

Revision of the southern African genus *Macroderes* Westwood (Coleoptera: Scarabaeidae: Scarabaeinae)

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Abstract – The southern African genus *Macroderes* Westwood is revised. Six new species, *M. amplior* n. sp., *M. minutus* n. sp., *M. endroedyi* n. sp., *M. namakwanus* n. sp., *M. foveatus* n. sp., and *M. cornutus* n. sp., are described. The neotype of *M. bias* (Olivier) is designated. Two new synonymies are established: *M. pilula* Sharp is a junior synonym of *M. bias* (Olivier), and *M. westwoodi* Preudhomme de Borre is a junior synonym of *M. undulatus* Preudhomme de Borre. A key to species and notes on biology and distribution are given.

Résumé – Le genre sud-africain *Macroderes* Westwood est révisé. Six nouvelles espèces *M. amplior* n. sp., *M. minutus* n. sp., *M. endroedyi* n. sp., *M. namakwanus* n. sp., *M. foveatus* n. sp., et *M. cornutus* n. sp., sont décrites. Le néotype de *M. bias* (Olivier) est désigné. Deux nouvelles synonymies sont établies: *M. pilula* Sharp comme synonyme junior de *M. bias* (Olivier), est *M. westwoodi* Preudhomme de Borre comme synonyme junior de *M. undulatus* Preudhomme de Borre. Une clé des espèces et des notes biologiques et sur la distribution sont données.

Macroderes Westwood 1842 is a small genus of the scarabaeine dung beetles endemic to southern Africa. The genus has been recognized since the mid-1800s, however, its extreme rarity in collections and poor species descriptions prevented biologists, up to now, from using it in ecological and biogeographical research.

The genus was proposed by Westwood (1842: 59) for one species, *Onthophagus greeni* Kirby, described from the Cape of Good Hope. In the brief diagnosis, the characters mentioned are: body nearly hemispherical, pronotum rounded laterally and weakly retuse anteriorly, elytra slightly striate, anterior tibiae dilated apically, basal segment of tarsi triangular. Westwood also stated (1847: 228), after Kirby (1818: 397), that the taxon “varies somewhat from the habit of *Onthophagus*, and forms an intermediate link between it and *Copris*”. The aptery and absence of elytral umbones were not mentioned among the diagnostic characters of the genus.

Preudhomme de Borre (1880: 7-11) transferred *Scarabaeus bias* Olivier to *Macroderes* and described 3 new species. Harold (1877: 97), Sharp (1880: 37, 37) and Kolbe (1908: 130) contributed 5 new species. Péringuey (1901: 297-304) described 2 new species and provided a key to 5 species. Most of the species described by European workers were, however, unknown to him.

Janssens (1939: 23-26) summarized the data available to him and provided a key to all nominal species which, although extensive, was based largely on the original descriptions and does not allow reliable identification. The Janssens’ paper was the last taxonomic work on the group and included description of *M. arrowi* Janssens. Ferreira (1969: 319-323) cited Janssens and provided no original data.

The species of *Macroderes* were described largely on the basis of the shape of pronotum and elytral intervals which, however, vary among individuals and between sexes. Structures of male genitalia were not examined nor was the geographical distribution of species analyzed. This resulted in synonymy of 2 names.

Before the present contribution, the genus included 13 nominal species most of which could not be identified with any degree of reliability. Ten species were

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described from single specimens (7 from females). Obscure taxonomy of the genus as well as reasonable number of specimens collected over past few decades, including those recently collected by the authors, necessitated a revision of the group.

Material and methods

Material examined is deposited in the following institutions: Albany Museum, Grahamstown, South Africa (AMSA), Canadian Museum of Nature, Ottawa, Canada (CMN), Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (IRSNB), Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (ZMHB), Muséum National d'Histoire Naturelle, Paris, France (MNHN), National Collection of Insects, Plant Protection Research Institute, Pretoria, South Africa (SANC), South African Museum, Cape Town, South Africa (SAMC), Natural History Museum, London, Great Britain (BMNH), Transvaal Museum, Pretoria, South Africa (TMSA), University of Pretoria Insect Collection, Pretoria, South Africa (UPSA), and Zoological Institute, St. Petersburg, Russia (ZIN).

The distribution map was generated with ArcView GIS software (ESRI, Inc.). Co-ordinates of localities were taken with a handheld GPS unit. For museum specimens, the co-ordinates were taken from the specimens' labels, if available, otherwise from the Alexandria Digital Gazetteer (<http://fat-albert.alexandria.ucsb.edu:8827/gazetteer/>).

Aedeagi and internal sac sclerites were prepared using common technique and photographed in glycerol. Scanning electron micrographs were taken with a JEOL 840 electron microscope from the specimens coated with gold. Within the species treatments, addition information and comments on the label data are given in square brackets. Labels of the type specimens are cited verbatim; [p] - printed, [h] – handwritten; lines in labels separated by comma.

Macroderes Westwood

Macroderes Westwood 1842. Type species: *Onthophagus greeni* Kirby, 1818, by monotypy.

Westwood 1843: 62; 1847: 228; Lacordaire 1858: 88; Preudhomme de Borre 1880: 7; Sharp 1880: 36; Péringuey 1900: 297; Gillet 1911: 44; Janssens 1939: 22; Ferreira 1969: 319; Montreuil 1998: 137.

Diagnosis – Species of *Macroderes* can be recognized by their convex, bulky body and absence of wings. Males have tibiae with acute process next to apical spur, similar to representatives of genera *Xinidium* Harold and *Metacatharsius* Paulian.

Description – Medium-sized beetles (length 7.5-13.0 mm, width 5.0-9.2 mm) with very convex body. Colour monotonous black; recently emerged specimens reddish-brown. Surface of body more or less densely punctate; each puncture bears a short yellowish seta. Setae may be abraded in older specimens.

Clypeus wide, semicircular, with border and two small angles on anterior margin (acute in recently emerged specimens), sinuate between the angles. Distance between the angles about 1/5 the width of the clypeus. Genae strongly protruding past eyes, right-angled to acute-angled. Eyes small, divided by canthus into smaller dorsal part and larger ventral part. Frontal suture distinct, keel-shaped, slightly curved, sometimes with a tubercle in the middle, otherwise head without horns or other processes. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, sometimes rugose, anterior part often transversally carinate. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long, more or less excavated anterolaterally in males of some species. Base sometimes with more or less developed concavity (*M. foveatus* n. sp. and *M. cornutus* n. sp. have a very deep triangular concavity occupying more than 1/2 the length of pronotum), but without smooth longitudinal line. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with fine border, base not bordered. Lateral margins punctate in some species and the margin appears crenulate in dorsal view. Dorsal surface of pronotum with rounded or irregular punctures (very elongated in *M. cornutus* n. sp.) and, in some species, with more or less developed tubercles in-between. Sometimes punctures are indistinct and pronotum appears granular.

Elytra very convex, without humeral umbones, with 10 distinct striae. Their maximum width is in basal 1/4 to 1/3. Striae with large punctures (diameter of punctures 1.5-2 times larger than width of a stria) separated by 2-4 puncture diameters. Most of striae do not reach apex of elytron. Stria 9 (pseudoepleural stria of authors) short, occupies 1/2 to 2/3 of apical part of elytron, sometimes located very close to stria 10. Elytral intervals 1-8 slightly convex to almost flat, sutural one a bit more convex than others. Intervals 9-10 (pseudoepleura) flat. Intervals more or less densely punctate, sometimes almost rugose; margins of punctures carinate in some species. Surface matte to shiny, sometimes with small smooth tubercles, or intervals shiny in the middle becoming matte, shagreened laterally.

Scutellum not visible from above.

Wings absent.

Anterior tibiae of typical scarabeoid shape, with 3 strong outer teeth and more or less distinct 4th tooth. Lateral margin basad of outer teeth crenulate. Apex of tibia in males with sharp process curved downward; that in females without process. Apical spur of anterior tibiae acute, curved inward and slightly downward. Anterior tarsi well developed, about 1/2 the length of tibiae. Claws 1/2 the length of apical tarsal segment. Ventral surface of anterior tibiae smooth with two rows of setae. Ventral surface of femora densely punctate, with two longitudinal keels, one of which doesn't reach the base of femur.

Middle and posterior legs are similar in shape; posterior femora and tibiae about 1/5 longer than the middle ones. Tibiae somewhat triangular, with inner margin only slightly concave, with longitudinal rows of setae; their outer margins crenulate, without transverse keels. Middle tibiae with two apical spurs; upper spur a bit longer than basal segment of tarsi. Posterior tibiae with one apical spur; the spur as long as, or a bit shorter than, basal segment of tarsi. Middle and posterior tarsal claws 2/3 length of last tarsal segment. Middle and posterior femora densely punctate.

Abdominal sternites densely punctate, similar in both sexes. Sternite 6 as wide as sternites 2-5 together in middle.

Pygidium transverse, two times wider than high, more or less densely punctate, without keels.

Aedeagus with strongly sclerotized, symmetrical parameres (fig. 50). Shape of parameres similar in all species examined and similar to that in related genera (*Xinidium*, *Metacatharsius*). Internal sac of aedeagus armed with a few sclerites easily homologizable among species (fig. 49, 51-63).

The immature stages are unknown.

Diagnostic characters – With the exception of *M. foveatus* n. sp. and *M. cornutus* n. sp., which are readily distinguished by a prominent deep triangular concavity at base of pronotum, all other species of *Macroderes* are superficially similar but can in most cases be identified by the characters of microsculpture of pronotum and elytra. The shape of a small, usually strongly sclerotized sclerite of the internal sac of the aedeagus (referred to as sclerite or internal sac sclerite hereafter, arrowed in fig. 49), is of diagnostic importance. Examination of the sclerites of some 60 specimens of all species for which males are known (fig. 51-63) shows that, in spite of some variation, species-specific shape can be recognized in most species. Allopatric habitats of most species provide an additional, geographic diagnostic character. Females sometimes cannot be identified with reliability when the locality they originate from is unknown.

Taxonomic position of the genus – In the subfamily Scarabaeinae, the genus *Macroderes* has traditionally been included in the tribe Dichotomiini. The main character to separate this tribe from Coprini is absence (in the former) and presence (in the latter) of the transverse carina on the middle and hind tibiae.

The validity of Dichotomiini was questioned by Génier (1996) and Montreuil (1998). On the basis of cladistic analysis of 42 morphological characters of 37 genera of Dichotomiini and Coprini, Montreuil (1998) hypothesized that *Macroderes* belongs to one lineage with moderate to large beetles with flat mesepimeres, in particular *Copris* Müller and *Catharsius* Hope, and transferred the genus in the tribe Coprini.

Distribution – Most of *Macroderes* species are distributed in south-western part of South Africa from

Richtersveld in the north to Cape Agulhas in the south (fig. 78). *M. pristinus* Sharp was described from “Diamond field” [present-day Diamond Area 1 in southern Namibia] which is the northernmost known locality of *Macroderes* species. This record is however ambiguous (see below).

The genus range largely falls into the winter-rainfall area. The notable exception is *M. bias* which occurs eastwards of ranges of other species up to Uniondale in the west.

It can be assumed, from the material available to us, that most *Macroderes* species are allopatric except for *M. minutus* n. sp. which has recently been collected along with specimens of *M. amplior* n. sp. (in vicinity of Rietpoort) and *M. arrowi* (in vicinity of Vanrhynsdorp).

Habitat preferences and biology – The biology of *Macroderes* is little known except for some recent observations in the Namaqualand. To collect *Macroderes* specimens, pitfall traps with different baits were set up in some 35 localities from Steinkopf in the north to Darling in the south and were exposed for 2 to 10 days in late August and early September, 2003. The specimens of *Macroderes* were sampled from 18 localities. Only traps baited with dung captured *Macroderes*.

It was noted that *Macroderes* occur in shrub-land areas with rather dense vegetation (fig. 79, 80). The soil type varied from loam in Kamieskroon and Rietpoort to soft sand in coastal area and vicinity of Vanrhynsdorp but is probably species-specific.

Feeding of the beetles was not observed in the field nor were the beetles found on the soil surface in day-time. We suppose that the *Macroderes* species are nocturnal but, however, may be active in day-time in case of cold and humid weather. The *Macroderes* tolerate quite low temperatures since the temperature went as down as 4 °C at nights in the survey period in central Namaqualand.

In the laboratory at the University of Pretoria, beetles fed on cattle and sheep dung. They dug vertical burrows in soil and stayed there during light-time appearing at night to collect some food. The beetles carried pieces of dung with their anterior legs moving back to their burrows.

We were unable, however, to breed the beetles.

Key to *Macroderes* species

1. Base of pronotum with very deep triangular concavity occupying more than 1/2 length of pronotum (fig. 27, 29) 2
- Base of pronotum without deep concavity 3

2. Frontal suture without rounded tubercle (fig. 43, 45), sides of pronotum with irregular, less elongated punctures (fig. 47), elytral intervals with denser and larger punctures (fig. 37), internal sac sclerite slender, with small but distinct lateral process (fig. 62) *M. foveatus* n. sp.
- Frontal suture with rounded tubercle flattened apically in males (fig. 44, 46) and acute in females, sides of pronotum with very elongated punctures (fig. 48), elytral intervals with sparser and smaller punctures (fig. 38), internal sac sclerite with wide basal part and without lateral process (fig. 63) *M. cornutus* n. sp.
3. Punctures of elytral intervals with somewhat carinate margins (fig. 35, 36). Sides of pronotum crenulate in dorsal view (fig. 26, 28) 4
- Elytral intervals with different sculpture. Sides of pronotum crenulate or entire in dorsal view 5
4. Pronotum with round punctures (fig. 28, 31) *M. greeni* (Kirby)
- Pronotum granular (fig. 26, 32) *M. arrowi* Janssens
5. Lateral border of pronotum not punctate (fig. 42), margin appears entire in dorsal view 6
- Lateral border of pronotum with punctures (fig. 41), margin appears entire (fig. 1-3) or crenulate (fig. 7, 8) in dorsal view 10
6. Elytral intervals with sparse punctures surrounded by matte areas separated by more or less developed smooth, elevated areas (fig. 66). Head with small tubercle in the middle of frontal suture. Metasternum smooth, without distinct punctuation *M. undulatus* Preudhomme de Borre
- Elytral intervals with different sculpture. Head with more or less carinate frontal suture, without tubercle in the middle. Metasternum with distinct punctuation 7
7. Elytra somewhat rugose, matte (fig. 68). Sclerite of internal sac with long lateral process (fig. 57) *M. amplior* n. sp.
- Elytral intervals more or less densely punctate but not rugose (fig. 67, 69, 71). Shape of internal sac sclerite different 8
8. Elytral intervals more convex, shiny or with more or less shagreened sides (fig. 22). Sclerite of internal sac strongly curved, without lateral process (fig. 54) *M. nitidus* Harold
- Elytral intervals flat, evenly matte or shiny (fig. 20, 21). Shape of internal sac sclerite different 9
9. Body larger (9.5-12.0 mm). Elytra evenly shagreened, matte (fig. 21, 69) *M. mutilans* Kolbe
- Body smaller (7.0-9.5 mm). Elytra more or less shiny (fig. 20, 71) *M. minutus* n. sp.
10. Pronotum granular at least antero-laterally, lateral margin more or less crenulate in dorsal view (fig. 7, 8) 11
- Pronotum punctate, not granular, lateral margin entire in dorsal view (fig. 1-3) 12
11. Base of pronotum with rounded, larger punctures (fig. 16). Elytral intervals densely punctate, rugose, monotonously opaque (fig. 24). Sclerite of internal sac not curved basally (fig. 59) *M. namaquanus* n. sp.
- Base of pronotum with sparser, somewhat irregular punctures, with more or less distinct tubercles in-between (fig. 15), appearing granular under dissecting microscope. Elytral intervals more strongly shagreened, with small shiny tubercles (fig. 23). Sclerite of internal sac curved basally (fig. 58) *M. endroedyi* n. sp.
12. Elytral intervals shiny at least in the middle (fig. 18, 70) *M. politulus* Preudhomme de Borre
- Elytral intervals strongly shagreened, matte (fig. 17, 19, 64, 65) 13
13. Elytral stria 9 almost adjacent to stria 10 (fig. 39). Males with more tapered, shield-shaped elytra (fig. 64). Eastern Cape Province up to Uniondale in the west *M. bias* (Olivier)
- Elytral stria 9 widely separated from stria 10 (fig. 40). Elytra more rounded apically (fig. 65). Western Cape Province *M. fornicatus* Sharp

Macroderes bias (Olivier)

(fig. 1, 9, 17, 39, 51, 64, 78)

Scarabaeus bias Olivier 1789: 187.*M. bias* (Olivier): Preudhomme de Borre 1880: 8; Péringuey 1900: 299; Janssens 1939: 28; Ferreira, 1969: 320.*M. pilula* Sharp, 1880: 38, n. syn.

Diagnosis – This species is similar to *M. mutilans* and *M. fornicatus* in having elytral intervals almost flat and matte, but can be separated from them by having more tapered, shield-shaped elytra in males (fig. 64), elytral stria 9 very close to stria 10 (fig. 39), and long internal sac sclerite with feebly sclerotized apex (fig. 51). From the former species it can also be separated by having punctate lateral border of pronotum.

Neotype designation – According to Olivier (1789: 187) the type of *M. bias* was deposited in “Cabinet du Prince d’Orange” (Zoologisch Museum Amsterdam). Janssens (1939: 28) and Ferreira (1969: 320) indicated MNHN as the type depository but apparently neither of them saw the type personally. We were unable to trace it either in the Amsterdam Museum or in MNHN and therefore we think that the type is lost.

The absence of the type causes potential instability of the nomenclature since the original description of the species is too incomplete and a number of scarabaeine taxa fit it. Moreover, the figure of *M. bias* provided in the Olivier’s work (Olivier 1789: plate 28, fig. 248) suggests that it is probably an *Onthopagus* Latreille species that the description was based on, rather than a *Macroderes* as it was commonly considered since the 19th century.

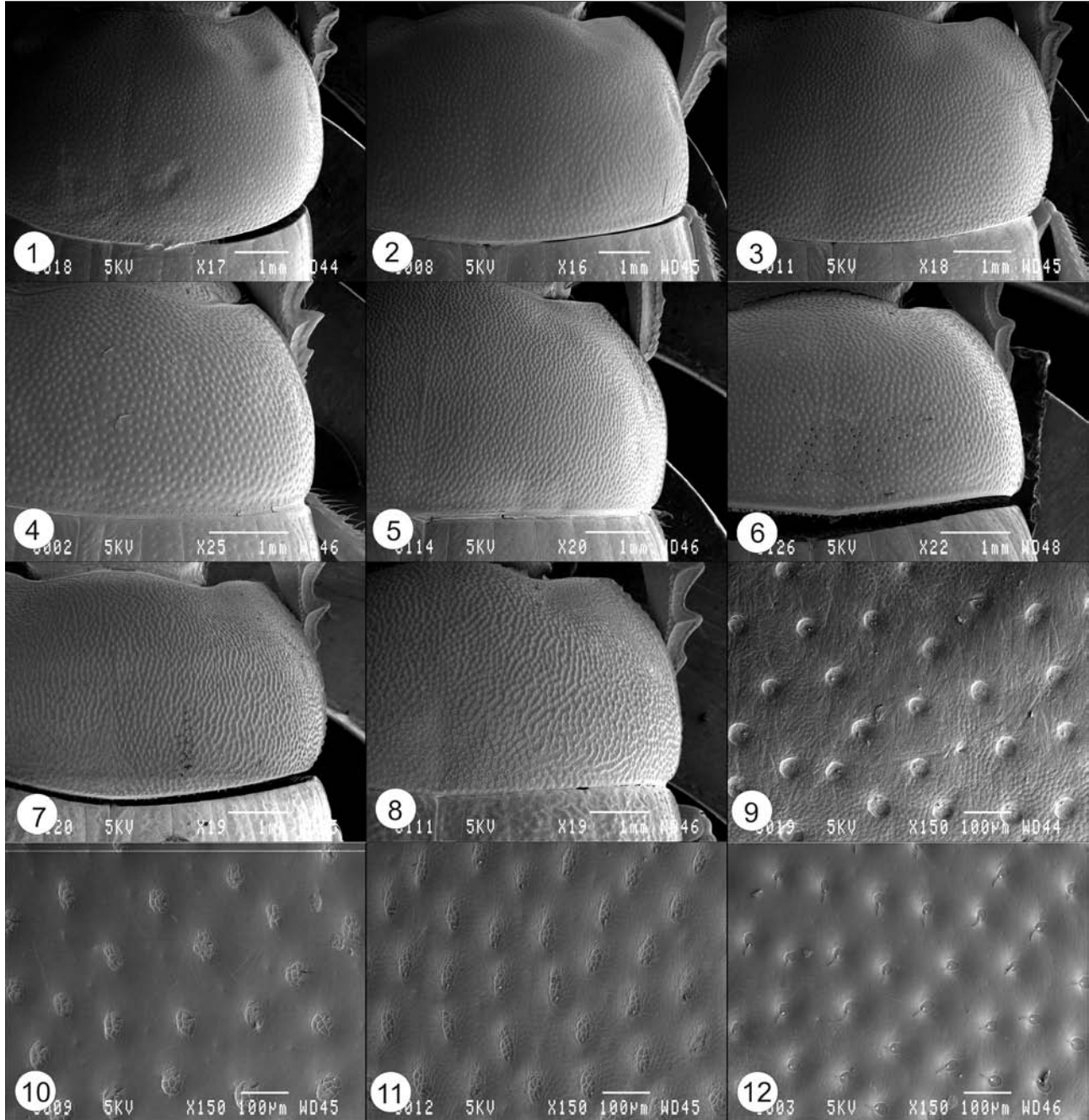
To ensure stability of the nomenclature the neotype of *M. bias* is here designated. A male specimen (fig. 64) with explicit characters of the species is chosen from the series originated from Grahamstown (Eastern Cape Province, South Africa) and deposited in IRSNB, and

Grahamstown area thereby should be considered the type locality for *M. bias*.

Description – Neotype, male. (fig. 64)

Body size: length 12.0 mm, maximum width 7.9 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae almost right-angled. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin.



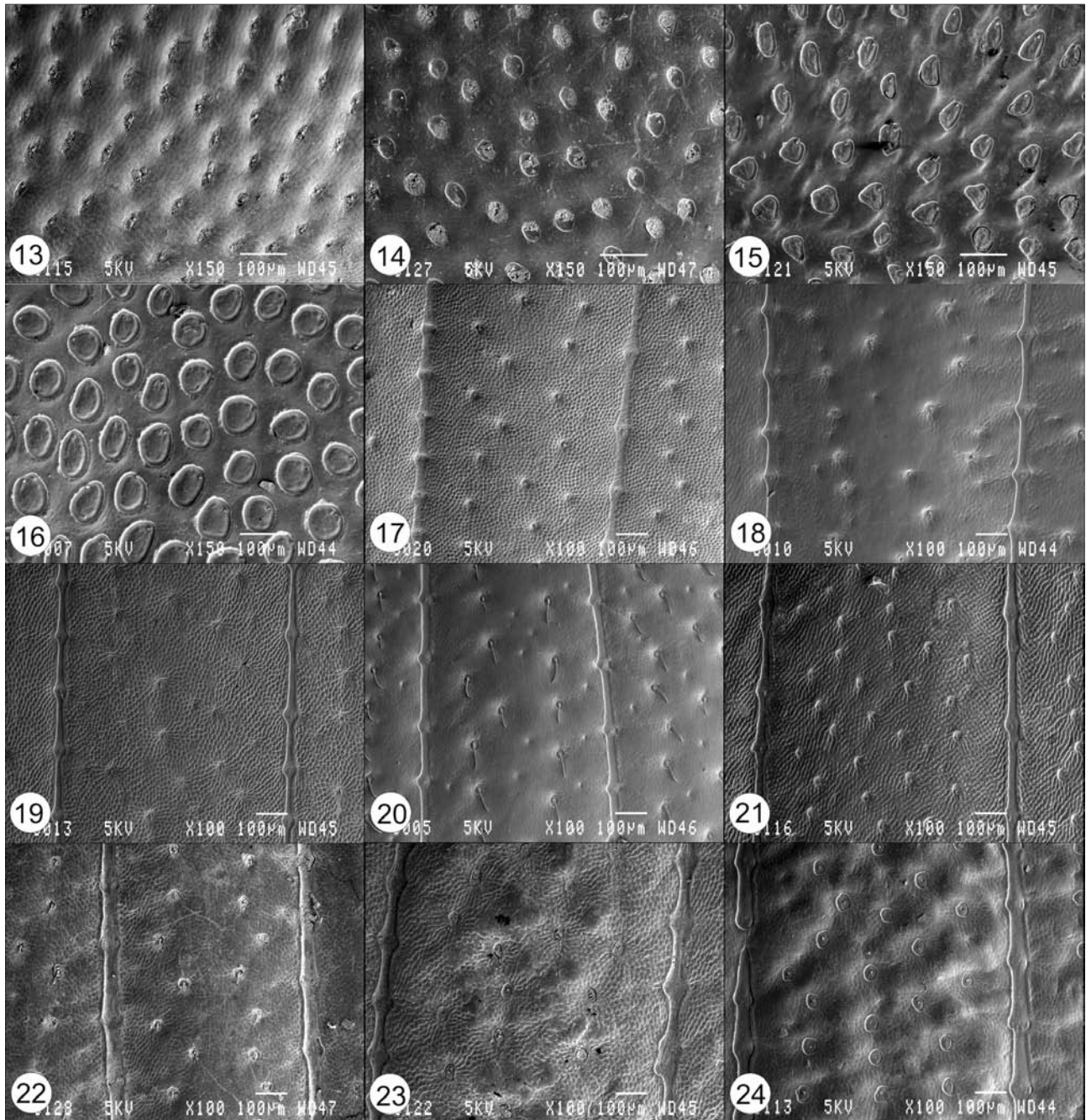
Figures 1-12

Macroderes spp. 1-8 – pronotum; 9-12 – punctuation of the base of pronotum. 1, 9 – *M. bias*; 2, 10 – *M. politulus*; 3, 11 – *M. fornicatus*; 4, 12 – *M. minutus* n. sp.; 5 – *M. mutilans*; 6 – *M. nitidus*; 7 – *M. endroedyi* n. sp.; 8 – *M. namaqwanus* n. sp.

Dorsal surface of clypeus very densely punctate, somewhat rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, distinctly excavated anterolaterally, with rounded lateral margins, about 2 times wider than

long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate. Dorsal surface with round, regular punctures separated by 1.5-3 puncture diameters on base.



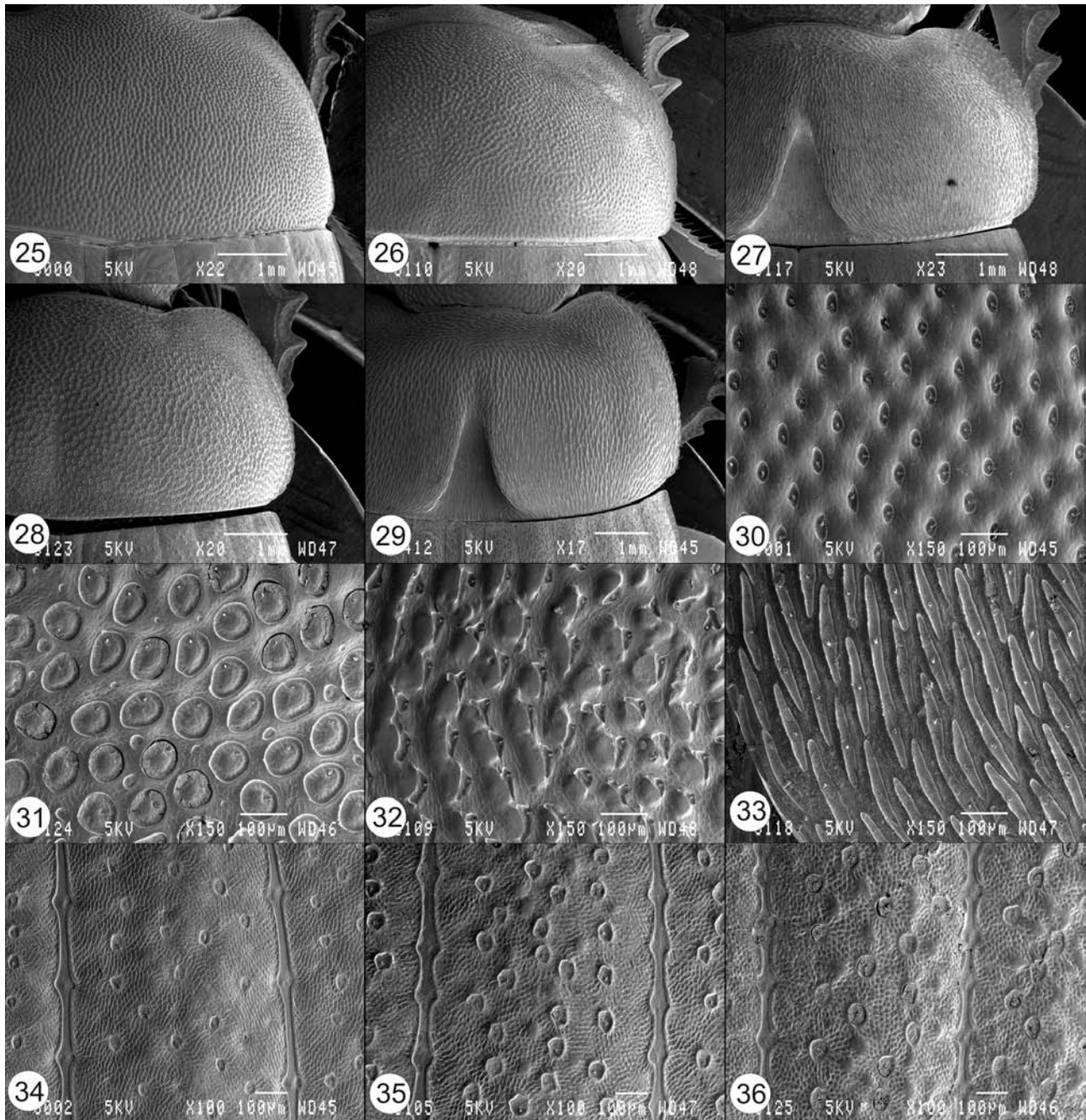
Figures 13-24

Macroderes spp. 13-16 – punctuation of the base of pronotum, 17-24 – sculpture of second elytral interval on disc. 13, 21 – *M. mutilans*; 14, 22 – *M. nitidus*; 15, 23 – *M. endroedyi* n. sp.; 16, 24 – *M. namaqwanus* n. sp., 17 – *M. bias*; 18 – *M. politulus*; 19 – *M. fornicatus*; 20 – *M. minutus* n. sp.

Elytra. Elytral intervals 1-8 shagreened, matte, punctate (punctures separated by 2-4 puncture diameters on disc), margins of punctures not carinate. Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 short, 2/3 the length of elytron, close, sometimes almost adjacent to stria 10.

Sclerite of internal sac of the aedeagus relatively long, with feebly sclerotized apical part (fig. 51a).

Variability – In the examined specimens, body size varies: in males from 9.0 mm to 11.5 mm (length) and from 5.8 mm to 8.0 mm (width), in females from 8.0 mm to 12.0 mm (length)

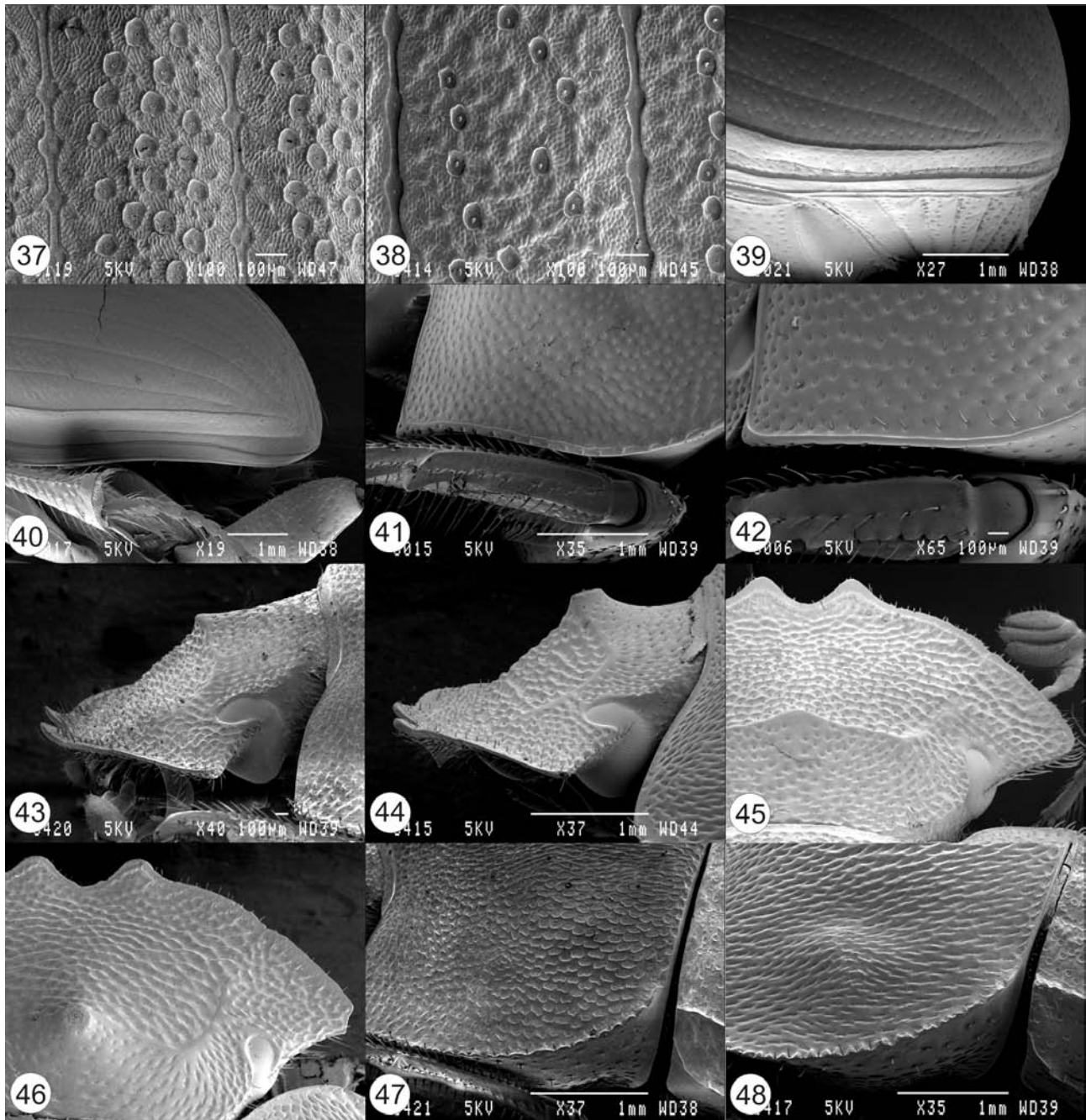


Figures 25-36

Macroderes spp., pronotum (25-29), punctuation of the base of pronotum (30-33), sculpture of second elytral interval on disc (34-36). 25, 30, 34 – *M. amplior* n. sp.; 26, 32, 35 – *M. arrowi*; 27, 33 – *M. foveatus* n. sp.; 28, 31, 36 – *M. greeni*; 29 – *M. cornutus* n. sp.

and from 6.0 mm to 8.1 mm (width). Elytral intervals vary from slightly convex through almost flat to slightly concave. This slight variation results in quite different appearance of the beetles but,

however, not supported by other morphological characters. Shape of the sclerites of internal sac varies but feebly sclerotized apical part is apparent in all specimens (fig. 51b-i).



Figures 37-48

Macroderes spp., sculpture of second elytral interval on disc (37-38), lateral elytral intervals (39-40), *Macroderes* spp., lateral side of pronotum (41, 42, 47, 48), head in lateral and dorsal view (43-46). 37, 43, 45, 47 – *M. foveatus* n. sp.; 38, 44, 46, 48 – *M. cornutus* n. sp.; 39 – *M. bias*; 40 – *M. fornicatus*. 41 – *M. politulus*; 42 – *M. minutus* n. sp.

Distribution – This species is known mostly from Eastern Cape Province ranging up to Uniondale in the west (fig. 78).

Type material examine – *M. bias*: neotype ♂ (here designated) with labels “Coll.R.I.Sc.N.B. South Africa [p], Graham’s Town 11/4/[19]05 [h], Coll. J.J.Gillet”, “Macroderes bias Oliv. t. arrow [h]”, and “A. Janssens det. 1939: [p] Macroderes pilula Sharp [h]” (IRSNB).

M. pilula: holotype ♀ with labels “♀, Macroderes pilula, Type D[avid], S[harp]., Graham’s Town. [Grahamstown, 33°18’S 26°32’E] 1870” [handwritten on the card with the specimen], “Cape, Graham’s Town” [p], “Ex. Musaeo, D. Sharp 1890” [p], “Museum Paris, 1952, Coll. R. Oberthür” [p], and “Holotype” [p] (MNHN).

Additional material examined – Eastern Cape Province. Grahamstown, 11.IV.1905 [Péringuey leg.?], 2 ♂ and 2 ♀ (SAMC) (fig. 51d), 1 ♂ and 1 ♀ (IRSNB) (fig. 51a), 2 ♂ (BMNH) (fig. 51b,c); 26.IX.1969, Gess leg., 1 ♂ and 1 ♀ (AMSA) (fig. 51f); 1 ♂ and 1 ♀: Tarkastad [32° 1’ S 26° 16’ E], I.1962 (AMSA); 1 ♀: Lynedoch, Bedford Distr. [32°29’S 26°2’E], I.1962 (AMSA); 1 ♀: Cradock [32° 11’ S 25° 37’ E], I.1962 (TMSA); 4 ♂ and 3 ♀: Loerie [33° 52’ S 25° 01’ E] (SAMC) (fig. 51i); 1 ♀: Addo Elephant Park [33° 29’ S 25° 47’ E], 16-20.XII.1996, Wolmarans leg. (TMSA); 1 ♂ and 1 ♀: Baviaans Kloof, I.1893, (AMSA) (fig. 51e). Western Cape Province. 2 ♂ and 1 ♀: 10 km NE of Uniondale [33° 39’ S 23° 08’ E], 4.V.1976, Davis and Aschenborn leg. (fig. 51g). 1 ♂: unknown locality (BMNH) (fig. 51h); 1 ♀: “Cap” (IRSNB).

Remark – Specimens from different localities show considerable variation in the shape of elytral intervals and punctuation. It is possible that a complex of similar allopatric *Macroderes* species inhabit Eastern Cape and eastern part of Western Cape provinces of South Africa. However, the material available to us is too fragmentary and until extensive sampling in the area is undertaken and a sound morphological hiatus among the forms is found we consider these forms to be conspecific.

***Macroderes fornicatus* Sharp**
(fig. 3, 11, 19, 40, 52, 65, 78)

M. fornicatus Sharp 1880: 37; Péringuey 1900: 303; Janssens 1939: 28; Ferreira 1969: 320.

Diagnosis – This species is similar to *M. mutilans* and *M. bias* in having elytral intervals almost flat and matte, but can be separated from the former species by having punctate lateral border of pronotum and from the latter by having elytra more rounded apically (fig. 65) and elytral stria 9 distinctly separated from stria 10 (fig. 40). From both species it also differs in the shape of the internal sac sclerite (fig. 52).

Description – Body size: males – length 8.4-10.5 mm, width 5.5-6.0 mm; females – length 9.5-10.5 mm, width 6.5-7.0 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled to obtuse. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part somewhat rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, somewhat excavated antero-laterally in large males, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate. Dorsal surface with elongate, regular punctures separated by 1.5-3 puncture diameters on base (fig. 3, 11).

Elytra. Elytral intervals 1-8 almost flat. Intervals shagreened, matte, punctate (punctures separated by 3-5 puncture diameters on disc), margins of punctures not carinate (fig. 19). Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 in middle of elytron (fig. 40).

Sclerite of internal sac of aedeagus with acute, strongly sclerotized apex and more or less developed lateral processes (fig. 52).

Variability – Some males differ from females in having pronotum with more developed lateral depressions, otherwise variation among examined specimens if very slight.

Distribution – Cape Peninsula (fig. 78).

Type material examined – Holotype ♀ with labels “♀, Macroderes fornicatus, Type D[avid]. S[harp]., Cap[ut]. B[onnae]. Sp[eci] Mus. Dejean” [handwritten on the card with the specimen], “Laferté 3919” [printed], “Ex. Musaeo, D. Sharp 1890” [p], “Museum Paris, 1952, Coll. R. Oberthür” [p], and “Holotype” [p] (MNHN).

Additional material examined – 1 ♂: Cape Town [33° 55’ S 18° 26’ E], 2.IX.1922 (IRSNB) (fig. 52a); 2 ♂ and 3 ♀: Cape of Good Hope Nature Reserve, 34° 18’ S 18° 27’ E, 23.VIII.1988, Davis leg. (UPSA); “Cape of Good Hope”, 4 ♂ (ZMHB) (fig. 52b, c), 1 ♀ (IRSNB).

***Macroderes mutilans* Kolbe**
(fig. 5, 13, 21, 53, 69, 78)

M. mutilans Kolbe 1908: 130; Péringuey 1908: 692; Janssens 1939: 29; Ferreira 1969: 322.

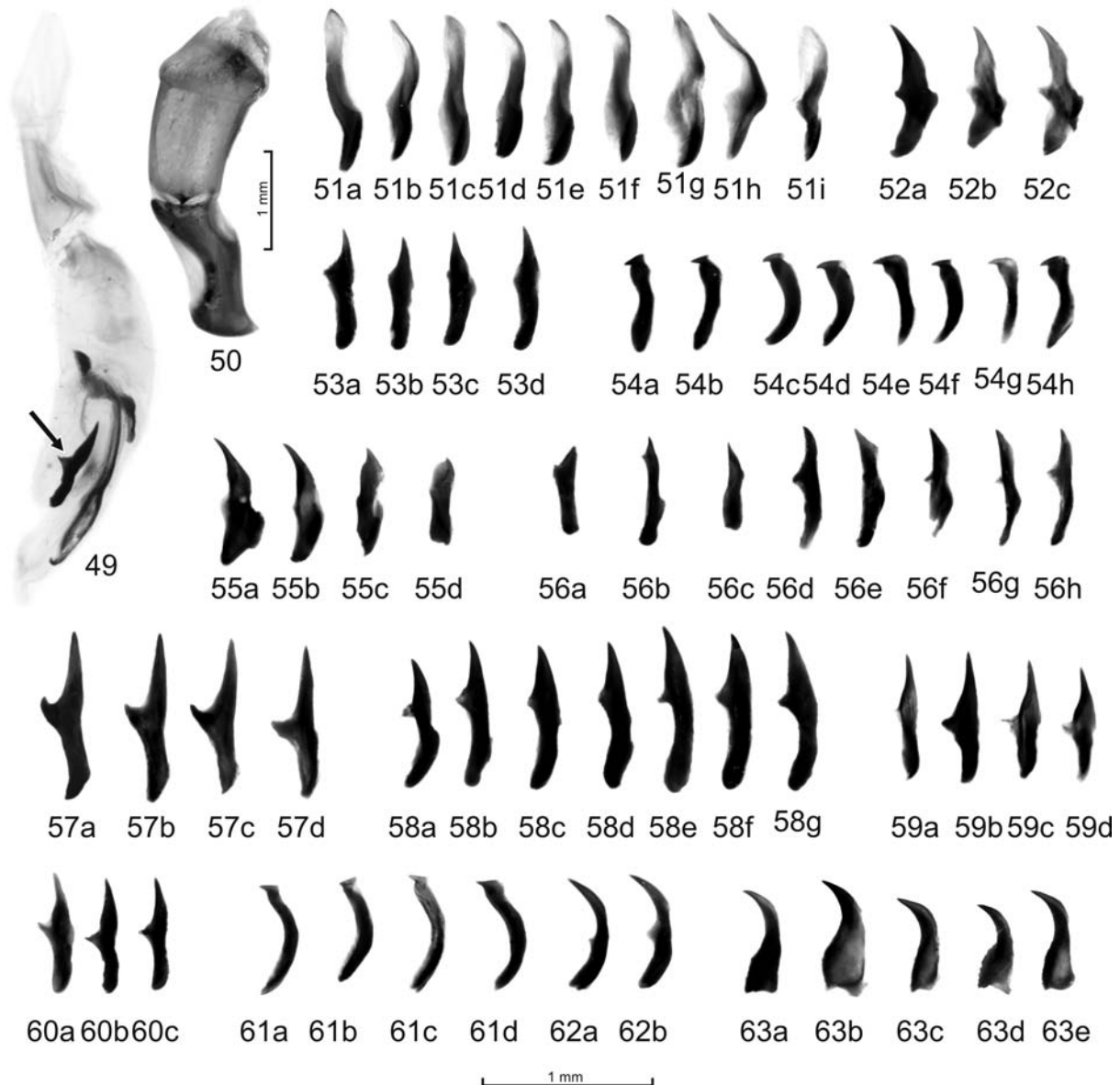
Diagnosis – This species is similar to *M. bias* and *M. fornicatus* in having elytral intervals almost flat and matte, but can be separated from them in having impunctate lateral border of pronotum and different shape of internal sac sclerite (fig. 53). From the former species it also differs in having elytral stria 9 widely separated from stria 10.

Description – Body size: males – length 9.5-11.9 mm, width 7.0-8.3 mm; females – length 10.0-12.0 mm, width 6.9-8.0 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled to obtuse. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, more or less excavated anterolaterally, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border not punctate. Dorsal surface with slightly elongated, regular punctures separated by 1-1.5 puncture diameters on base (fig. 5, 13).

Elytra. Elytral intervals 1-8 almost flat, shagreened, matte, punctate (punctures separated by 2-4 puncture diameters on



Figures 49-63

Macroderes spp., internal sac of aedeagus (49); aedeagus (50); internal sac sclerite (51-64; numbers indicated in the material examined). 49, 60 – *M. arrowi*; 50, 56 – *M. minutus* n. sp.; 51 – *M. bias*; 52 – *M. fornicatus*; 53 – *M. mutilans*; 54 – *M. nitidus*; 55 – *M. politulus*; 57 – *M. amplior* n. sp.; 58 – *M. endroedyi* n. sp.; 59 – *M. namaqwanus* n. sp.; 61 – *M. greeni*; 62 – *M. foveatus* n. sp.; 63 – *M. cornutus* n. sp.

disc), margins of punctures not carinate (fig. 21). Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus almost straight basally, with very short medial process (fig. 53).

Variability – Large males have the pronotum more excavated antero-laterally, otherwise variation among specimens very slight.

Distribution – This species is known from a few localities in the Namaqualand (fig. 78).

Type material examined – Holotype ♀ with the labels: “Brit. SW. Africa, Kl. Namaland, Steinkopf [29°15'S, 17°44'E], VIII.[19]04. L. Schultze S.”, “No 752”, “Typus”, and “*Macroderes mutilans* n. sp.” (ZMHB).

Additional material examined. South Africa; Northern Cape Province, 6 km S of Kamieskroon, 30° 15' 25" S 17° 55' 58" E, 1-13.IX.2003, Frolov and Deschodt leg., 2 ♂ and 1 ♀ (UPSA) (fig. 53a); 8 km S of Kamieskroon, 30° 17' 23" S 17° 57' 20" E, 1-13.IX.2003, Frolov and Deschodt leg., 7 ♂ and 10 ♀ (1 ♂ and 4 ♀ in UPSA, ♂ and ♀ in TMSA, ♂ and ♀ in SANC, ♂ and ♀ in SAMC, ♂ and ♀ in ZIN, ♂ and ♀ in MNHN, ♂ and ♀ BMNH) (fig. 53b); 8 km S of Kamieskroon, 30° 17' 17" S 17° 56' 59" E, 1-13.IX.2003, Frolov and Deschodt leg., 8 ♂ and 6 ♀ (UPSA) (fig. 53c, d); Springbok [29° 39' S 17° 53' E], IX.1965, Vari leg., 1 ♂ (TMSA); 10 m E of Springbok [29° 39' S 18° 4' E], III.1958, v. Son leg., 1 ♂ (TMSA).

***Macroderes amplior* n. sp.**
(fig. 25, 30, 34, 57, 68, 78, 80)

Diagnosis – This species is similar to *M. mutilans* but can be separated from it in having surface of elytral intervals somewhat undulate (fig. 68) and sclerite of internal sac of aedeagus with very long medial process (fig. 57).

Description – Holotype, male (fig. 68). Body length 12.5 mm, width 9.0 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border not punctate. Dorsal surface with slightly elongated, regular punctures separated by 1-1.5 puncture diameters on base.

Elytra. Elytral intervals 1-8 somewhat undulate, shagreened, matte, punctate (punctures separated by 2-4 puncture diameters on disc), margins of punctures not carinate. Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus almost straight basally, with very long medial process (fig. 57d).

Paratypes. Body size: males - length 11.5-13.0 mm, width 8.0-9.0 mm, females - length 10.0-12.0 mm, width 7.5-8.5 mm. Except for body size variation, the specimens are very similar.

Distribution – This species is known from the central Namaqualand (fig. 78).

Type material – Holotype ♂ with labels: “RSA, Western Cape Prov., 5 km W of Rietpoort, A. Frolov & C. Deschodt leg.” and “AF-0035(15) 3-11.IX.2003 S 30° 58' 36.58" E 017° 59' 55.69"” (TMSA) (fig. 57d). Paratypes, 16 specimens: 5 ♀ with the same data as the holotype (2 in UPSA and 3 in TMSA); 8 ♀ and 6 ♂: 5 km W of Rietpoort, 30°58'48"S 17° 59' 37" E, 3-11.IX.2003, Frolov and Deschodt leg. (2 ♂ and ♀ in UPSA, 2 ♂ and ♀ in TMSA, ♂ and ♀ in SANC, ♂ and ♀ in SAMC, ♂ and ♀ in ZIN, ♂ and ♀ in MNHN, ♂ and ♀ BMNH) (fig. 57b, c); 1 ♂: Rietpoort Farm, 30° 59' S 18° 06' E, 22.VIII.1979, Endrödy-Younga leg. (TMSA) (fig. 57a); 1 ♀: 7 km N Komaggas [29° 44' S, 17° 29' E], 9.IX.1981, Davis leg. (SANC).

***Macroderes politulus* Preudhomme de Borre**
(fig. 2, 10, 18, 41, 55, 70, 78)

Preudhomme de Borre 1880: 11; Péringuey 1900: 302; Janssens 1939: 29; Ferreira 1969: 322.

Diagnosis – This species is most similar to *M. minutus* n. sp. and *M. nitidus* but can be separated from them by having punctate lateral border of pronotum (fig. 41) and by the shape of internal sac sclerite (55).

Description – Body size: males - length 9.5-12.0 mm, width 6.0-8.2 mm, females - length 9.5-11.9 mm, width 6.5-8.4 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, sometimes rugose, anterior part often transversely carinate. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate (fig. 41). Dorsal surface with round, regular punctures separated by 1.5-3 puncture diameters on base (fig. 2, 10).

Elytra. Elytral intervals 1-8 slightly convex, shiny, sometimes slightly shagreened laterally, punctate (punctures separated by 2-5 puncture diameters on disc), margins of punctures not cari-

nate (fig. 18). Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 $2/3$ to $3/4$ the length of elytron; interval 10 twice as wide as interval 9 in the middle.

Sclerite of internal sac of the aedeagus similar to that of *M. fornicatus*, with acute, slightly curved apex (fig. 55a-c).

Variability – In some of the examined specimens, elytral intervals distinctly shagreened laterally, while in others intervals smooth and evenly shiny. Pronotum somewhat excavated antero-laterally in large males. The specimen from Cold Bokkeveld has pronotum very densely punctate with almost adjacent punctures. The examined specimens show considerable variability of the shape of internal sac sclerite. Additional material is needed to ascertain that these specimens are conspecific.

Distribution – The species occurs in the Western Cape Province (fig. 78).

Type material examined – Holotype ♂ with labels “Coll. R. I. Sc. N. B., South Africa [p], Caffria [sic!], Col. Dej. [Dejean; h] Collection E. Candeze [p]”, “M. politulus de Borre, Type 1880 P. de Borre [h]”, “A. Janssens 1939 [p], Macroderes, politulus (type) Preud[homme] de B[orre] [h]”, and “Type [p]” (IRSNB) (fig. 55c).

Additional material examined – Stellenbosch [33° 56' S 18° 51' E], V-VI.1928, Dendy leg., 1 ♂ (SAMC) (fig. 55b), 1901, Péringuey leg., 2 ♀ (SAMC), 1887, Péringuey leg., 1 ♂ (SANC); 1 ♀: Cold Bokkeveld, Ceres District [33° 5' S 19° 25' E], 15-30.X.1934 (SAMC); 1 ♀: Darling [33°23'S 18° 23' E], 1905, Péringuey leg. (SAMC); 1 ♀: Elsenburg [33° 51' S 18° 50' E], 31.VIII.1944 (SAMC); 1 ♂: Somerset West [34° 05' S 18° 51' E], VIII-IX.1927, Hesse leg. (SAMC); 1 ♂: unknown locality (BMNH) (fig. 55d); 1 ♀: Worcester [33° 39' S 19° 26' E], 17-31.VIII.1928, Turner leg. (BMNH); 4 ♂ and 5 ♀: Oranjefontein farm near Darling, 33° 25' S 18° 26' E, 19.VIII.1987, Davis leg. (UPSA) (fig. 55a).

Macroderes nitidus Harold

(fig. 6, 14, 22, 54, 67, 78)

M. nitidus Harold 1877: 97; Preudhomme de Borre 1880: 11; Péringuey 1900: 302; Janssens 1939: 28; Ferreira 1969: 322.

Diagnosis – This species is very similar to *M. minutus* n. sp. and *M. politulus* in body shape and punctuation of pronotum (fig. 6, 14) but males can easily be separated from them by the peculiar shape of internal sac sclerite (fig. 54). From the former species it also differs in larger average size. From the latter species it also differs in having impunctate lateral border of pronotum.

Description – Body size: males - length 8.2-11.5 mm, width 5.0-7.5 mm, females - length 8.5-12.0 mm, width 5.0-8.1 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled. Frontal suture distinct, keel-shaped, curved, without

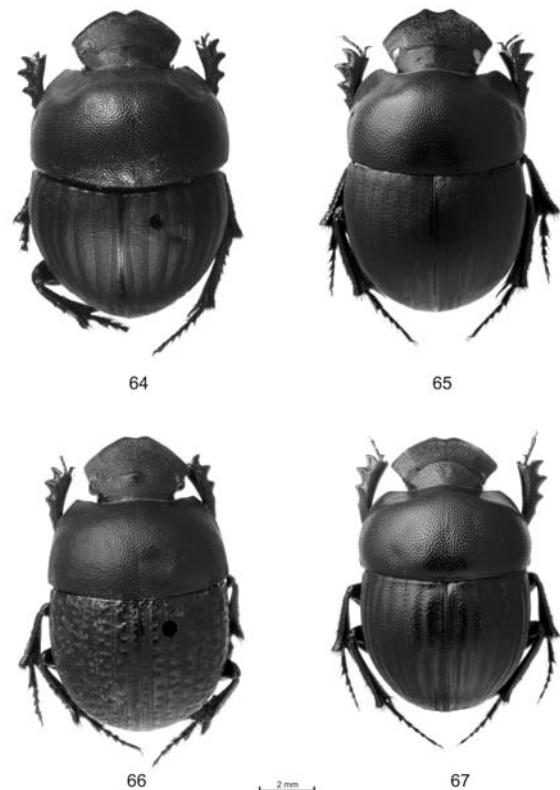
tubercle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part somewhat carinate. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long (fig. 6). Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border not punctate. Dorsal surface with round, regular punctures separated by 1.5-3 puncture diameters on base (fig. 14).

Elytra. Elytral intervals 1-8 slightly convex and strongly shiny in the middle and shagreened laterally, punctate (punctures separated by 2-4 puncture diameters on disc), margins of punctures not carinate (fig. 22). Striae punctate with large punctures separated by 2-4 puncture diameters. Stria 9 $2/3$ to $3/4$ the length of elytron; interval 10 $1/3$ as wide as interval 9 in the middle.

Sclerite of internal sac of the aedeagus strongly curved, without medial process (fig. 54b).

Variability – Except for the body size variation, the specimens slightly differ in the sculpture of the elytral



Figures 64-67
Macroderes spp., habitus. 64 – *M. bias*, neotype; 65 – *M. fornicatus*; 66 – *M. undulatus*; 67 – *M. nitidus*.

intervals: those of the specimens from the Cederberg Range are slightly shagreened laterally whereas the intervals of the syntypes are evenly shiny.

Distribution – The only exact locality known for this species is the Cederberg Range (Western Cape Province, South Africa).

Type material examined – 6 ♀ with the labels “Promont. b. sp. [Cape of Good Hope], Meyer [leg.], Nr.50568” (ZMHB); 6 ♀ with the labels “Orlog Rivier [not traced], Meyer [leg.], Nr.57079” (ZMHB). All the specimens were labeled by ZMHB staff as the syntypes of *M. nitidus*. Body size varies from 9.0 mm to 11.0 mm, otherwise the specimens are very similar and might originate from the same locality.

Harold (1877: 97) did not indicate the exact number of the specimens the description was based on, but it can be inferred from the text that a few specimens were studied and that there were no males among them.

Additional material examined – 4 ♂ and 2 ♀, South Africa, Western Cape Province, Cedarberg Range, east track, 800 m, 32° 29' S 19° 22' E, 21.VIII.1983, groundtrap with faeces bait,

66 days, Endrödy-Younga and Penrith leg. (TMSA) (fig. 54b); 33 specimens with the same data but co-ordinates and elevation: 4 ♂ and 12 ♀: 32° 24' S 19° 25' E, 650 m (fig. 54c, d) (1 ♂ and 2 ♀ in UPSA, 1 ♂ and 2 ♀ in ZIN, 1 ♂ and 1 ♀ in MNHN, 1 ♂ and 1 ♀ in BMNH, 6 ♀ in TMSA); 2 ♂ and 3 ♀: 32° 27' S 19° 23' E, 1,100 m (fig. 54e, i); 4 ♂ and 5 ♀: 32° 23' S 19° 24' E, 650 m (fig. 54j, f); 1 ♂ and 2 ♀: 32° 22' S 19° 24' E, 650 m (fig. 54a) (TMSA).

Remark – The specimens collected by Endrödy-Younga and Penrith were caught in the traps baited with dung, meat, and banana, but a very long trap exposure suggests that the beetles from the meat and banana baited traps were captures occasionally.

***Macroderes minutus* n. sp.**
(fig. 4, 12, 20, 42, 56, 71, 78)

Diagnosis – This species differs from other *Macroderes* species in its smaller average size (7.0-9.5 mm). It is similar to *M. politulus* and *M. nitidus* in body shape and punctuation of pronotum (fig. 4, 12) but can be separated from the former species by evenly shiny to slightly opaque, flat elytral intervals (fig. 20) and from the latter species in having lateral margins of pronotum not punctate (fig. 42). From both species it also differs in the shape of internal sac sclerite (fig. 56).

Description – Holotype, male (fig. 71). Body length 8.2 mm, width 5.5 mm.

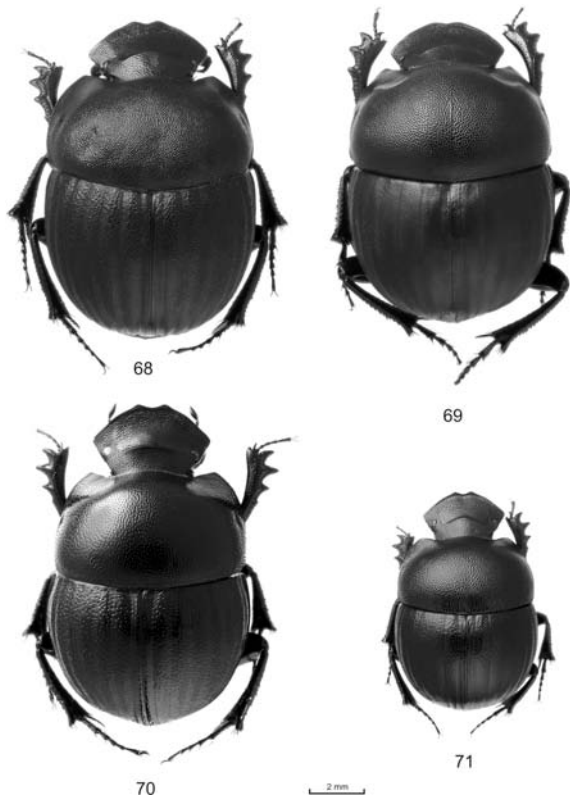
Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled. Frontal suture distinct, slightly curved, without tubercle in the middle. Genal sutures distinct. Dorsal surface of clypeus very densely punctate, anterior part somewhat rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, not excavated laterally, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border not punctate. Dorsal surface with round, regular punctures separated by 3-4 puncture diameters on base.

Elytra. Elytral intervals 1-8 flat to very slightly convex, shiny, punctate (punctures separated by 3-5 puncture diameters on disc), margins of punctures not carinate. Striae punctate with large punctures separated by 2-3 puncture diameters. Stria 9 short, half the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus almost straight, with short process in distal part (fig. 56a).

Paratypes. Body size: males - length 7.0-9.5 mm, width 5.2-6.8 mm, females - length 7.5-9.0 mm, width 5.0-6.3 mm. Shape of internal sac sclerite varies among examined specimens (fig. 56b-j); those of specimens from the Cederberg Range have distinct process in the middle. However all specimens are very



Figures 68–71
Macroderes spp., habitus; 68 – *M. amplior* n. sp.; 69 – *M. mutilans*; 70 – *M. politulus*; 71 – *M. minutus* n. sp.

similar in other morphological characters. Additional material is needed to clarify if all the specimens treated here as *M. minutus* n. sp. are indeed conspecific.

Distribution – The species is known from Western Cape Sandveld and Cederberg Range.

Type material – Holotype ♂ with labels “RSA, Western Cape Prov., 15 km SW of Lutzville, A. Frolov & C. Deschodt leg.” and “AF-0046(26) 6-10.IX.2003 S 31° 40' 21.00" E 018° 13' 50.10"” (TMSA) (fig. 54a). Paratypes, 22 specimens: 2 ♀ with the same data as the holotype (1 in UPSA and 1 in TMSA); 6 ♀ 5 km W of Rietpoort, 30° 58' S 17° 59' E, 3-11.IX.2003, Frolov and Deschodt leg. (2 in UPSA, 1 in SANC, 1 in MNHN, 1 in ZIN, 1 in BMNH); 1 ♀: 25 km N of Vanrhynsdorp, 31° 23' S 18° 38' E, 5-11.IX.2003, Frolov and Deschodt leg. (UPSA); 1 ♀: Vanrhynsdorp [31° 37' S 18° 44' E], VII-VIII.1927, v. Son. leg. (IRSNB); 1 ♂: Vredendal [34° 14' S 19° 12' E], 28-38.VII.1927, v. Son. leg. (IRSNB) (fig. 54b); 1 ♂: Namaqualand, Nuwerust farm, 31° 04' S 18° 17' E, 27.VIII.1979, singled on red sand, Endrödy-Younga leg. (TMSA) (fig. 54c); 1 ♂: Zandkraal farm, 31° 42' S 18° 46' E, 12.IX.1987, coarse-sandy flat, Endrödy-Younga leg. (TMSA); 1 ♀: 10 km N

of Bitterfontein, 30° 57' S 18° 13' E, 11.IX.1985, from sand pit, Endrödy-Younga leg. (TMSA); 1 ♂ and 2 ♀: Cederberg Mts., Jeep Track, 32° 26' S 19° 13' E, 1.IX.1981, groundtraps with faeces and meat bait, 63 days, Endrödy-Younga leg. (TMSA) (fig. 54f); 1 ♂: Cederberg Mts., Jeep Track, 32° 23' S 19° 24' E, 1.IX.1981, groundtrap with meat bait, 63 days, Endrödy-Younga leg. (TMSA) (fig. 54d); 1 ♂ and 1 ♀: Cederberg Mts., Jeep Track, 32° 24' S 19° 10' E, 1.IX.1981, *Redunca rufo* dung, Endrödy-Younga leg. (TMSA) (fig. 54h); 2 ♂ with the same data but collected from groundtraps with meat and faeces bait set up for 63 days (TMSA) (fig. 54e, g).

Macroderes undulatus Preudhomme de Borre
(fig. 66, 78)

M. undulatus Preudhomme de Borre 1880: 10; Péringuey 1900: 303; Janssens 1939: 27; Ferreira 1969: 323.

M. westwoodi Preudhomme de Borre 1880, **syn. n.** Péringuey 1900: 302; Janssens 1939: 28; Ferreira 1969: 323.

Diagnosis – This species can be separated from other *Macroderes* species by the combination of the following characters: head with small tubercle in the middle of frontal suture; base of pronotum with large, adjoining punctures becoming sparser and smaller towards anterior margin; metasternum smooth, without distinct punctuation; elytral intervals with sparse punctures surrounded by matte areas separated by smooth elevated areas (fig. 66). The sculpture of elytra is, however, subject to some variation (see description below).

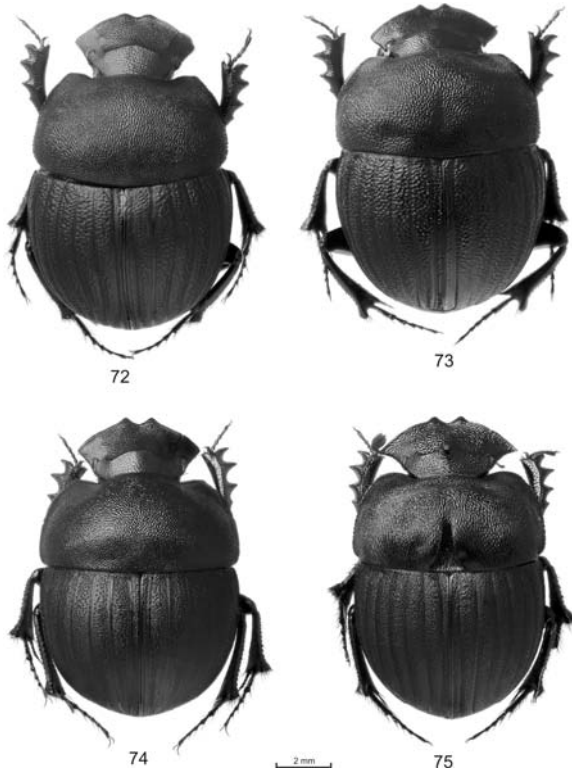
Description – Body size: length 10.0-11.5 mm, width 7.3-8.0 mm

Clypeus wide, semicircular, with border and two small angles on anterior margin, slightly sinuate between the angles. Genae obtuse, protruding past eyes. Frontal suture feebly visible in some specimens, with more or less developed tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus densely punctate, anterior part transversely carinate. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border not punctate. Base with large, adjoining punctures becoming sparser and smaller towards anterior margin.

Elytra. Elytral intervals shagreened, matte with very sparse punctures and with smooth, elevated, shiny areas in the middle of intervals. In some specimens shiny, elevated areas occupy some 50% of the elytral surface (fig. 66) while in others they are greatly reduced in size and intervals mostly matte. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Male unknown.



Figures 72-75
Macroderes spp., habitus. 72 – *M. endroedyi* n. sp.; 73 – *M. namaqwanus* n. sp.; 74 – *M. arrowi*; 75 – *M. cornutus* n. sp.

Variability – Except for the body size variation, specimens examined vary mostly in the sculpture of the elytral intervals described above.

Distribution – The range of the species is unclear since most of the older specimens have locality label “Cape of Good Hope”. The only exact locality record available, “Rietpoel”, although probably originally misspelled, suggest western Cape distribution (fig. 78).

Type material examined – *M. undulatus*: holotype ♂ with the labels “Coll. R.I.Sc.N.B., South Africa [p], C[aput]. B[onnae]. Sp[ei]. [h], Coll. J. Thomson [p]”, “det.[p] Preudhomme, de Borre 1880, Macroderes undulatus n. sp. [h]”, “A. Janssens vid.1939: [p], Macroderes undulatus, P[reudhomme]. d[e] B[orre] [h]”, and “Type” [p] (IRSNB). *M. westwoodi*: 3 syntypes ♀ with the same locality label as the holotype of *M. undulatus* and labels “det.[p] Preudhomme, de Borre 1880, Macroderes westwoodi n. sp. [h]”, “A. Janssens vid.1939: [p], Macroderes westwoodi, P. d. B. [h]” [one specimen with more developed smooth elevated areas on elytra has the label “... Macroderes undulatus...” by Janssens], and “Type” [p] (IRSNB).

Additional material examined – 1 ♀ from “Rietpol, Cape Province” [it is probably misspelled Rietpoel, 34° 15' S 19° 45' E] (SAMC); 2 ♀ from “Cape of Good Hope” [no exact locality] (1 in BMNH and 1 in ZMHB); 1 ♀: Riversdale [34° 6' S 21° 16' E] (SAMC); 1 ♀: 20 km E of Swellendam [34° 02' S 20° 26' E], 03.V.1976, Davis and Aschenborn leg. (SANC); 14 ♀: 15 km SE of Villiersdorp [33° 58' S 19° 15' E], 13.VII.1979, Davis and Payton leg. (SANC).

Remark – *M. undulatus* and *M. westwoodi* were described in the same paper from the material from J. Thomson’s collection (Preudhomme de Borre, 1880: 7, 9-11). The specimens differ mostly in the sculpture of elytral intervals and most probably originate from the same locality. They are similar in body shape, slightly tuberculate frontal suture, punctuation of pronotum, and almost indistinctly punctate metasternum. We consider the variation of the elytral sculpture to be interspecific and, therefore, *M. westwoodi* to be a junior synonym of *M. undulatus*.

The specimens from Riversdale, Swellendam and Villiersdorp differ from the type of *M. undulatus* in having elytral intervals almost flat and opaque with denser punctuation and may represent another, undescribed species. Male specimens are needed to clarify taxonomic status of this form.

***Macroderes endroedyi* n. sp.**
(fig. 7, 15, 23, 58, 72, 78)

Diagnosis – This species is very similar to *M. namakanus* n. sp. but can be separated from it in having base of pronotum with sparser, somewhat irregular punctures,

with more or less distinct tubercles in-between (fig. 7, 15), elytral intervals more shagreened, with small shiny tubercles (fig. 23), and more curved basal part of internal sac sclerite (fig. 58).

Description – Holotype ♂ (fig. 72). Body length 11.5 mm, width 8.0 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled, protruding past eyes. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part somewhat rugose. Punctuation of frons sparser with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 1.8 times wider than long. Base without longitudinal depression. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral margins punctate, crenulate in dorsal view. Dorsal surface of pronotum densely punctate with irregular punctures with tubercles in-between. Base of pronotum appears granular under dissecting microscope.

Elytra relatively sparsely punctate (punctures separated by 3-5 puncture diameters on disc), shagreened, with small, smooth tubercles. Elytral intervals 1-8 slightly convex. Striae punctate with large punctures separated by 1.5 puncture diameters on disc. Stria 9 short 1/2 to 2/3 the length of elytron; interval 10 3-4 times narrower than interval 9 in middle of elytron.

Sclerite of internal sac of the aedeagus with curved basal part and small medial process (fig. 58d).

Paratypes. Body size: males - length 9.5-12.5 mm, width 7.0-8.7 mm, females - length 9.4-12.0 mm, width 7.0-8.5 mm. Except for the body size, specimens examined are very similar.

Distribution – This species is known from Western Cape Sandveld area (fig. 78).

Type material – Holotype ♂ with labels “S. Afr., SW Cape, Nortier Farm, 32° 03' S 18° 19' E”, “25.8.1981; E-Y:1845, groundtraps, Endrödy-Younga leg.”, and “groundtraps with faeces bait” (TMSA) [58d]. Paratypes, 62 specimens from Western Cape Province: 2 ♂ and 7 ♀ with the same data as the holotype (TMSA) (fig. 58c); 2 ♀: Seweputs farm, 31° 39' S 18° 22' E, 22.VIII.1981, singled at night, Endrödy-Younga leg. (TMSA); 1 ♀: Kliphoutkop, 32° 17' S 18° 24' E, 26.VIII.1981, groundtraps with faeces bait, 63 days, leg. Endrödy-Younga (TMSA); 1 ♂ and 1 ♀: Papkuilsfontein farm, 32° 02' S 19° 10' E, 16.IX.1994, groundtraps with faeces bait, 9 days, leg. Endrödy-Younga (TMSA) (fig. 58a); 1 ♀: Grootdrif farm, 32° 24' S 18° 27' E, 29.VIII.1981, groundtraps with meat bait, 61 days, leg. Endrödy-Younga (TMSA); 1 ♂ and 4 ♀: Verlorevlei farm Farm, 32° 19' S 18° 22' E, 28.VIII.1981, groundtraps with faeces bait, 60 days, leg. Endrödy-Younga (TMSA) (fig. 58b); 1 ♀ with from the same locality but collected in sandy hill during day (TMSA); 9 ♂ and 3 ♀: 6 km NE of Elandsbaai, 32° 17' S 18° 24' E, 6-10.IX.2003, Frolov and Deschodt leg. (2 ♂ in UPSA, 2 ♂ and 1 ♀ in TMSA, 1 ♂ and 1 ♀ in SANC, 1 ♂ in

SAMC, 1 ♂ and 1 ♀ in ZIN, 1 ♂ in MNHN, 1 ♂ in BMNH) (fig. 58f); 3 ♂ and 2 ♀: 4 km S of Trawal, 31° 55' S 18° 38' E, 6-10.IX.2003, Frolov and Deschodt leg. (1 ♂ and 1 ♀ in UPSA, 2 ♂ and 1 ♀ in TMSA); 8 ♂ and 15 ♀: Kliphoeck, 31°50'S 18° 20' E, 6-10.IX.2003, Frolov and Deschodt leg. (1 ♂ and 2 ♀ in UPSA, 1 ♂ and 4 ♀ in TMSA, 1 ♂ and 2 ♀ in SANC, 2 ♂ and 2 ♀ in ZIN, 1 ♂ and 2 ♀ in MNHN, 1 ♂ and 1 ♀ in BMNH, 1 ♂ and 1 ♀ in CMN) (fig. 58e, g); 1 ♀: Aurora, 32° 42' S 18° 29' E, 6-10.IX.2003, Frolov and Deschodt leg. (UPSA).

Etymology – The species is named for Sebastian Endrödy-Younga who headed the Coleoptera section of the Transvaal Museum for many years and collected vast amount of scarab beetles during his numerous expeditions throughout South Africa.

Macroderes namakwanus n. sp.

(fig. 8, 16, 24, 59, 73, 78)

Diagnosis – This species is very similar to *M. endroedyi* n. sp. but can be separated from it in having the base of the pronotum with denser, regular punctures and without distinct tubercles in-between (fig. 8, 16), elytral intervals less shagreened, without distinct shiny tubercles (fig. 24), and less curved basal part of internal sac of aedeagus (fig. 59).

Description – Holotype ♂ (fig. 73). Body length 11.5 mm, width 8.0 mm.

Clypeus wide, semicircular, bordered, with two small angles on anterior margin, sinuate between the angles. Genae right-angled. Frontal suture distinct, keel-shaped, slightly curved, not tuberculate. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, anterior part rugose. Punctuation of frons sparser with punctures separated by about a puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base without longitudinal depression in middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral margins punctate, crenulate in dorsal view. Base of pronotum densely, regularly punctate with punctures somewhat elevated in the middle, without distinct tubercles. Base appears punctate but not granular under dissecting microscope.

Elytra relatively sparsely punctate (punctures separated by 3-5 puncture diameters on disc), less shagreened than in the previous species, without distinct smooth tubercles. Elytral intervals 1-8 slightly convex. Striae punctate with large punctures separated by 1.5 puncture diameters on disc. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus with almost straight basal part and small medial process.

Paratypes. Body size of males: length 10.5-12.5 mm, width 7.0-8.2 mm; females: length 11.5-12.0 mm, width 8.0-8.1 mm.

Except for body size variation, the specimens examined are very similar.

Distribution – The species is distributed mostly in the Namaqualand with one specimen collected in southern Richtersveld (fig. 78).

Type material – Holotype ♂ with labels “RSA, Western Cape Prov., Hoekbaai, Frolov & Deschodt leg.”, and “AF-0039(19), 4-11.IX.2003, S 31° 09' 26.07'' E 0 17° 45' 55.70''' (TMSA). Paratypes, 7 specimens: ♂ and ♀ with the same data (♂ in ZIN, ♀ in UPSA); 1 ♂: Namaqualand, Rooidam farm, 31° 04' S 17° 48' E, 26.VIII.1979, yellow sand, day, leg. Endrödy-Younga leg. (UPSA) (fig. 59d); 1 ♂: Namaqualand, Brakriver Mouth, 31° 06' S 17° 44' E, 25.VIII.1979, groundtraps with faeces bait, 63 days, Endrödy-Younga leg. (TMSA) (fig. 59b); 1 ♂: Namaqualand, 2 km ENE of Hoekbaai, 31° 11' S 17° 47' E, 27.VIII.1979, white sand, night, Endrödy-Younga leg. (TMSA); 1 ♂: Namaqualand, Kotzesrus, 30° 57' S 17° 50' E, 23.VIII.1979, white dune, day, Endrödy-Younga leg. (TMSA) (fig. 59a); 1 ♀: Richtersveld, Klein Helskloof, 28° 51' S 17° 24' E, 8.IX.1976; groundtraps with faeces bait, 32 days, Endrödy-Younga leg. (TMSA).

Etymology – The name of the species is derived from the Namaqualand.

Macroderes greeni (Kirby)

(fig. 28, 31, 36, 61, 76, 78)

Onthophagus greeni Kirby 1818:

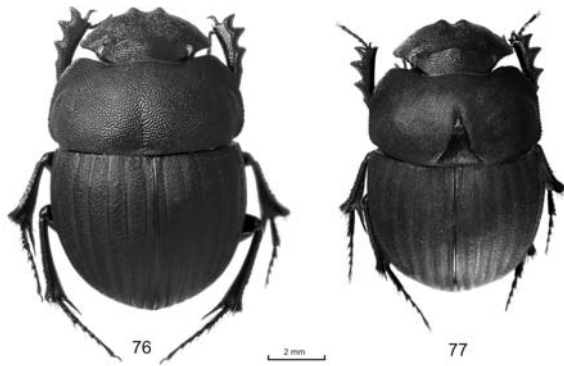
M. greeni (Kirby): Westwood 1847: 228; Preudhomme de Borre 1880: 9; Péringuey 1900: 298; Janssens 1939: 27; Ferreira 1969: 320.

Diagnosis – This species is similar to *M. arrowi*, *M. foveatus* n. sp. and *M. cornutus* n. sp. in having elytral intervals with punctures with slightly carinate margins (fig. 36), but can be separated from them in having pronotum regularly punctate with round punctures (fig. 31) as opposed to being granular in the former species and punctate with very elongated punctures in the two latter species. From the two latter species it also differs in having the pronotum without a deep concavity at the base (fig. 28).

Description – Body size: length 9.8-11.8 mm, width 6.3-8.0 mm.

Clypeus very wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae acute-angled, strongly protruding past eyes. Frontal suture distinct, keel-shaped, slightly curved. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, sometimes rugose, anterior part often transversely carinate. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base with longitudinal depres-



Figures 76-77

Macroderes spp., habitus (76 – *M. greeni*; 77 – *M. foveatus* n. sp.).

sion. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral margins crenulate in dorsal view. Dorsal surface of pronotum with rounded, regular punctures, slightly convex in the middle (fig. 28, 31).

Elytra. Elytral intervals 1-8 almost flat, densely punctate (punctures separated by 1-2 puncture diameters on disc), margins of punctures carinate, shagreened between punctures, with small smooth tubercles (fig. 36). Striae punctate with large punctures separated by 1.5 puncture diameters on disc. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus slender and curved, without medial process (fig. 61).

Variability – Except for body size variation indicated above, the specimens examined are very similar.

Distribution – This species is known from a few localities on the south-western coast of South Africa from Saldanha Bay in the north-west to Cape Agulhas in the south-east (fig. 78).

Type material examined – Holotype ♂ [no locality data] with labels: “Type”, “63 40”, and “(59) greeni” (BMNH).

Additional material examined – 3 ♀: Struisbaai, 34° 46' S 20° 03' E, Endrödy-Younga and Penrith leg., 28.VIII.1983, (TMSA); 1 ♂: Abrahamskraal farm, 33° 14' S 18° 09' E, Endrödy-Younga and Penrith leg., 25.VIII.1983, (TMSA) (fig. 61b); Langebaan, 12 km SE farm Geelbek, [33° 12' S 18° 08' E], Davis and Payton leg., 30.V.1979, 1 ♀, 26.VI.1979, 1 ♀, 6.VII.1979, 1 ♀, 23.VII.1979, 1 ♀, 13.VIII.1979, 3 ♀, 29.X.1979, 1 ♀ (SANC); 2 ♂ and 6 ♀: Modderivier Farm, 33° 28' S 18° 20' E, Davis leg., 29.VI.1987 (UPSA); 1 ♂: Saldanha Bay [33° 5' S 18° 01' E], (SAMC); road Mamre-Mamlesbury, VIII.1938, 2 ♂ (fig. 61d), IX.1938, 1 ♀ (SAMC); 1 ♂: no locality data (SAMC); 1 ♂: “South Africa” (BMNH); 2 ♂ and 1 ♀ (fig. 61a): no locality data (BMNH); 1 ♂ and 2 ♀: “Caffraria” (ZMHB) (fig. 61c); 2 ♀: “Cape of Good Hope” (ZMHB); 3 ♀: “South Africa, Cape” (IRSNB).

Macroderes arrowi Janssens

(fig. 26, 32, 35, 49, 60, 74, 78)

M. arrowi Janssens 1939: 26; Ferreira 1969: 320.

Diagnosis – This species is similar to *M. greeni*, *M. foveatus* n. sp. and *M. cornutus* n. sp. in having elytral intervals with punctures with slightly carinate margins, but can be separated from them in having pronotum granular (fig. 26, 32) as opposed to being punctate with round punctures in *M. greeni* and punctate with very elongated punctures in *M. foveatus* sp.n. From the two later species it also differs in having the pronotum without a concavity on the base.

Description – Body size of males: length 9.0-11.5 mm, width 8.0-6.5 mm; females: length 9.5-11.0 mm, width 6.2-7.8 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled, strongly protruding past eyes. Frontal suture distinct, keel-shaped, slightly curved. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, sometimes rugose, anterior part often transversely carinate. Punctuation of frons sparser with punctures separated by about a puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base without longitudinal depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate, margins crenulate in dorsal view. Dorsal surface of pronotum granular, with a small, irregular puncture next to each granule (fig. 32).

Elytra. Elytral intervals 1-8 almost flat, densely punctate (punctures separated by 1-2 puncture diameters on disc), margins of punctures carinate, shagreened in-between punctures, with small smooth tubercles (fig. 35). Striae punctate with large punctures separated by 1.5 puncture diameters on disc. Stria 9 short, 2/3 the length of elytron; interval 10 2 to 3 times as wide as interval 9 in middle.

Sclerite of internal sac of the aedeagus almost straight, with small medial process (fig. 60).

Variability – Larger males have the pronotum more excavated laterally.

Distribution – This species is known only from vicinity of Vanrhynsdorp, Western Cape Province (fig. 78).

Type material examined – Holotype ♂ with labels “♂” [p], “Coll. R.I.Sc.N.B, South Africa [p], Cape Prov. [h], v Rhynsdorp [Vanrhynsdorp; 31° 37' S 18° 44' E], July-Aug. [19]27, G. v. Son [leg.] [h]”, *Macroderes*, *Greeni* Kirby [h], G.J. Arrow det. [p], J.J. Gillet det., vend.: [p], *Macroderes*, *Greeni* Kirby [hw], R.M.H.N. Belg. 10.640 [p], “A. Janssens det., 1939: [p], *Macroderes*, *Arrowi* nov. ♂, Type [h]”, “cf. Expl. P.N.A., G.F. de Witte (1933-1935), fasc. 29, 1939, p. 26” [p], and “Type” [p] (IRSNB) (fig. 60a).

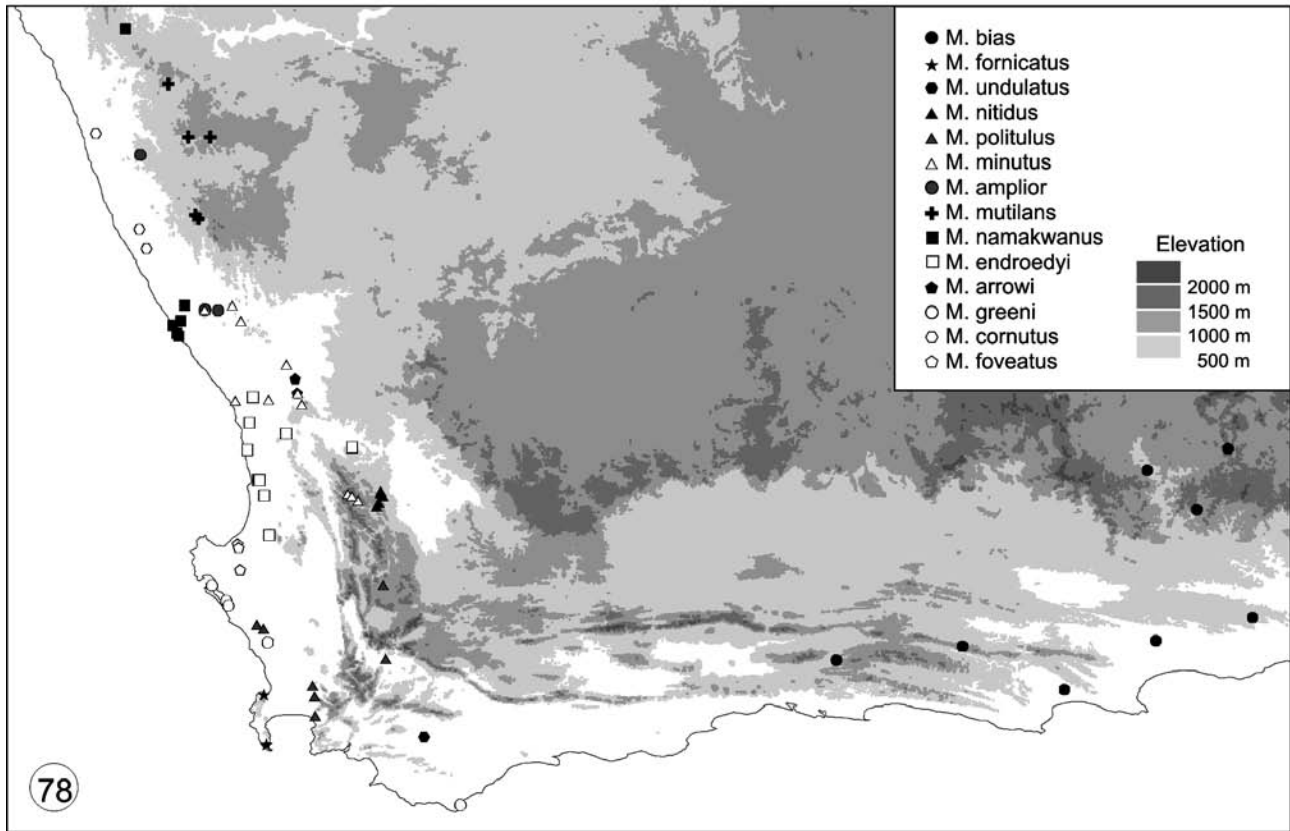


Figure 78
Distribution map of species.

Additional material examined – 5 ♂ and 6 ♀: 11 km N of Vanrhynsdorp, 31° 30' S 18° 43' E, 5-11.IX.2003, Frolov and Deschodt leg. (1 ♂ and 2 ♀ UPSA, 1 ♂ and 1 ♀ in TMSA, 1 ♂ and 1 ♀ in ZIN, 1 ♂ and 1 ♀ in MNHN, 1 ♂ and 1 ♀ in BMNH) (fig. 60b, c).

Macroderes foveatus n. sp.
(fig. 27, 33, 37, 43, 45, 47, 62, 77, 78)

Diagnosis – This species is similar to *M. cornutus* n. sp. in having the base of pronotum with very deep triangular concavity (fig. 27), but can be separated from it in having frontal suture without rounded tubercle (fig. 43, 45), irregular, less elongated punctures on sides of pronotum (fig. 47), denser and larger punctures on elytral intervals (fig. 37), internal sac sclerite with small but distinct lateral process (fig. 62), and smaller average size.

Description – Holotype ♂ (fig. 77). Body length 9.2 mm, width 6.3 mm.

Clypeus very wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae acute-angled, strongly protruding past eyes. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, somewhat rugose. Punctuation of frons sparser with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base with very deep triangular concavity occupying more than 3/5 the length of pronotum. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate, margins crenulate in dorsal view. Disc of pronotum with elongated punctures becoming shorter and irregular towards anterior and lateral margins.

Elytra with sculpture similar to that of *M. greeni*, *M. arrowi* and *M. cornutus* n. sp. but punctures larger and denser. Elytral intervals 1-8 almost flat, densely punctate (punctures separated by 1-1.5 puncture diameters on disc), margins of punctures carinate, shagreened in-between punctures, with small smooth tubercles. Striae punctate with large punctures separated by 1.5 punctures.



Figures 79-80
Natural habitat of *Macroderes* species in South Africa. 79 – Northern Cape Province, vicinity of Wallekraal, habitat of *M. cornutus* n. sp.; 80 – Western Cape Province, vicinity of Rietpoort, habitat of *M. amplior* n. sp.

ture diameters on disc. Stria 9 short, 2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus with strongly curved, acute apex and small medial process (fig. 62a).

Paratypes. Body size of male: length 9.5 mm, width 6.0; females: length 8.6-10.0 mm, width 5.5-6.1 mm. Except for body size examined specimens are very similar.

Distribution – This species is known from a few localities in vicinity of Veldrif (Western Cape Province) (fig. 78).

Type material – Holotype ♂ with labels “S. Afr., 3 km E of Veldrif, 32° 46' S 18° 14' E”, “31.8.1981, E-Y:1870, ground-traps, 59 days, leg. Endrödy-Younga”, and “groundtrap with meat bait” (TMSA) (fig. 62a). Paratypes, 1 ♂ and 7 ♀: 4 ♀ with the same data as the holotype (1 in TMSA, 1 in UPSA, 1 in BMNH, 1 in MNHN); 1 ♂ and 1 ♀: 3 km E of Veldrif, 32° 47' S 18° 14' E, Frolov and Deschodt leg. (ZIN) (fig. 62b); 1 ♀: Brackfontein farm, 32° 58' S 18° 15' E, 23.VIII.1979, ground-

trap with faeces bait, 72 days, Endrödy-Younga leg. (TMSA); 1 ♀: Brackfontein farm, 32° 58' S 18° 15' E, ground traps with meat bait, 72 days, 23.VIII.1979, Endrödy-Younga and Penrith leg. (TMSA).

Additional material examined – 1 ♂: Namaqualand, 20 km E of Soutpan, 31° 15' S 17° 32' E, cattle dung, 31.VII.1989, Endrödy-Younga and Klimaszewsky leg. (TMSA); Namaqualand, Koekenaap, hill dunes, ground traps with meat bait, 23.IX.1994, Endrödy-Younga and Bellamy leg., 1 ♀, red dunes, 30.VIII.1979, 1 ♂, Endrödy-Younga leg. (TMSA).

The specimens from Soutpan and Koekenaap, not included in the type series, differ from the type of *M. foveatus* n. sp. in having internal sac sclerite with very wide base and somewhat granular sides of pronotum. Shape of head is similar to the type, though, and differ from that of *M. cornutus* n. sp. It is possible that these specimens belong to yet another species but the material available to us is insufficient to clarify their taxonomic status.

***Macroderes cornutus* n. sp.**
(fig. 29, 38, 44, 46, 48, 63, 75, 78, 79)

Diagnosis – This species is similar to *M. foveatus* n. sp. in having the base of pronotum with very deep triangular concavity, but can be separated from it in having a distinct rounded tubercle in the middle of frontal suture (fig. 44, 46), elongated punctures on pronotum (fig. 48), sparser and smaller punctures on elytral intervals (fig. 38), internal sac sclerite without lateral process (fig. 63), and larger average size.

Description – Holotype ♂ (fig. 75). Body length 10.5 mm, width 7.0 mm.

Clypeus very wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae acute-angled, strongly protruding past eyes. Frontal suture distinct, keel-shaped, slightly curved, with distinct tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, somewhat rugose. Punctuation of frons sparser with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, with rounded lateral margins, about 2 times wider than long. Base with very deep triangular concavity occupying more than 1/2 the length of pronotum. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate, margins crenulate in dorsal view. Dorsal surface of pronotum with very elongated punctures becoming shorter towards anterior margin.

Elytra with sculpture similar to that of *M. greeni* and *M. arrowi*. Elytral intervals 1-8 almost flat, densely punctate (punctures separated by 1.5-3 puncture diameters on disc), margins of punctures carinate, shagreened in-between punctures, with small smooth tubercles. Striae punctate with large punctures separated by 1.5 puncture diameters on disc. Stria 9 short,

2/3 the length of elytron; interval 10 twice as wide as interval 9 on disc.

Sclerite of internal sac of the aedeagus with strongly curved, acute apex, without medial process (fig. 63c).

Paratypes. Body size of males: length 10.8–11.5 mm, width 7.2–7.9 mm; females: length 10.1–11.5 mm, width 6.8–7.6 mm. Except for body size examined specimens are very similar.

Distribution – This species is known from coastal area of the Namaqualand (fig. 78, 79).

Type material – Holotype ♂ with labels “S. Afr. Namaqualand, Sand Kop 322, 29° 38' 31" S 17° 08' 53" E, 19.VIII.1996, leg. J. du G. Harrison” [p] and “Univ. Pret. Zoo&Ento., J. du G. Harrison 1996, Site 62 no a, vegetated dune, nr, k. bush rat nest” (TMSA) (fig. 63a). Paratypes: 1 ♂ (fig. 63d) and 3 ♀ with the same date as the holotype; 7 ♂: 3 km W of Wallekraal, 30° 22' S 17° 28' E, Frolov and Deschodt leg. (1 in SANC, 1 in ZIN, 1 in MNHN, 1 in BMNH, 3 in UPSA) (fig. 63b, c, d); 1 ♀: Strandfontein farm, 30° 33' S 17° 22' E, dunes, 2.IX.1977, Endrödy-Younga leg. (TMSA).

Macroderes pristinus Sharp

M. pristinus Sharp 1880: 38; Péringuey 1901: 304; Janssens 1939: 29; Ferreira 1969: 322.

Type material examined – Holotype ♀ with labels “♀, *Macroderes pristinus*, Type D[avid]. S[harp]., Diamond field, S[outh] Africa” [handwritten on the card with the specimen], “Ex. Musaeo, D. Sharp 1890” [p], “Museum Paris, 1952, Coll. R. Oberthür” [p], and “Holotype” [p] (MNHN).

Diagnosis – The specimen is very similar to known females of *M. bias* differing mostly in having flat densely punctate not shagreened elytral intervals.

Description – Holotype, female.

Body size: length 10.5 mm, width 7.0 mm.

Clypeus wide, semicircular, with border and two small angles on anterior margin, sinuate between the angles. Genae right-angled to obtuse. Frontal suture distinct, keel-shaped, slightly curved, without tubercle in the middle. Genal sutures distinct proximally, becoming very faint and indistinct towards clypeal margin. Dorsal surface of clypeus very densely punctate, somewhat rugose. Punctuation of frons sparser, with punctures separated by about one puncture diameter.

Pronotum convex, trapezoidal, distinctly excavated antero-laterally, with rounded lateral margins, about 2 times wider than long. Base without depression in the middle. Anterior angles obtuse, posterior angles rounded, unclear in dorsal view. Lateral and anterior margins with very fine border, base not bordered. Lateral border punctate. Dorsal surface with round, regular punctures separated by 1.5–3 puncture diameters on base.

Elytra. Elytral intervals 1–8 shagreened, matte, densely punctate (punctures separated by 1–2 puncture diameters on disc), margins of punctures not carinate. Striae punctate with large punctures separated by 2–4 puncture diameters. Stria 9 short, 2/3 the length of elytron, close to stria 10.

Remark – The only specimen available, the holotype, is not sufficient to specify the status of this form bearing in mind considerable variability of *M. bias*. It is possible that the specimen was mislabeled and actually originated from the Eastern Cape Province of South Africa. *M. pristinus* is therefore not included in the key to species.

Nomina dubia

Macroderes spectabilis Péringuey

M. spectabilis Péringuey 1901: 300; Janssens 1939: 27; Ferreira 1969: 322.

The species was described from a single female from “Cape Colony” but no additional specimens were found since then and all the following authors cited the Péringuey’s description. The type is absent from the South African Museum and apparently lost. The characters of the species mentioned in the original description suggest that it might be an aberrant specimen of *M. bias*. The description, although brief, corresponds well to the examined specimens of *M. bias* except for two characters indicated as diagnostic for *M. spectabilis*, namely “retuse prothorax which is almost lobate in front” and absence of elytral stria 9. The former character suggests that the specimen could be missexed since the retuse pronotum, excavated antero-laterally is characteristic for large males of a few *Macroderes* species, especially *M. bias*, but not found in females. Elytral stria 9 is very close to stria 10 in *M. bias* and it might be still closer to, or inseparable from in the exemplar Péringuey’s description was based on.

Macroderes dubius Péringuey

M. dubius Péringuey 1901: 301; Janssens 1939: 29; Ferreira 1969: 320.

As the previous species, *M. dubius* was described from a single female from “Cape Colony”. In the original description, Péringuey compared the new species with *M. politulus* and wrote that the two species were similar in shape, size and colour. The only difference between them was the shape of elytral intervals: those of the new species were flat and “the striate part sharply costate” whereas those in *M. politulus* were convex and sub-rectiform. Péringuey (1901: 302) however noted that “peculiar form of the intervals of the elytra may be caused by malformation” and the name given to the species suggests that the author was not sure about validity of this species.

We were unable to trace the type of this species but we examined a specimen with slightly concave elytral intervals, identified by Janssens as *M. dubius* and deposited in IRSNB, which is otherwise very similar to *M. bias*.

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REFERENCES

- FERREIRA M. 1969 – Os escarabídeos de Africa (Sul do Sáara), I. – *Revista de Entomologia de Moçambique*, **11**, 5-1088.
- GÉNIER F. 1996 – A revision of Neotropical genus *Ontherus* Erichson (Coleoptera: Scarabaeidae: Scarabaeinae). – *Memoirs of the Entomological Society of Canada*, **170**, 1–169.
- GILLET J.J.E. 1911. Pars 38. Scarabaeidae: Coprinae I. In: S. Schenkling (ed.), *Coleopterorum Catalogus*. W. Junk, Berlin, p. 1-100.
- HAROLD E., VON. 1877 – *Coleopterorum species novae*. – *Mitt. muench. ent. Ver.*, **1**, 97-111.
- JANSSENS A. 1939 – Coprini. – *Exploration du Parc National Albert. Mission G. F. de Witte*, **29**, 1-104.
- KIRBY W. 1818 – A century of insects, including several new genera described from his cabinet. – *Transactions of Linnean Society of London*, **12**, 375-453.
- KOLBE H. J. 1908 – Dynastidae, Cetoniidae, Scarabaeidae. – *Denkschr. med. naturw. Ges. Jena*, **13**, 121-132.
- LACORDAIRE J. T. 1856 – *Historie naturelle des insectes. Genera des Coléoptères appartenant au exposé méthodique et tous les genres proposés jusqu'ici dans cet ordre d'insectes. Tome III. Contenant les Familles des Pectinicornes et Lamellicornes*. Roret, Paris.
- MONTREUIL O. 1998 – Analyse phylogénétique et paraphylie des Coprini et Dichotomiini (Coleoptera, Scarabaeidae), Scenario biogéographique. – *Annales de la Societe Entomologique de France (N.S.)*, **34** (2): 135-148.
- OLIVIER A.G. 1789 – *Entomologie, ou Histoire Naturelle des Insectes, ... Coléoptères*. Paris, **1** (3): 236.
- PÉRINGUEY L. 1901 – Descriptive Catalogue of the Coleoptera of South Africa. – *Transactions of South African philosophical Society*, **12**, 1-920.
- PÉRINGUEY L. 1908 – Descriptive Catalogue of the Coleoptera of South Africa, Additions and Corrections. – *Transactions of South African philosophical Society*, **13**, 1-563.
- PREUDHOMME DE BORRE A. 1880 - Note sur le genre *Macroderes* Westwood. – *Annales de la Societe Entomologique de Belge*, **23**, 7-11.
- SHARP D. 1880 – Sur quelques espèces du genre *Macroderes*. – *Annales de la Societe Entomologique de Belge*, **23**, 36-39.
- WESTWOOD J. O. 1842 – Descriptions of some new exotic genera belonging to the family of the sacred beetles. – *Proceedings of the Royal entomological Society of London*, 59.
- WESTWOOD J. O. 1847 – Characters of various new groups and species among the coprophagous lamellicorn beetles. – *Transactions of entomological Society of London*, **4**: 225-243.

