Schäfer & Fischer (2001: 43) in their treatment of Rwandan *Gymnopleurini*. Kolbe (1897: 138) described this variety from “Nyassa-See” (Lake Nyasa, Tanzania) for *Gymnopleurus splendens* Castelnau from “Nubie” (Sudan), and Péringuey (1901: 67) redescribed this species as valid in his catalogue of South African Coleoptera. Neither Kolbe nor Péringuey saw the holotype of *Gymnopleurus splendens* labeled as from “Poonah” (Poona near Bombay), which is virtually identical with the holotype of *Gymnopleurus sumptuosus* described by Castelnau (1840) on the same page (p. 71) as from “Indes-Orientales” (the type itself lacks a locality label), and therefore had no reason to doubt the “Nubie” locality of Castelnau. Arrow (1931: 61) examined the OXUM types of both species, synonymized *G. splendens* (Fig. 16) with *G. sumptuosus* (Fig. 17), and noted that the type locality “Nubie” given by Castelnau for *G. splendens* was an error. *Garreta splendens* (Castelnau) thus is a synonym of the Oriental *Garreta sumptuosus* (Castelnau), whereas *Gymnopleurus splendens* Castelnau sensu Péringuey (1901) is a synonym of the Afrotropical *Garreta rutilans* (Castelnau). This is also evident from the synonyms listed by Péringuey under *Gymnopleurus splendens*, of which *Gymnopleurus profanus* Latreille (unavailable name, see the checklist) is either *Garreta nitens* or *G. rutilans* and *Gymnopleurus splendidus* Bertoloni is *Allogymnopleurus* (see Janssens 1943, Pokorný & Zidek 2009).

As stated in the Introduction, color of iridescent species (which prevail) is not a reliable criterion for separating species-group taxa. One exception may be the antennal club, however the stability of its color on the species / subspecies level is not known. The aedeagus is dorso-ventrally flattened, with the phallobase taking about two-thirds of total length and the short parameres differing enough to permit division of species into two groups, but in only one instance are the parameres unquestionably (Fig. 5) and in two instances possibly (Figs. 7-8) species-diagnostic. Our criteria are therefore confined to external morphology, namely sculpture, presence / absence of the pronotal basal fossae and features of the metasternal process (Table 1). The sculpture is punctate, granulate, granulorugose, or a combination of two or all three. The term ‘granulorugose’ follows Edmonds (1994: 4), who defined it as “... a heterogenous mixture of asperities of various shapes and sizes producing a highly fractured surface ... that is not clearly granulate.” The combination of metasternal process and presence / absence of pronotal basal fossae reliably identifies most species except distinguishing between *G. diffinis* (Fig. 2) and *G. rutilans* (Fig. 12), which both have the fossae present and the process seemingly divided. However, a closer examination reveals that in *G. rutilans* the tip is merely a minute knob not separated from the body of the process by a transverse groove, and that the pronotum contains all three kinds of sculpture. Besides that, the two species are widely separated geographically.

ACKNOWLEDGEMENTS. We thank M. Barclay (BMNH), J. Hájek (NMPC) and D. Mann (OXUM) for lending us the material of *Garreta* in their care, and G. Lindberg (NHRS), C. Locatelli (ISNB), A. Mantilleri (MNHN), A. Mayekiso (SAMC), S. G. Selvantharan (ZMUC) and J. Willers (MNHB) for information and photos of type specimens.

REFERENCES

- ARNETT R. H. Jr., SAMUELSON G. A. & NISHIDA G. M. 1993: *The insect and spider collections of the world. Second edition.* Gainesville, FL: Sandhill Crane Press, 310 pp.
- ARROW G. J. 1900: [New taxa]; pp. 21-33 in: GAHAN C. J. & ARROW G. J., 5. Coleoptera. In: PEEL C. V. A., AUSTEN E. E., DIXEY F. A., DRUCE H., GAHAN C. J., ARROW G. J., MCLACHLAN R., BURR M. & POCOCK R. I., On a collection of insects and arachnids made in 1895 and 1897, by Mr C. V. A. Peel, F. Z. S., in Somaliland, with description of new species. *Proceedings of the Zoological Society of London* 1900: 14-63, 175-182.
- ARROW G. J. 1931: *The fauna of British India, including Ceylon and Burma. Coleoptera Lamellicornia Part III (Coprinae).* London: Taylor & Francis, 428 pp.
- BALTHASAR V. 1961: Coléoptères Scarabaeidae nouveaux de l'Afrique tropicale. *Revue Zoologique et Botanique Africaine* 63(1-2): 96-104.
- CASTELNAU (LAPORTE DE) F. L. N. 1840: *Histoire naturelle des insectes Coléoptères. Tome deuxième. Histoire naturelle des animaux articulés, annélides, crustacés, arachnides, myriapodes et insectes.* Paris: P. Duménil, 564 pp.
- CHANDRA K. & GUPTA D. 2014: Studies on tribe Gymnopleurini (Coleoptera: Scarabaeidae: Scarabaeinae) from Madhya Pradesh and Chhattisgarh with a checklist from India. *Proceedings of the National Academy of Sciences of India (B)* 84(2): 317-330.
- DAVIS A. L. V., FROLOV A. V. & SCHOLTZ C. H. 2008a: *The African dung beetle genera.* Pretoria: Protea Book House, 272 pp.
- DAVIS A. L. V., BRINK D. J., SCHOLTZ C. H., PRINSLOO L. C. & DESCHODT C. M. 2008b: Functional implications of temperature-correlated colour polymorphism in an iridescent, scarabaeine dung beetle. *Ecological Entomology* 33: 771-779.
- EDMONDS W. D. 1994: Revision of *Phanaeus* Macleay, a New World genus of scarabaeine dung beetles (Coleoptera: Scarabaeidae, Scarabaeinae). *Natural History Museum of Los Angeles County Contributions in Science* No. 443: 1-105.
- FABRICIUS J. C. 1801: *Systema Eleutheratorum secundum ordines, genera, species: adiectis synonymis, locis, observationibus, descriptionibus. Tomus I.* Kiel: Bibliopoli Academici Novi, 506 pp.
- FÄHRÆUS O. I. 1857: [New taxa]; in: BOHEMAN C. H., *Insecta Caffrariae annis 1838-1845 a J. A. Wahlberg collecta amici auxilio suffultus descripsit. Pars II. Coleoptera (Scarabaeidae).* Stockholm: Officina Norstedtiana, 395 pp.
- FAIRMAIRE L. 1891: Coléoptères de l'Afrique Orientale. *Annales de la Société Entomologique de Belgique, Compte Rendu* 35: 279-289.
- FREY G. 1967: Zwei neue afrikanische Coprophagen sowie eine neue Synonymie (Col. Scarab.). *Entomologische Arbeiten aus dem Museum G. Frey* 18: 404-405.
- GILLET J. J. 1911: Scarabaeidae: Coprinae I; in: SCHENKLING S. (ed.), *Coleopterorum Catalogus Pars 38, Vol. 19(2).* Berlin: W. Junk, 100 pp.
- HAROLD E. 1867: Diagnosen neuer Coprophagen. *Coleopterologische Hefte* 1: 76-83.
- HOPE F. W. 1842: On some new insects from western Africa. *Annals and Magazine of Natural History* 1(9): 494-496.
- ICZN (INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE) 1999: *International Code of Zoological Nomenclature. Fourth Edition.* London: The International Trust for Zoological Nomenclature, 306 pp.
- JANSENSSENS A. 1938: *Exploration du Parc National Albert, Mission G. F. de Witte (1933-1935), Fascicule 21, Scarabaeini.* Brussels: Institut des Parcs Nationaux du Congo Belge, 76 pp., 3 pls.
- JANSENSSENS A. 1940: Monographie des Gymnopleurides (Coleoptera, Lamellicornia). de *Mémoires du Musée Royal d'Histoire Naturelle Belgique* (2) 18: 1-73, 2 pls.
- JANSENSSENS A. 1943: Contribution à l'étude des coléoptères lamellicornes coprophages. VII. Notes sur quelques Coprinae d'Afrique. *Bulletin du Musée Royal d'Histoire Naturelle de Belgique* 19: 1-8.
- KOLBE H. J. 1895: Beiträge zur Kenntniss der Mistkäfer, Lamellicornia onthophila. *Stettiner Entomologische Zeitung* 56(10-12): 329-345.
- KOLBE H. J. 1897: Käfer und Netzflüger Ost-Afrikas; pp. 128-196 in: MOEBIUS K., *Deutsch Ostafrika. Wissenschaftliche Forschungsergebnisse über Land und Leute unseres ostafrikanischen Schutzgebietes und der angrenzenden Länder. Band IV. Die Tierwelt Ost-Afrikas und der Nachbargebiete. Wirbellose Tiere, Coleopteren.* Berlin: Dietrich Reimer, 367 pp.
- KOLBE H. J. 1914: Scarabaeiden; pp. 261-416 in: SCHUBOTZ H. (ed.), *Wissenschaftliche Ergebnisse der Deutschen Zentral-Afrika-Expedition 1907-1908 unter Führung Adolf Friedrichs, Herzogs zu Mecklenburg. Band V. Zoologie III herausgegeben von Dr. H. Schubotz. Lieferung 3.* Leipzig: Klinkhardt & Biermann.
- LATREILLE P. A. 1827: Description des Insectes; pp. 271-292 in: *Voyage à Méroé, au Fleuve Blanc, au-delà de Fazoql dans le midi du royaume de Sennâr, à Syouah et dans cinq autres oasis; fait dans les années 1819, 1820, 1821, et 1822, par M. Frédéric Caillaud de Nantes. Tome IV.* Paris: Imprimerie Royale, Deleure, 416 pp., 1 pl.
- MITTAL I. C. 2011: Synoptic key to Indian species of genus *Garreta* Janssens (Coleoptera: Scarabaeidae: Scarabaeinae) with a new species from Haryana (India). *Journal of Entomological Research* 35(3): 295-298.
- MORETTO P. & GÉNIER F. 2015: La véritable identité de *Scarabaeus nitens* Olivier, 1789, et *Ateuchus azureus* Fabricius, 1801 (Scarabaeidae, Gymnopleurini). *Catharsius, La Revue* 12(2): 1-32.
- OLIVIER A. G. 1789: *Entomologie, ou histoire naturelle des insectes, avec leurs caractères généraux et spécifiques, leur description, leur synonymie et leur figures enluminées. Coléoptères. Tome premier.* Paris: Baudoin, 497 pp. [genera

paginated separately].

- PÉRINGUEY L. 1901: Descriptive catalogue of the Coleoptera of South Africa (Lucanidae and Scarabaeidae). *Transactions of the South African Philosophical Society* 12: 1-563.
- POKORNÝ S. & ZÍDEK J. 2009: Review of the Gymnopleurini (Coleoptera: Scarabaeidae: Scarabaeinae) I. Introduction and the genus *Allogymnopleurus*. *Folia Heyrovskyana (A)* 17(3-4): 133-149.
- POKORNÝ S. & ZÍDEK J. 2016: Review of the Gymnopleurini (Coleoptera: Scarabaeidae: Scarabaeinae). III. Asian species of *Garreta* Janssens. *Insecta Mundi* 0483: 1-8.
- QUEDENFELDT G. 1884: Verzeichniss der von Herrn Major a. D. von Mechow in Angola und am Quango-Strom 1878-1881 gesammelten Pectinicornen und Lamellicornen. *Berliner Entomologische Zeitschrift* 28(2): 265-340.
- SCHÄFER P. & FISCHER E. 2001: Zur Scarabaeidenfauna Rwandas, Zentralafrika. 2. Gymnopleurini und Nachtrag Sisyphini (Insecta: Coleoptera: Lamellicornia). *Mitteilungen des Internationalen Entomologischen Vereins*, Supplement 9: 1-93.
- WATERHOUSE C. O. 1890: New Scarabaeidae in the British Museum. *Annals and Magazine of Natural History* (6) 5: 365-373.

Published: 31. 7. 2018