

RESEARCH PAPER

Review of the genera *Elaphinis* and *Parelaphinis* (Coleoptera: Scarabaeidae: Cetoniinae) with description of three new species from South Africa

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Abstract. The cetoniine genera *Elaphinis* Burmeister, 1842 and *Parelaphinis* Marais & Holm, 1989 are reviewed in the light of substantial new material that has become available recently. A new species, *E. matatiele* sp. nov., in the previously monotypic subgenus *Elaphinis* s. str. and closely related to *E. (E.) cinereonebulosa* (De Geer, 1778), is described from the southern Drakensberg area near Matatiele (Eastern Cape, South Africa). Within *Parelaphinis*, two new species, *P. umtamvuna* sp. nov. and *P. drakensbergica* sp. nov. are described and compared with *P. moesta* (Gory & Percheron, 1833) – hitherto the only member of the genus. The former is a mid- to lowland dweller, currently known only from the KwaZulu-Natal side of the Umtamvuna River valley (South Africa). The latter is a montane species apparently distributed across the eastern portion of the Drakensberg Escarpment, from the north-eastern Free State (South Africa) to eSwatini (formerly Swaziland). A review of the enigmatic species *E. (Micrelaphinis) pumila* Boheman, 1857, also presumably originating from the same broader region, reveals that only five specimens, three of which belong to the type series, are currently still traceable to accessible collections, while no further specimens have been found since the 19th century. It is here established that the type series collected by Wahlberg during the period 1838–1845 most likely originated from the Orange River valley, either in the Eastern Cape, Free State or Lesotho. As this area has been extensively transformed by agricultural and mining activities, as well as human settlements, it is hypothesized that the species may already be extinct. All the species analysed in detail are illustrated, and dichotomic keys to all species of both genera are provided to facilitate their identification.

Key words. Coleoptera, Scarabaeidae, Cetoniini, new species, Southern Africa, Afrotropical Region

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Introduction

Consistently regarded as a member of the Cetoniina in all the major recent studies (KRIKKEN 1984, HOLM & MARAIS 1992, KRAJČÍK 1998, SAKAI & NAGAI 1998, BEINHUNDNER 2017), the genus *Elaphinis* Burmeister, 1842 has nevertheless undergone some rearrangements and revisions, with the latest involving the consolidation of *Elaphinis* and *Micrelaphinis* Schoch, 1896 into a single genus and the erection of *Parelaphinis* Marais & Holm, 1989 as a separate genus (MARAIS & HOLM 1989). While the morphological differences between the two subgenera are minor indeed,

and mainly based on the bending angle of their tarsal claws and the presence or absence of a minute obtuse projection from the posterior pronotal margin over the scutellum (MARAIS & HOLM 1989), their biological divergence is more substantial. *Elaphinis* s. str. inhabits semi-arid areas with grassland, larvae develop in herbivore dung and adults do not feed. However, *Micrelaphinis* occurs in a much wider variety of habitats, has a large distributional area and adults feed on flowers and ripe fruits (see Discussion section below). On the other hand, the morphological differences between the two sister genera involve a whole



suite of characters, ranging from the absence of pronotal tubercle, the presence of tridentate protibiae, acute scutellar apex, broader body habitus and ventrodistal setation on parameres in *Parelaphinis* by comparison with *Elaphinis* s. lat. (MARAIS & HOLM 1989, 1992).

Following the major synonymization of names undertaken by various authors during the last century, the genus *Elaphinis* now encompasses six species, one in the nominotypical subgenus and five in *Micrelaphinis* (MARAIS & HOLM 1992, HOLM & MARAIS 1992, KRAJČÍK 1998, BEINHUNDNER 2017). The genus *Parelaphinis*, on the other hand, has so far included only one species, *P. moesta* (Gory & Percheron, 1833). In the latest revision of the species, however, HOLM & PERISSINOTTO (2004) had already highlighted the extreme variation in a number of characters across its rather vast and ecologically diverse distribution range. The cautious approach adopted on that occasion was to retain the monospecific status until further evidence was gathered in support of its subdivision into multiple taxa.

In the light of new and recent discoveries and collections, as well the re-analysis of some of the older specimens, it has now become apparent that the genus comprises at least three different species, with two new species described here from the wetter, eastern part of South Africa. A new species of *Elaphinis* s. str. has also been discovered recently in the same broader region and its description is also provided here, along with a critical revision of the rather enigmatic *E. (M.) pumila*, which has only been recorded twice again in the early 1900s since its type specimens were collected in the mid 1800s.

Material and methods

Observations and collections of recent specimens were undertaken throughout the southern African region during the period 1993–2018. On each occasion, searches were conducted by direct inspection of the ground and flowering plants, while fruit-baited cylindrical traps were deployed in selected area, whenever the duration of the visit was long enough to result in meaningful trapping. However, none of the species dealt in detail within this work was ever retrieved from these baited cylinders, regardless of the height above the ground to which they were deployed. Most specimens were actually found crawling on the soil surface immediately after rain, or underground, often still inside their cocoons in various stages of development. Cocoons were generally taken back to a laboratory or controlled facility, where they were reared to maturity and adult emergence using standard procedures with minimal manipulation. On rare occasions, specimens were also netted in flight using standard entomological nets, or picked from flowering herbs and shrubs, on which they were apparently feeding (cf. MALEC & ŠÍPEK 2016). A few specimens were also retrieved by hand after drowning in farm troughs and dams, or even just dead on the ground. In all cases, when specimens were selected for in-depth analysis they were immediately preserved with ethyl acetate

fumes and subsequently set and dried in the laboratory or preserved in a frozen state.

Specimens repositied in old collections were generally analysed using photographic material provided by the various curators. Similarly, all data accompanying each specimen, along with complementary information and observations, were obtained from a variety of public museums and private collectors, regarded as key holders of material of interest. Further information was also obtained from literature sources such as MARAIS & HOLM (1989), HOLM & MARAIS (1992), HOLM & STOBIA (1995), HOLM & PERISSINOTTO (2004), MALEC & ŠÍPEK (2016, 2017) and BEINHUNDNER (2017). Data records are accompanied by the number and sex of individuals in front of each entry only when provided by the collection owners or curators, otherwise such details are omitted and only a generalized reference to unspecified number (n) of individuals (inds.) is given.

The usual Cetoniinae terminology used by KRIKKE (1984) and HOLM & MARAIS (1992) is followed in this study in the description of specimen morphological characters. Specimen total length (TL) and maximum width (MW) were measured using a Vernier calliper, from the anterior margin of the clypeus to the apex of the pygidium and at the widest point of the elytra, respectively. Photos of specimen dorsal and ventral habitus were taken with a Nikon CoolPix S9700 digital camera with macro setting, while photos of the male genitalia were obtained using a Nikon DigitalSight DS-Fi2 camera attached to a Nikon SMZ25 dissecting microscope. Where necessary, the background was removed from the photos using Microsoft Word 2010 (Picture Tools), in order to increase clarity of resolution. The Combine ZP Image Stacking Software by Alan Hadley (alan@micropics.org.uk) was used to obtain z-stacking composite images.

Specimen repositories are abbreviated as follows:

BMNH	Natural History Museum, London, United Kingdom;
BMCS	Jonathan Ball and Andre Marais private collection, Cape Town, South Africa;
DNSM	Durban Natural Science Museum, Durban, South Africa;
EPBS	Ernest Pringle private collection, Bedford, South Africa;
GBEG	Gerhard Beinhundner private collection, Euerbach, Germany;
ISAM	Iziko South African Museum, Cape Town, South Africa;
MHNG	Muséum d'Histoire Naturelle, Geneva, Switzerland;
MZLU	Biologiska museet, Lunds Universitet, Lund, Sweden;
NHRS	Naturhistoriska riksmuseet, Stockholm, Sweden;
NMPC	Národní muzeum, Prague, Czech Republic;
OKPC	Ondřej Kouklík private collection, Prague, Czech Republic;
PMBC	Petr Malec private collection, Brno, Czech Republic;
RBINS	Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium;
RMNH	Naturalis Biodiversity Center, Leiden, The Netherlands;
RPGS	Renzo Perissinotto, research material, Gqeberha, South Africa;
SANC	South African National Collection of Insects, Pretoria, South Africa;
TGMF	Thierry Garnier private collection, Montpellier, France;
TMSA	Ditsong National Museum of Natural History (formerly Transvaal Museum), Pretoria, South Africa;
UKPC	Univerzita Karlova, Katedra Zoologie, Prague, Czech Republic;
ZMHB	Leibniz Institut für Evolutions und Biodiversitätsforschung an der Humboldt Universität, Berlin, Germany;
ZMUC	Zoologisk Museum, Københavns Universitet, Copenhagen, Denmark.

Additional abbreviations used in the text are: EC = Eastern Cape Province; FS = Free State Province; GP = Gauteng Province; LP = Limpopo Province; MP = Mpumalanga Province; NC = Northern Cape Province; NW = North-West Province; WC = Western Cape Province; ZN = KwaZulu-Natal Province; N = northern; S = southern.

Taxonomy

Genus *Elaphinis* Burmeister, 1842

Subgenus *Elaphinis* (*Elaphinis*) Burmeister, 1842

Elaphinis Burmeister, 1842: 595. Type species: *Cetonia cinerascens* Fabricius, 1798 (by designation of MARAIS & HOLM 1989: 19).

Elaphinis: LACORDAIRE (1856): 526; SCHÖCH (1894): 214; SCHÖCH (1895): 100, 107; SCHÖCH (1897): 47; PÉRINGUEY (1907): 324, 371, 446; PÉRINGUEY (1908): 684; SCHENKLING (1921): 303; SCHEIN (1960): 98; KRIKKEEN (1984): 58; MARAIS & HOLM (1989): 11; ANTOINE (1991): 1; HOLM & MARAIS (1992): 175; KRAJČÍK (1998): 52; SAKAI & NAGAI (1998): 306; BEINHUNDNER (2017): 86.

Included species: *Elaphinis* (*E.*) *cinereonebulosa* (De Geer, 1778); *E.* (*E.*) *matatiele* sp. nov.

Elaphinis (*Elaphinis*) *matatiele* sp. nov.

(Figs 1–9, 19)

Type material. HOLOTYPE: ♂, South Africa, EC, Matatiele, 7 Dec 2008, R Perissinotto & L Clennell (ISAM). PARATYPES: 11 ♂♂ 1 ♀, same data (BMCS, RPGS); 1 ♂ 1 ♀, RSA, Eastern Cape, Alfred Nzo District (Matatiele Municipality), Matatiele Nature Reserve, 1900 - 2100 m, 1 Jan 2017, P. Malec & P. Šípek leg. (PMBC, UKPC); 1 ♂, same locality, Bred from wild larvae, P. Malec breeding (PMBC); 58 ♂♂ 3 ♀♀, same locality, 6 Dec 2019, P. Šípek, M. Hříman, O. Kouklík leg. (NMPC, OKPC, PMBC, UKPC); 3 ♀♀, same locality, Dec 2019, P. Šípek leg., ex ovum, P. Malec Breed F1 (PMBC).

Description of holotype male (Figs 1–8). *Body.* Black and matte, with head, pronotum and scutellum predominantly black but elytra extensively covered in white-greyish (often discolouring to pink or even brick-red in preserved specimens) tomentum, except on periscutellar, perisutural and postero-lateral regions; with regularly spaced round sculpture on head and apical part of pronotum (around tubercular ridge), becoming minute and very scattered on the pronotal disc, scutellum and elytra; with dense and long, pale-yellow to tawny setae on entire head surface, becoming shorter, more scale-like in shape and scattered on pronotal declivities and mesepimera, and virtually disappearing on pronotal disc, elytra and scutellum (Figs 1–4).

Size. Total length = 11.9 mm; maximum width = 6.1 mm.

Head. Entirely black and concave; clypeus broadly bilobate, with angulate indentation at apex and lateral margins smoothly rounded; all margins sharply upturned, especially in apical region around indentation; entire surface covered in round to coarsely irregular sculpture; pale-yellow to tawny setae distributed along entire surface, generally shorter and more scattered on clypeus and frons, becoming much longer and denser on vertex; antenna dark brown to black, with club approximately as long as flagellum and pedicel combined; thin light setae scattered across flagellum, becoming thicker and denser on pedicel (Fig. 4).

Pronotum. Black and matte, with white-greyish tomentose ornamentation along lateral margins spreading towards

declivities on posterior half and generating two short converging lines in suprascutellar area; with tubercular ridge in central apical area exhibiting dense round punctures on declivities; punctures becoming smaller and more scattered along lateral margins and declivities but minute on disc; short scale-like setae distributed along lateral margins and declivities, becoming minute on disc; shape smoothly rounded along lateral and posterior margins, with very weak obtuse angle above scutellum; antero-lateral margins abruptly angulate, leading to steep declivity up the apical tubercle (Figs 1, 3).

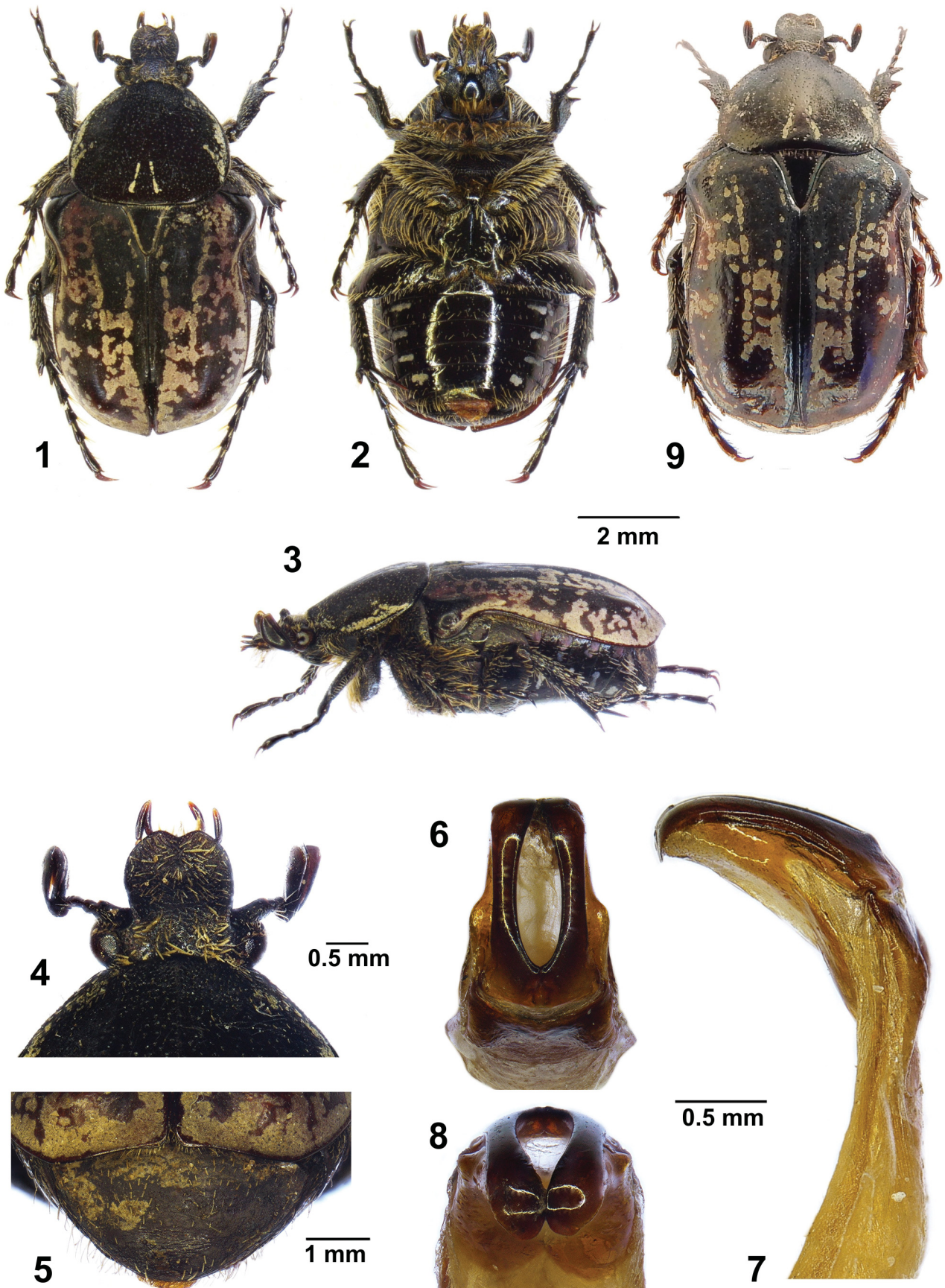
Scutellum. Black, matte and glabrous, with tomentose lining around lateral and apical margins; few, shallow round to crescent or irregularly shaped punctures along basal and part of lateral margins, inwards of tomentose lining; broadly isoscelic triangular in shape with smoothly round apex; lateral grooves very narrow and shallow, deepening somehow around apex (Fig. 1).

Elytron. Black and matte, with shiny patches in umbonal areas; with intricate white-greyish (often discolouring to pink or even brick-red in preserved specimens) ornamentation of maculae and dotted stripes across entire surface, excluding umbonal, periscutellar, perisutural and posterolateral areas; black areas on elytral disc producing symmetric figure in shape of inverse anchor when both elytra are combined; costae obsolete to weakly elevated and barely visible; striae equally faded, exhibiting some shallow and scattered round punctures; humeral callus protruding remarkably outwards, leading to formation of deep subhumeral arch; posterior margin smoothly rounded without projections or upturning at apex; virtually glabrous on disc and umbones, but with scattered short and light setae distributed along lateral and apical declivities (Figs 1, 3).

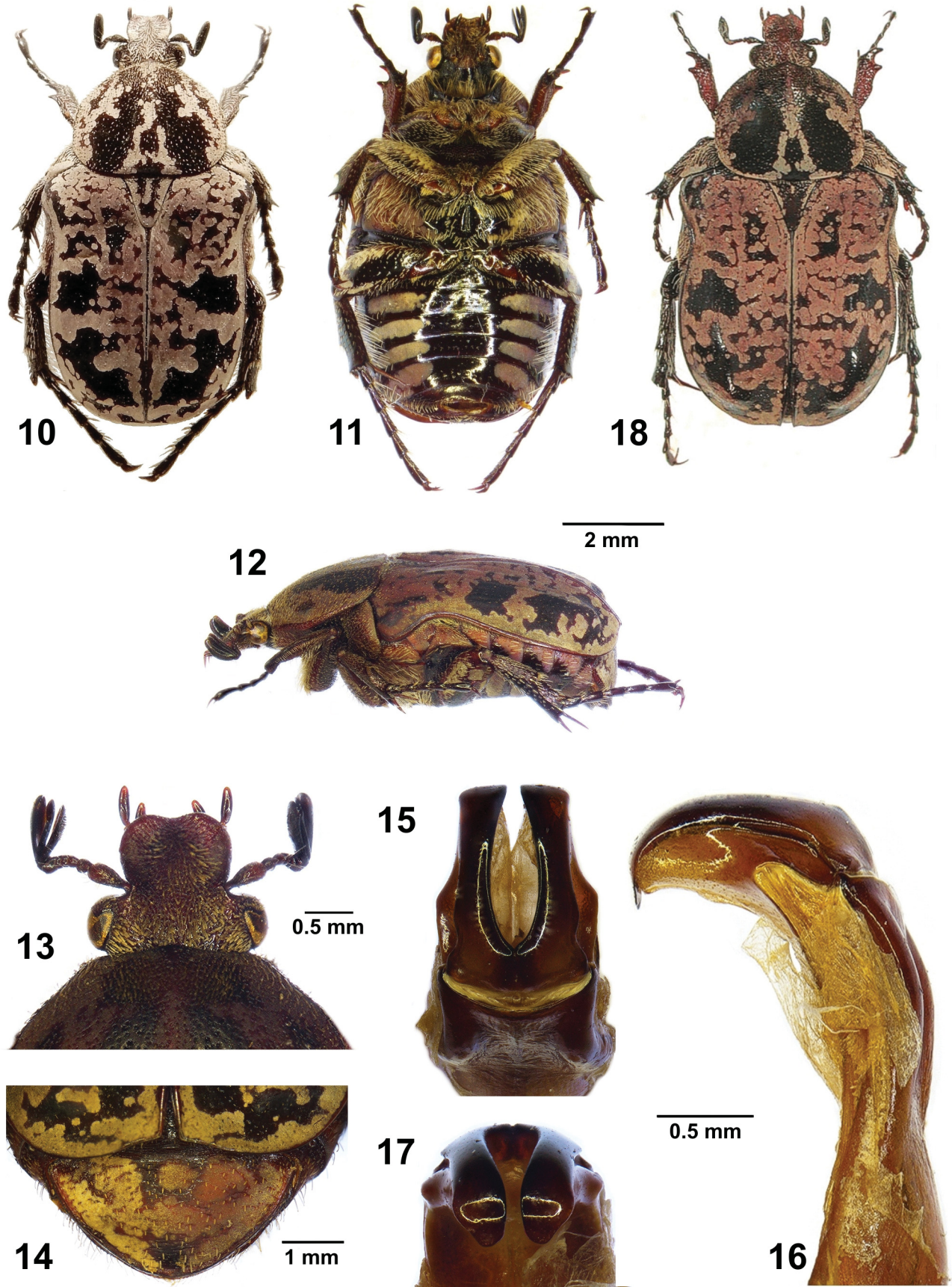
Pygidium. Broadly triangular in shape, with smoothly rounded apex and unevenly domed with marked depressions on baso-lateral corners; exhibiting white-greyish tomentose markings most noticeable in basal and lateral regions; with dense but shallow rugulose sculpture across entire surface and light-yellow to tawny short setae scattered throughout disc, becoming longer and finer along lateral margins and apex (Fig. 5).

Legs. Black and shiny with occasional brown tips or edges; tarsomeres rather elongate, with apical ones twice as long as preceding units and all claws distinctively bent at 90° angles; tibiae irregularly sculptured and covered in dense, scale-shaped, light-yellow setae, becoming longer and finer on inner margins; protibia broad and bidentate, with both teeth equally developed and residual presence of regressive third tooth in proximal area; mesotibia with bifid mid spine on outer carina sharply pointed and spurs elongate, thin and sharp; metatibia with outer carina bearing one blunt but robust distal tooth, spurs substantially more elongate than in mesotibia and remarkably sharp (Figs 1–3).

Ventral surface. Black and shiny, with white-greyish tomentum markings restricted to marginal areas of ventrites; covered in dense and long light-yellow to tawny setae, except on central metafemoral surface, abdominal ventrites



Figs 1–9. *Elaphinis (E.) matatiele* sp. nov. 1–8 – holotype male; 9 – female. 1, 9 – dorsal habitus; 2 – ventral habitus; 3 – lateral habitus; 4 – clypeus; 5 – pygidium; 6 – parameres, dorsal view; 7 – parameres, lateral view; 8 – parameres, frontal view. Photographs: Lynette Clennell.



Figs 10–18. *Elaphinis (E.) cinereonebulosa* (De Geer, 1778). 10–17 – typical male; 18 – female. 10, 18 – dorsal habitus; 11 – ventral habitus; 12 – lateral habitus; 13 – clypeus; 14 – pygidium; 15 – parameres, dorsal view; 16 – parameres, lateral view; 17 – parameres, frontal view. Photographs: Lynette Clennell (10–17); Gerhard Beinhundner (18).

and mesometasternal region, where setae become short or very scattered; mesosternal lobe very narrow, smoothly rounded and not protruding either forward or downwards; metasternal lobe exhibiting oblong, but very narrow and subparallel groove on anterior two thirds of median sulcus; abdominal ventrites with slight concavity at centre (Fig. 2).

Aedeagus. Parameres with dorsal lobes relatively elongate and exhibiting a narrow constriction both towards base and apex, before expanding again in both directions (Figs 6–8); apical projection of lobes curving smoothly downwards and forming regularly rounded, drop-shaped tips in frontal view (Fig. 8); ventral lobes wider than dorsal virtually across entire length, reaching maximal expansion at mid to basal distance and forming a small pair of lateral projections in dorsal and frontal views (Figs 6, 8).

Variability. Specimen size lies in the range of 10.9–13.1 mm in total length and 6.1–6.7 mm in maximum width. The dorsal ornamentation can vary in extent on the pronotum, elytra and pygidium, but its general pattern remains rather stable across different individuals. Females are stockier than males, have broader protibia, shorter antennal clubs and protarsi, exhibit reduced tomentose ornamentation on the dorsum and complete absence on the venter (Fig. 9). They are also characterized by drastically reduced pubescence, by comparison with their male counterparts, and therefore tend to appear shiny. Their dorsal surface is, however, more densely covered in round punctures, particularly on head, pronotum and protibiae.

Differential diagnosis. This is clearly a sister species of *Elaphinis cinereonebulosa*, with which it shares all the key characters of the nominal subgenus. The two species can easily be separated even on the basis of their dorsal and ventral ornamentation, as the tomentose markings are extensive in *E. cinereonebulosa* but substantially reduced in *E. matatiele* sp. nov., particularly on the pronotal, scutellar and elytral discs as well as abdominal ventrites (Figs 1, 3). Other notable diagnostic differences are observed at the level of the clypeus, the scale-shaped setae of the general body cover and the aedeagal parameres (Figs 1–8). The clypeus is slightly longer and narrower in *E. matatiele* sp. nov., by comparison with that of *E. cinereonebulosa*, and also exhibits a sharp angular indentation at the apex in the former, rather than a smooth sinuation like in the latter species (Figs 4, 13). The scale-shaped setae that cover much of the dorsal surface of *E. cinereonebulosa* are remarkably shorter and broader than those of *E. matatiele* sp. nov. Also, they are very dense in many areas (e.g. head and antero-pronotal surface) on the dorsum of *E. cinereonebulosa*, while they are substantially more scattered in all the areas of *E. matatiele* sp. nov. Finally, the aedeagal parameres of *E. matatiele* sp. nov. are substantially narrower and slightly longer than those of *E. cinereonebulosa* (Figs 6–8, 15–17). The ventral lobes of the parameres are particularly well developed in *E. cinereonebulosa*, with baso-lateral projections much larger in extent than those observed in *E. matatiele* sp. nov. (Figs 6, 15).

Etymology. The species is named after its type locality, which is also the only place where it is currently known to occur. The specific epithet is a noun in the nominative singular.

Bionomy. Adult activity in the wild has so far been recorded only in December and January. All specimens were retrieved from sandy soil accumulations in the proximity of, or under, old cow dung on rocky terraces at high altitude (Fig. 19). Larvae of the species bred in captivity have shown very long pre-pupal dormancy and high mortality rates, thereby proving it difficult to reach adult stage under controlled conditions (P. Malec, pers. comm.).

Distribution. All the specimens currently known originate from the Matatiele Nature Reserve (Fig. 23), which is a core protected area within the Maloti-Drakensberg Transfrontier Conservation Area. The Matatiele Municipality was part of Cape Province until being transferred to Natal in 1978; in 2005 it was moved back from the KwaZulu-Natal Province to the Eastern Cape. Most specimens of the new species were collected around the base of Mount Hargreaves, at an altitude of about 1700 m (Fig. 21), and it is virtually certain that it also occurs on several nearby mountains that have similar habitat characteristics. These, however, have not been explored recently due to issues of accessibility.

Elaphinis (Elaphinis) cinereonebulosa (De Geer, 1778)

(Figs 10–18, 20)

Scarabaeus cinereonebulosus De Geer, 1778: 643.

Cetonia cinereonebulosa: SCHÖNHERR (1817): 141; MACLEAY (1838): 47; BURMEISTER (1842): 596.

Dolichostethus cinereo-nebulosa: SCHOCH (1895): 108.

Atrichelaphinis cinereonebulosa: PÉRINGUEY (1907): 346.

Elaphinis cinereonebulosa: PÉRINGUEY (1908): 684; SCHENKLING (1921): 303; SCHEIN (1960): 98; MARAIS & HOLM (1989): 22; HOLM & MARAIS (1992): 176; MALEC & ŠÍPEK (2017): 41; BEINHUNDNER (2017): 86.

Cetonia cinerascens Fabricius, 1798: 130; SCHÖNHERR (1817): 141; MACLEAY (1838): 47.

Elaphinis cinerascens: BURMEISTER (1842): 596; KRAATZ (1898): 220.

Cetonia irregularis Olivier, 1789: 51; SCHÖNHERR (1817): 142; BURMEISTER (1842): 596.

Type material. *Scarabaeus cinereonebulosus*: not traced.

Cetonia cinerascens: LECTOTYPE (designated by MARAIS & HOLM 1989): 'Cap. bon. sp. Paykul. *Cetonia cinerascens* F.' (ZMUC).

Cetonia irregularis: not traced.

Material examined. SOUTH AFRICA: EASTERN CAPE: 24 inds, Loerie, Jan 1960, South African Museum Expedition (ISAM COL-A027389); 1 ♂, Grahamstown, 5 May 1992, [R Perissinotto & L Clennell] (BMCS); ibidem, SE 3326 Be (MARAIS & HOLM 1989: 32); 1 ♂, Port Elizabeth, 18 Feb 1994 [drowned in swimming pool], P Webb (BMCS); ibidem, SE 3325 Be (MARAIS & HOLM 1989: 32); 1 ♂, Baviaanskloof, 1 Dec 1995, R Perissinotto & L Clennell (BMCS); 2 ♂♂, ibidem, 24 Dec 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, 24 Dec 1997, R. Viossat (TGFMF); 1 ♂, Commando Drift, 10 Dec 1995, R Perissinotto & L Clennell (BMCS); 3 ♂♂, Sam Knott NR, 21 Jan 1996, R Perissinotto & L Clennell (BMCS); 3 ♂♂, ibidem, 1 Apr 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, 4 Apr 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, 5 Apr 1997, R Perissinotto & L Clennell (BMCS); 2 ♂♂, Somerset East, 16 Mar 1997, R Perissinotto & L Clennell (BMCS); 2 inds, ibidem, (SANC-COLS-14629); 4 ♂♂ 2 ♀♀, Winterberg, 11 Jan 1998, R Perissinotto & L Clennell (GBEG); 1 ♂, ibidem, 10 Jan 1998 (GBEG); 2 ♂♂, Bedford, Huntley Glen farm, 17 Dec 1995, R Perissinotto & L Clennell (BMCS); 2 ♂♂, ibidem, 3 Mar 1996, R Perissinotto & L Clennell (BMCS); 3 ♂♂, ibidem, 25 Jan 1997, R Perissinotto & L Clennell (BMCS); 3 ♂♂ 1 ♀, ibidem, 16 Feb 1997, R Perissinotto & L Clennell (BMCS); 2 ♂♂, ibidem, 17 Dec 1998, EL Pringle (EPBS); 1 ♂, ibidem, 17 Dec 1997, EL Pringle (EPBS); 1 ♂, ibidem, 6 Dec 2001, EL Pringle (EPBS); 1 ♂, ibidem, 31 Dec 2016, EL Pringle (EPBS); 1 ♀, ibidem, 11 Jan 2003, EL Pringle (EPBS);



Figs 19–22. 19–20 – males of *Elaphinis (E.) matatiele* sp. nov. (19) and of *E. (E.) cinereonebulosa* (De Geer, 1778) (20) in their respective natural habitats at Matatiele and Willowmore. 21–22 – typical habitat of *E. matatiele* sp. nov. in the grassland of Mount Hargreaves, above the Eastern Cape town of Matatiele (21) and of *E. cinereonebulosa* in the highland grasslands of the Winterberge range of the Eastern Cape. Photographs: Lynette Clennell.

1 ♀, *ibidem*, 13 Jan 2005, EL Pringle (EPBS); 1 ♂, Mountain Zebra NP, 15 Jan 1997, R Perissinotto & L Clennell (BMCS); 2 ♂♂ 1 ♀, Fort Brown, 19 Jan 1997, R Perissinotto & L Clennell (BMCS); 1 ♀, *ibidem*, 27 Jan 97, R Perissinotto & L Clennell (RPGS); 1 ♀, *ibidem*, 23 Feb 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, Addo Elephant NP, 27 Jan 97, R Perissinotto & L Clennell (BMCS); 16 ♂♂ 2 ♀♀, Winterberge, 07 Dec 2002, R Perissinotto & L Clennell (BMCS, RPGS); 2 ♂♂ 2 ♀♀, *ibidem*, 10 Jan 1998, P Stobbia (TGMF); 1 ♂, Graaff-Reinet, 16 Dec 2004, R Perissinotto & L Clennell (BMCS); 1 ♂, Toorberg, 30 Dec 2007, R Perissinotto & L Clennell (BMCS); 1 ♂, Amsterdamhoek, 15 Feb 2014, R Perissinotto & L Clennell (BMCS); 1 ♂, Steytlerville, 18 Jun 2016, R Perissinotto & L Clennell (BMCS); 1 ♂, Tarkastad, 16 Jan 2016, R Perissinotto & L Clennell (BMCS); 1 ♂ 1 ♀, Willowmore, 8 Jan 2004, R Perissinotto & L Clennell (BMCS); 3 ♂♂ 1 ♀, *ibidem*, S33°14'28" E23°23'04", 945 m, 4 Jan 2017, P Malec & P Šípek (PMBC); 1 ♂, Olifantskop Pass, WGS 84 33°19'S, 25°57'E, 7–11 Feb 2003, R+H Fouqué (PMBC); n ♂ 1 ♀, Sarah Baartman District (Dr Beyers Naudé Municipality), 15 km NW of Willowmore, 900 m, 4 Jan 2017, ♂ landing on large goat manure midden under *Acacia* bush, ♀ dug out from soil (MALEC & ŠÍPEK 2017: 40); 4 inds, Wilgerskloof Farm, W of Sterkstroom, 19–27 Jan 2007, Pitfall-and-funnel trap, Bycatch of South African Reptile Conservation Assessment (SARCA), M Burger & M Fabricius (SANC-

COLS-16011); n inds, Adelaide, SE 3226 Cb (MARAIS & HOLM 1989: 31); 1 ♀, Cradock, Dr. Martin (ISAM COL-A027388); 1 ♀, Dunbrody, 1899, O' Neil (ISAM COL-A027384); 1 ♂, Pt. Elizabeth, 1889, Rous (ISAM COL-A027385); 1 ♀, G/Tn [Grahamstown?] (ISAM COL-A027382); 1 ind., Uitenhage C.C., 3325 CD, Ex C.N.B Coll. (DNSM-10413). **WESTERN CAPE:** 1 ♂, Great Brak R., Mossel Bay, Feb 1960, South African Museum Expedition (ISAM COL-A027386); 3 ♂♂, Mossel Bay, 1910, G. French (ISAM COL-A027383); n inds, George, SE 3322 Cd (MARAIS & HOLM 1989: 32); 1 ♂, Kleinmond, Jan 1905 (ISAM COL-A027387); 2 ♀♀, Cap Bon Spei, Riversdale, 1889, Coll. Duvivier, *E. cinereonebulosa* det. Moser 1908 (GBEG); 1 ind., *ibidem*, (DNSM-10414); 2 inds (damaged), De Hoop Vlei, 20 Meilen ostnordöstlich Bredasdorp, Loc. Nr. 108 (SCHEIN 1960: 98); 1 ♂, Haarwegskloof Renosterveld Reserve, Apr 2016 (J. Groenewald, pers. comm. & photo). **CAPE PROVINCE** [not resolved]: n inds., Brakkloof, SE 3326 Ba (MARAIS & HOLM 1989: 31); 1 ♂ 1 ♀, C. Colony, 30 Jun 1881, Dunn (ISAM COL-A027381); 1 ♂, Kap, Coll. H. Schein, München (GBEG).

Remarks. This species is widely distributed in the Eastern and Western Cape, with habitat preference for semiarid environments (Fig. 23). Although it has generally been regarded as rare (MARAIS & HOLM 1989,

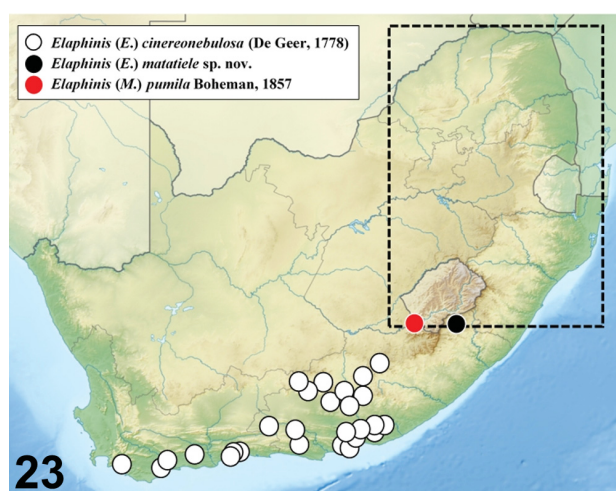


Fig. 23. Known distribution of *Elaphinis* (*E.*) *cinereonebulosa* (De Geer, 1778) and *E. (E.) matatiele* sp. nov. within South Africa, as well as outline of Wahlberg's 'Caffraria' (black dotted frame) with position of estimated type locality of *E. (M.) pumila* Boheman, 1857 (map adapted from www.wikimedia.org).

HOLM & MARAIS 1992, MALEC & ŠÍPEK 2017), recent observations have actually shown that it can be locally abundant. Aggregations under trees with wide, shading canopy (e.g. *Vachellia karroo*, *Papea capensis*, *Schotia afra*) can be observed immediately after major summer rainfalls across the Great Karoo region of the Eastern Cape (Figs 20, 22; pers. obs.). Adults emerge from local accumulations of old cow, goat or sheep dung, where larvae grow and develop. As these large trees with extended canopy provide shade for a variety of livestock during hot summer days in the semiarid Karoo environment, high densities of dung accumulate under them and this attracts beetles like *E. cinereonebulosa*, occasionally in high numbers.

The species has never been found inside fruit-baited traps, or feeding on flowers or sap flows. Therefore, adults live for relatively short periods of time after emergence, fly over very short distances, generally just above the ground, and simply mate and lay eggs. Females (Fig. 18) are seldom seen at the surface and males normally excavate the females partly out of the ground in order to mate. Petr Malec has attempted to reproduce the species in captivity through larval breeding, but has reported great difficulties in completing the cycle (MALEC & ŠÍPEK 2017). Apparently, larvae were able to grow fast to 3rd instar when fed a mixed substrate containing cow dung, followed by successful cocooning in sandy soil. However, inside the cocoon larvae underwent a very long pre-pupal dormancy, with no pupation occurring in some cases even after eight months and a high mortality rate recorded in general (MALEC & ŠÍPEK 2017).

Subgenus *Micrelaphinis* Schoch, 1896

Micrelaphinis Schoch, 1896: 331. Type species: *Elaphinis mutabilis* Schoch, 1895: 108 (by original designation).

Micrelaphinis: SCHÖCH (1897): 45, 49; PÉRINGUEY (1907): 324, 326, 339, 340; DISTANT (1911): 266; SCHENKLING (1921): 304; SCHEIN (1960):

98; KRIKKE (1984): 58; KRAJČÍK (1998): 53.

Elaphinis (*Micrelaphinis*): MARAIS & HOLM (1989): 22; HOLM & MARAIS (1992): 177; SAKAI & NAGAI (1998): 307; BEINHUNDNER (2017): 88.

Included species. *Elaphinis* (*M.*) *adpersula* Gerstaecker, 1884; *E. (M.) delagoensis* Schoch, 1894; *E. (M.) irrorata* (Fabricius, 1798); *E. (M.) latecostata* Boheman, 1857; *E. (M.) pumila* Boheman, 1857.

Elaphinis (*Micrelaphinis*) *pumila* Boheman, 1857

(Figs 24–34)

Elaphinis pumila Boheman, 1857: 40.

Micrelaphinis pumila: PÉRINGUEY (1907): 340, 341; SCHENKLING (1921): 306; KRAJČÍK (1998): 53; BEINHUNDNER (2017): 93.

Heteroclitia (?) *scitula* Janson, 1878: 300; PÉRINGUEY (1908): 684; SCHENKLING (1921): 81; MARAIS & HOLM (1989): 29.

Micrelaphinis (?) *scitula*: SCHEIN (1960): 100.

Type material. *Elaphinis pumila*: LECTOTYPE: ♂ (designated by MARAIS & HOLM 1989), 'Caffraria', 'J. Wahlb.', 'Type, *pumila* Bhn. Lnd. Caffr.', 'Riksmuseum Stockholm', '462/85', '*Micrelaphinis pumila* Boheman, Lectotype Holm 1986' (TMSA-CPH1980). PARALECTOTYPE: ♂, 'Caffraria', 'J. Wahlb.', '463 35', '*Micrelaphinis pumila* Boheman (var. a), Paralectotype, Holm 86', '5378 E92 +', 'Riksmuseum Stockholm', '(NHRS-JLKB 000027205)'.

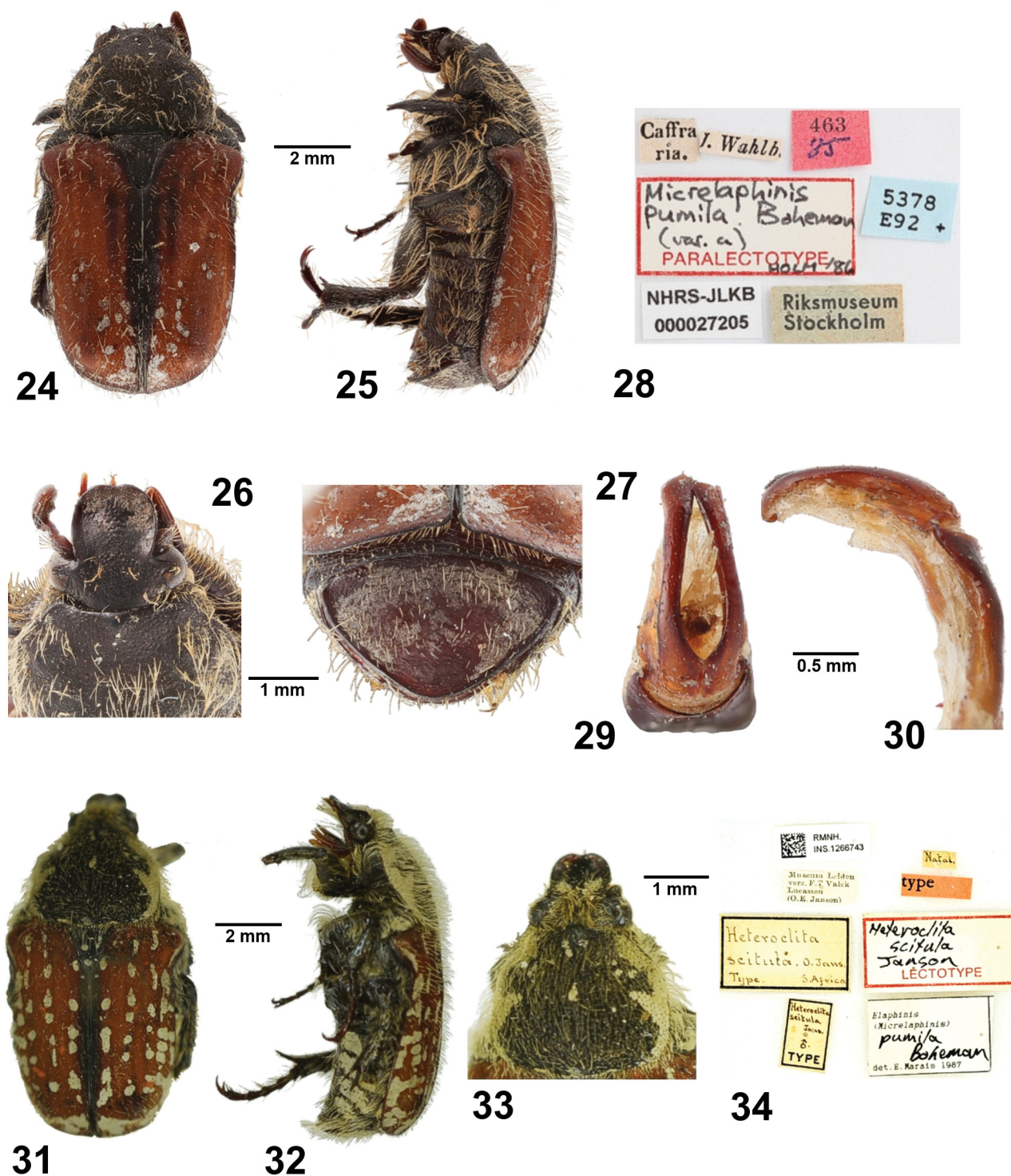
Heteroclitia (?) *scitula*: LECTOTYPE: ♂, designated by MARAIS & HOLM (1989), 'Natal', 'Museum Leiden verz. F.T. Valck Lucassen (O. E. Janson)', '*Heteroclitia scitula*, O. Jans., Type, S. Africa', *Elaphinis* (*Micrelaphinis*) *pumila* Boheman, det. E. Marais 1987, '*Heteroclitia scitula* Janson, Lectotype', '(RMNH.INS.1266743)'.

Additional material examined. 1 ♂, 85/28, *corpulenta* Gerst., *Heteroclitia* (?) sp. bei *scitula*, det. H. Schein 1955, *pumila* (TMSA-CPH1981); 1 ♂, Natal, Durban, 11.1900, *M. pumila* Boh., comp LT; PLT (via: STO, 'Caffraria, J. Wahlb.', *M. scitula* Jans., comp. T: LEIDEN, 'Natal' (TMSA-CPH1982).

Remarks. The status of this species remains rather enigmatic even in the present day and, therefore, deserves a dedicated analysis. To start with, most specimens identified under this name in historical collections have actually been proven to be colour varieties of *E. (M.) delagoensis* with a brown livery similar to that exhibited by inland specimens of *E. (M.) irrorata* (cf. MARAIS & HOLM 1989, BEINHUNDNER 2017; pers. obs.). Thus, there are only five specimens, all collected in the 1800s or early 1900s, that can be attributed to this species with confidence. These include the lectotype (LT) and one paralectotype (PLT), both males, from the original collections undertaken by Wahlberg in the eastern part of South Africa ('Caffraria' – see notes below) during the period 1838–1845. Although these type specimens were only designated by MARAIS & HOLM (1989), it is almost certain that they represent indeed the material used by BOHEMAN (1857) in his original description of the species. Two other specimens are currently reposit in the TMSA and show all the typical characters of the species, but have only negligible traces of white tomentum on their dorsum and probably represent the 'model' used by MARAIS & HOLM (1989) in their illustration of this species (p. 26, fig. 58), later also reproduced in HOLM & MARAIS (1992: pl. 21, fig. 5). A dorsal view of the PLT specimen has already been included in BEINHUNDNER (2017) and is also reproduced here, along with a complete set of images obtained from Johannes Bergsten of the Naturhistoriska riksmuseet, Stockholm (courtesy: G. Beinhundner) (Figs 24–30).

A fifth specimen, again a male, originally described with some reservation as '*Heteroclitia* (?) *scitula*' by JANSON (1878), was later questioned by PÉRINGUEY (1908) in terms of its generic affiliation and eventually transferred to *Micrelaphinis* by SCHEIN (1960). It was only in the later revision of the genus by MARAIS & HOLM (1989), however, that this species was synonymized with *Elaphinis* (*M.*) *pumila* and the specimen designated as LT.

This specimen is repositied in the Naturalis Biodiversity Center, Leiden (RMNH), and a set of photos highlighting its critical diagnostic characters was recently obtained by courtesy of Oscar Vorst. This is now reproduced here as Figs 31–34, in order to corroborate the validity of its earlier synonymy and highlight the remarkable variability in dorsal tomentose maculation exhibited by the species. Indeed, this can range from virtual complete absence, with



Figs 24–34. *Elaphinis* (*Micrelaphinis*) *pumila* Boheman, 1857. 24–30 – paralectotype male; 31–34 – lectotype male of *Heteroclitia* (?) *scitula* Janson, 1878. 24, 31 – dorsal habitus; 25, 32 – lateral habitus; 26, 33 – clypeus; 27 – pygidium; 28, 34 – specimen labels; 29 – parameres, dorsal view; 30 – parameres, lateral view. Photographs: Johannes Bergsten (24–30) (courtesy of Gerhard Beinhundner) and Oscar Vorst (31–34).

only residual spots or lining on the pronotal margins (cf. HOLM & MARAIS 1992: pl. 21, fig. 5), to a rather dense and intricate network of round and irregularly shaped maculae and stripes, both on the dorsal and ventral surfaces (Figs 31–33). Consistent features across the range are, however, its dense pubescence, which is particularly noticeable on head and pronotum, and the testaceous background colour of its elytra. These, along with the uniquely shaped apical expansions of its aedeagal parameres, make it possible to separate it fairly promptly from its closest relatives, i.e. *E. (M.) latecostata* and *E. (M.) delagoensis* (cf. identification key below).

Regarding the correct geographic origin of the two type specimens collected by Wahlberg, BOHEMAN (1848) explained in the introductory section that Wahlberg's 'Caffraria' included the north-eastern part of South Africa, from approximately 30°25' to 23°00'S and 32°40' to 27°00'E (cf. black dotted frame within map in Fig. 23). This includes an area comprising virtually the entire provinces of KwaZulu-Natal, Mpumalanga, Limpopo and Gauteng, along with the eastern half of the Free State, the extreme eastern portion of the North-West and only the north-eastern tip of the Eastern Cape Province, to the north of the town of Lady Grey and bordering Lesotho. This is drastically different to the historical definition of 'Kaffraria' used by the British, who regarded this region as comprising the entire eastern half of what is today the Eastern Cape Province (CRISHOLM 1911). Regarding the type locality of *E. (M.) pumila*, BOHEMAN (1857: 40), specifically stated '*Habitat in regione fluvii Gariepis*'. As this unequivocally refers to the Orange River valley, the only possibility within the area sampled by Wahlberg in South Africa lies in the south-eastern part of the Free State, south of Zastron, or in the north-eastern tip of the Eastern Cape, north of Lady Grey. Alternatively, this may also be located in neighbouring Lesotho. The distribution map illustrated in MARAIS & HOLM (1989: 24, fig. 48), shows only one locality 'Natal, Durban (SE 2931 Cc)', while the revised map presented in HOLM & MARAIS (1992: 181, fig. 98g) has an additional locality in the border area between KwaZulu-Natal and Mpumalanga, near the town of Wakkerstroom. It is not clear how these localities were derived, as with the exception of the type specimens there is no specific list of specimens label data in either of the two works mentioned above. The locality 'Natal, Durban' is reported on one label of specimen CPH1982 (TMSA), but this locality is almost certainly erroneous and probably reflects the 'port-of-call' role that this city used to play in the early days of entomological collections in the eastern part of South Africa. A series of four specimens carrying the identification of '*M. pumila* Boh.' reposit in the ZMHB also has the locality 'Natal/Durban' in their accompanying labels, but they are actually all males of *E. (M.) delagoensis*, lacking in particular the dense and long pubescence characteristic of Boheman's *E. (M.) pumila* LT and PLT (Figs 24–26).

What emerges rather clearly from this review is that *E. (M.) pumila* is not coastal, but rather a highland dweller possibly restricted to a small region above the Drakensberg

Escarpment. As already pointed out by MARAIS & HOLM (1989) and HOLM & MARAIS (1992), what is remarkable though is that no new specimens are known besides the types collected in the 19–20th centuries. So, it is possible that the species may indeed be already extinct, as extensive land-use changes have happened in its hypothetical distribution range, both due to agricultural activities and human settlements.

Updated identification key to the subgenera and species of *Elaphinis*

Partially adapted from MARAIS & HOLM (1989).

- 1 Tarsal claws strongly arcuate in hook-like shape; posterior pronotal margin converging to form obtuse angle above scutellum; dorsal setae mainly scale-shaped; adult stages non-feeding. 2
 - Subgenus *Elaphinis* Burmeister, 1842 2
 - Tarsal claws smoothly curved, posterior pronotal margin straight or arching slightly upwards above scutellum; dorsal setae hair-shaped; adult stages feeding on flowers and fruits. 3
 - Subgenus *Micrelaphinis* Schoch, 1896 3
- 2 Body with extensive tomentose markings; clypeus with smooth sinuation at apex; aedeagal parameres with large baso-lateral projections on ventral lobes; distribution: South Africa (WC, EC). *E. (E.) cinereonebulosa* (De Geer, 1778)
 - Tomentose markings substantially reduced; clypeus with sharp angular indentation at apex; aedeagal parameres with reduced baso-lateral projections on ventral lobes; distribution: South Africa (EC-E). *E. (E.) matatiele* sp. nov.
- 3 Dorsal habitus distinctly pubescent, with setae particularly long and dense on head and pronotum. 4
 - Dorsal habitus glabrous, or with very short to minute setae only. 5
- 4 First metatarsomere with dorso-distal protrusion in both sexes, but particularly well-developed in female; clypeal apex deeply sinuate, but clypeolateral ridges poorly elevated; aedeagal parameres with apex markedly bent downwards and exhibiting both outward and inward expansions; distribution: Kenya, Tanzania, Uganda. *E. (M.) adpersula* Gerstaecker, 1884
 - First metatarsomere without dorso-distal protrusion, clypeal apex mildly sinuate and clypeolateral ridges highly elevated; aedeagal parameres with apex smoothly rounded and exhibiting only weak outward expansions; distribution: South Africa (Orange River Valley of EC/FS?). *E. (M.) pumila* Boheman, 1857
- 5 Background colour and ornamentation extremely variable; when present, white tomentum organized in longitudinal dotted lines or larger maculae; male with dorsal habitus matte, but female shiny; smaller size, with TL = 9–12 mm. 6
 - Background colour rather stable, from testaceous to bronze, with widespread suffusion of white tomentum predominant, particularly in male; both sexes with

- dorsal habitus matte; larger size, with TL = 11–15 mm; aedeagal parameres exhibiting marked lateral projections both at base and apex, with apex also sharply bent downwards; distribution: South Africa (EC, FS, MP, ZN-S). *E. (M.) irrorata* (Fabricius, 1798)
- 6 First metatarsomere with marked dorso-distal protrusion in both sexes; male with protibia unidentate; female with elytral apex upturned along suture; aedeagal parameres with small but visible lateral projections both at base and apex; distribution: South Africa (ZN-N, MP, LP), Mozambique.
..... *E. (M.) delagoensis* Schoch, 1894
- First metatarsomere with weak to absent dorso-distal protrusion; male with protibia bidentate; female with elytral apex flat; aedeagal parameres without lateral projections either at base or apex; distribution: South Africa (LP, NW, NC), Botswana, Namibia.
..... *E. (M.) latecostata* Boheman, 1857

Genus *Parelaphinis* Marais & Holm, 1989

Parelaphinis Marais & Holm, 1989: 29. Type species: *Cetonia moesta* Gory & Percheron, 1833: 292.

Parelaphinis: ANTOINE (1991): 1; HOLM & MARAIS (1992): 173; KRAJČÍK (1998): 57; HOLM & PERISSINOTTO (2004): 87; BEINHUNDNER (2017): 258.

Included species. *Parelaphinis drakensbergica* sp. nov.; *P. moesta* (Gory & Percheron, 1833); *P. umtamvuna* sp. nov.

Parelaphinis drakensbergica sp. nov.

(Figs 35–42)

Type material. HOLOTYPE: ♂, RSA, Free State Prov., Harrismith Dist., Platberg 2315 m, 28°15'14" S, 29°11'18" E, 5 Dec 1988, Dr. L. Coetzer leg. (ISAM). PARATYPES: SOUTH AFRICA: 2 ♂♂, same data (RPGS); 1 ♀, RSA, Dirkie'sdorp, 5 Dec 1988, I. Coetzer (HOLM & PERISSINOTTO 2004: 88). ESWATINI: 1 ♂, Swaziland, Sidwashini, 13 Nov 1994, 'Parelaphinis moesta (G&P)', N.J. Duke (TMSA-CPH2088).

Description of holotype male (Figs 35–42). *Body.* Matte, with black head, pronotum, scutellum and legs, but testaceous to brick-red elytra; all surfaces exhibiting white tomentose maculation, forming longitudinal midline and lateral eye shapes on pronotum; with dense round sculpture on head, becoming scattered and horse-shoe shaped on pronotum, scutellum and elytra; with scattered, long to medium size, pale-yellow to tawny setae on entire head surface, becoming extremely short and sparse on pronotal and elytral declivities, and virtually disappearing on pronotal and elytral disc as well as scutellum (Figs 35, 37).

Size. Total length = 10.9 mm; maximum width = 6.4 mm.

Head. Black with extensive white tomentum across lateral areas, leaving longitudinal black band at centre; clypeus deeply concave and broadly bilobate with marked and angulate indentation at apex, with lateral margins smoothly angulate anteriorly; all margins sharply upturned and reflexed; entire surface covered in dense round punctures; pale-yellow setae distributed along entire surface, generally shorter and more scattered on clypeus and frons, becoming much longer and denser on vertex; antenna black to dark brown, with club approximately as long as flagellum and pedicel combined; thin light setae scattered across flagellum, becoming thicker and denser on pedicel (Fig. 38).

Pronotum. Black and matte, with widespread white tomentose maculation, forming in particular two symmetric lateral eye-shaped patterns and one longitudinal midline briefly interrupted towards posterior margin; without any tubercle or ridge in central apical area of anterior margin; exhibiting very scattered and shallow round to horseshoe punctures across entire surface, becoming denser on declivities; with few short light setae distributed along lateral margins and declivities, becoming extremely sparse on disc; shape smoothly rounded along lateral and posterior margins, with abrupt angulation only at antero-lateral margins (Fig. 35).

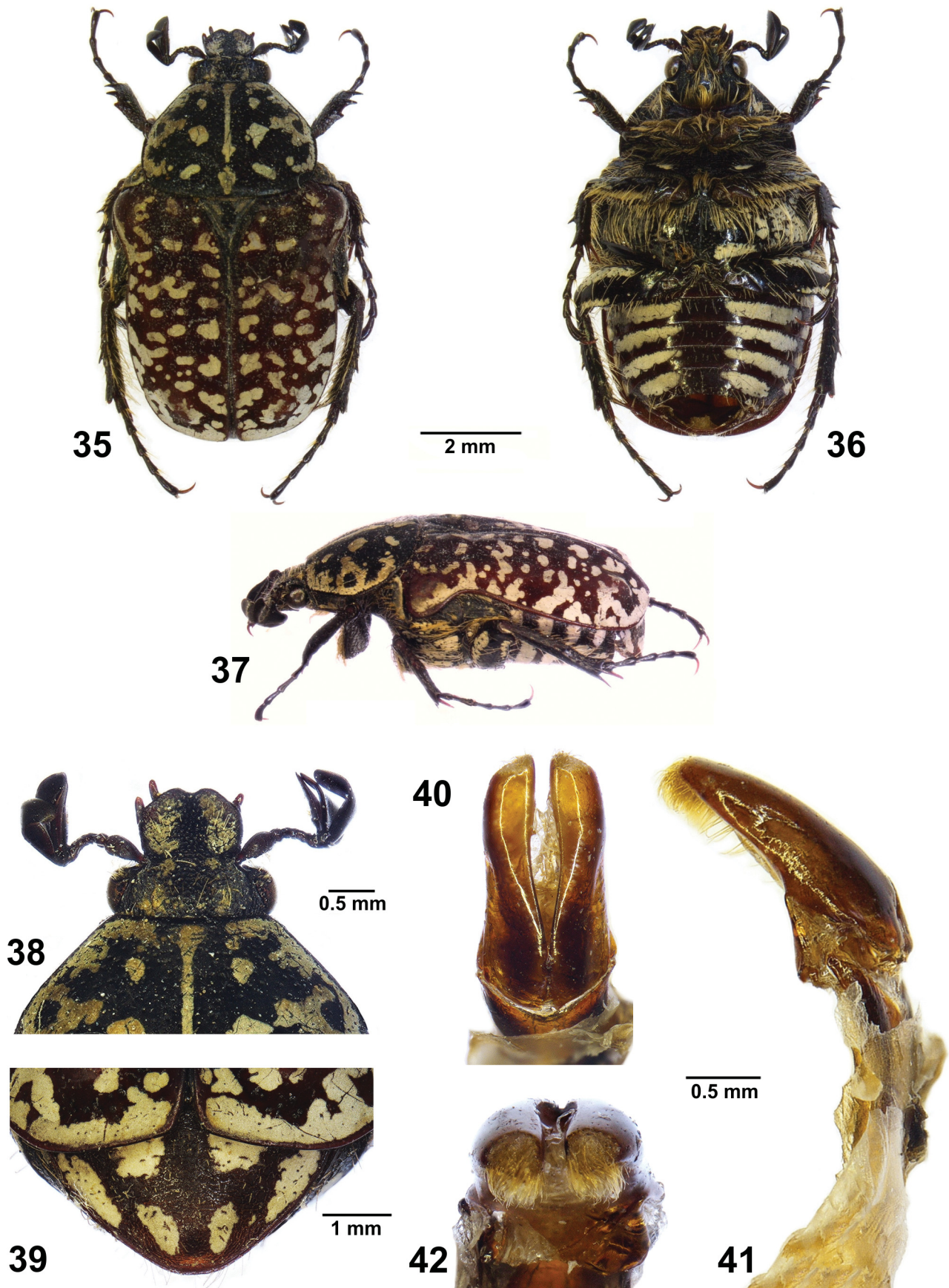
Scutellum. Black, matte and glabrous, with tomentose maculation on two basal corners, extending laterally towards apex; round to horseshoe punctures regularly spaced along entire perimeter, denser around base but absent on disc; broadly equilateral triangular in shape with acute apex and lateral margins inwardly arcuate; lateral grooves rather wide and deep, except on peri-basal portions (Fig. 35).

Elytron. Testaceous to brick-red, with darker areas around margins and along suture; with dense and variously shaped white tomentose maculation across entire surface; costae obsolete to weakly produced and barely visible; humeral callus protruding outwards and subhumeral arch deeply sinuate; posterior margin smoothly rounded without projections or upturning at apex; wide crescent to horseshoe punctures scattered across disc, becoming larger and denser towards basal margin but smaller and more sparse on lateral and apical declivities; surface generally glabrous, with few scattered minute setae on lateral and apical declivities (Figs 35, 37).

Pygidium. Triangular in shape, with smoothly rounded, domed apex and marked depressions on baso-lateral corners; exhibiting symmetric set of three wide and oblong white tomentose maculae on each side; with dense but shallow rugulose sculpture across entire surface, not visible in areas of white maculae; few short light-yellow setae scattered throughout disc, becoming longer and finer along lateral margins and apex (Fig. 39).

Legs. Black and coarsely sculptured, with tips and edges often brown; tarsal segments moderately elongate, with apical ones longer than preceding units and all claws smoothly arcuate; tibiae with coarse longitudinal rugulose sculpture, covered with sparse and short light-yellow setae, becoming longer and denser on inner margins; protibia tridentate, with teeth decreasing gradually in size from apical (longest) to proximal (shortest); mesotibia with prominent and sharp medio-dorsal spine, spurs brown and moderately elongate, thin and blunt; metatibia with outer carina bearing one small but sharp medio-distal tooth, spurs brown substantially more elongate than in mesotibia and sharp or rounded at apex (Figs 35–37).

Ventral surface. Black with white tomentum markings very widespread across entire surface, except central and posterior areas of abdominal ventrites, mesometasternal region and femoral bases; covered in dense and long light-yellow to tawny setae, except on central metafemoral surface, abdominal ventrites and mesometasternal region, where setae become shorter and very scattered; mesosternal



Figs 35–42. *Parelaphinis drakensbergica* sp. nov. (holotype male). 35 – dorsal habitus; 36 – ventral habitus; 37 – lateral habitus; 38 – clypeus; 39 – pygidium; 40 – parameres, dorsal view; 41 – parameres, lateral view; 42 – parameres, frontal view. Photographs: Lynette Clennell.

lobe flattish, smoothly rounded and covered by long tawny setae on anterior margin, not protruding either forward or downwards; metasternal lobe covered in deep but rather sparse round punctures and exhibiting wide concavity at centre of median sulcus; abdominal ventrites with slight concavity at centre (Fig. 36).

Aedeagus. Parameres with dorsal lobes laterally constrained at centre, expanding then slightly in apical half and abruptly rounded at apex (Fig. 40); apical area with flat surface in frontal view exhibiting dense and fine long pubescence extending posteriorly to about mid length of ventral lobes (Figs 41–42); club-shaped dorsal flat surface elongate and extending towards basal attachment by two-thirds of total lobe distance; ventral lobes protruding laterally but visible in dorsal view only in basal half of their total length (Fig. 40). **Variability.** This species is generally smaller than *P. moesta*, with size in the range of 10.5–10.9 mm in total length and 6.1–6.4 mm in maximum width. The dorsal ornamentation varies little in extent in the few specimens currently known, with white markings covering most of the head, scutellar and elytral surfaces in extreme cases. In the eSwatini specimen, the colour of the elytral maculation is greyish-pink, but this appears to be a discolouring effect due to oil impregnation of the cuticle during preservation. Similar discolouring patterns have been observed in *Elaphinis cinereonebulosa*, *E. matatiele* sp. nov. and even in *P. umtamvuna* sp. nov. (cf. respective descriptions above and below). The female of *P. drakensbergica* sp. nov. is not known yet, but it is expected to be slightly broader than the male, with wider protibiae and shorter protarsi, reduced tomentose ornamentation on the dorsum, pygidium protruding beyond elytral apices and slight convexity on abdominal ventrites.

Differential diagnosis. Specimens belonging to this species have previously been included with some hesitation under *P. moesta*, as the genus was believed to be monotypic (cf. HOLM & PERISSINOTTO 2004). However, new material and more in depth analyses have now revealed that there are at least three species currently recognizable, all within South Africa with one partly in Lesotho and another in eSwatini too. In particular, the north-eastern populations already highlighted in HOLM & PERISSINOTTO (2004) as distinct in having smaller, more rounded bodies and elongated and merging spots on pronotum, typically represent *P. drakensbergica* sp. nov. This species lies at one extreme of the gradient in morphological characters observed across the series, exhibiting the broadest body shape and the most extensive tomentose ornamentation among the three species (Figs 35, 44, 53). Other diagnostic characters can be observed at the level of clypeal shape, protibial denticles development and aedeagal parameres morphology. More specifically, in *P. drakensbergica* sp. nov. the clypeus shows the widest apical situation and also the only sign of angulation along its lateral margins among the three species (Figs 38, 47, 56). The three protibial denticles are clearly visible in all three species, but they are most developed in *P. drakensbergica* sp. nov. and least in *P. moesta* (Figs 35, 44, 53). Finally, the aedeagal parameres of *P. drakensbergica* sp. nov. are the shortest, but also widest among the three species. Their dorsal lobes



Fig. 43. Typical grassland habitat of *Parelaphinis drakensbergica* sp. nov. on the plateau of the Platberg above Harrismith, Free State. Photograph: ©vrystaatconfessions.com.

exhibit a flat to gently inward sloping club-shaped area, which in this species extends all the way from just behind the apex to about one third of its total distance above the base, while it is restricted to the apical half in *P. moesta* and becomes even shorter and narrower in *P. umtamvuna* sp. nov. (Figs 40, 49, 58). In frontal view, the apical region of the lobes is approximately equally rounded in all three species, but the downward bend is minimal in *P. drakensbergica* sp. nov., intermediate in *P. moesta* and extreme in *P. umtamvuna* sp. nov. (Figs 42, 51, 60).

Etymology. The species is named after the Drakensberg Escarpment of southern Africa, where all specimens currently known originate from. The specific epithet is an adjective in the nominative singular.

Bionomy. So far, adult activity has been recorded only in late Austral spring and no other information is available on the biology of this species.

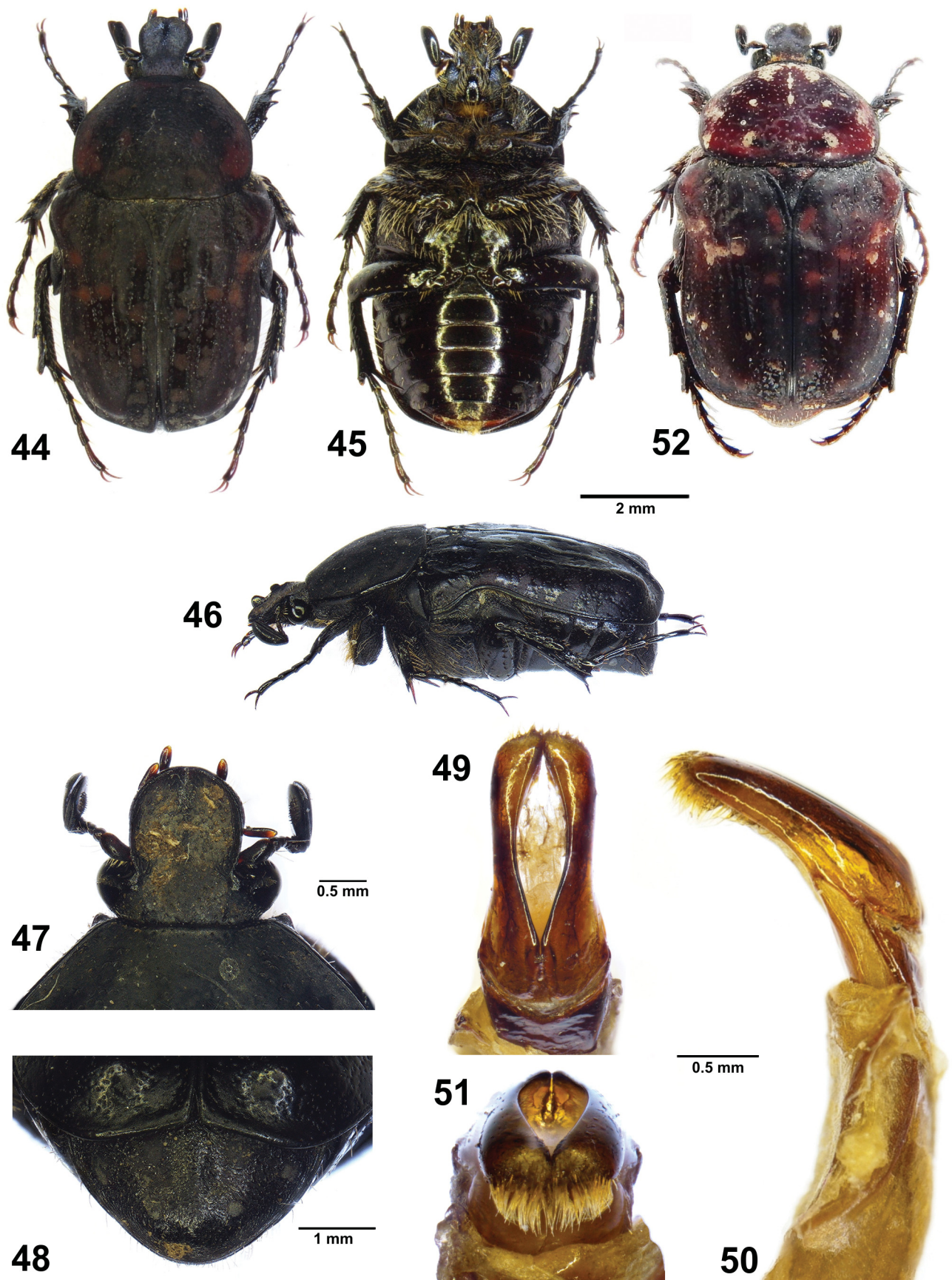
Distribution. This species appears to be restricted to high altitude areas (approximately 1500–2300 m) of the Drakensberg Escarpment, from the Platberg above Harrismith in the Free State (Fig. 43) to Dirkieisdorp in Mpumalanga and Sidwashini in eSwatini (Fig. 66). This area experiences a substantially higher annual rainfall (1000–2000 mm) than the western interior of South Africa, where the annual average can range between 100 and 1000 mm (COLE et al. 2018), with a gradient decreasing rapidly towards the semiarid karoid region. Thus, *P. drakensbergica* sp. nov. and *P. moesta* are allopatric and separated by the big geological, climatic and vegetation divide represented by the Maloti-Drakensberg Mountain Centre (CARBUTT 2019).

Parelaphinis umtamvuna sp. nov.

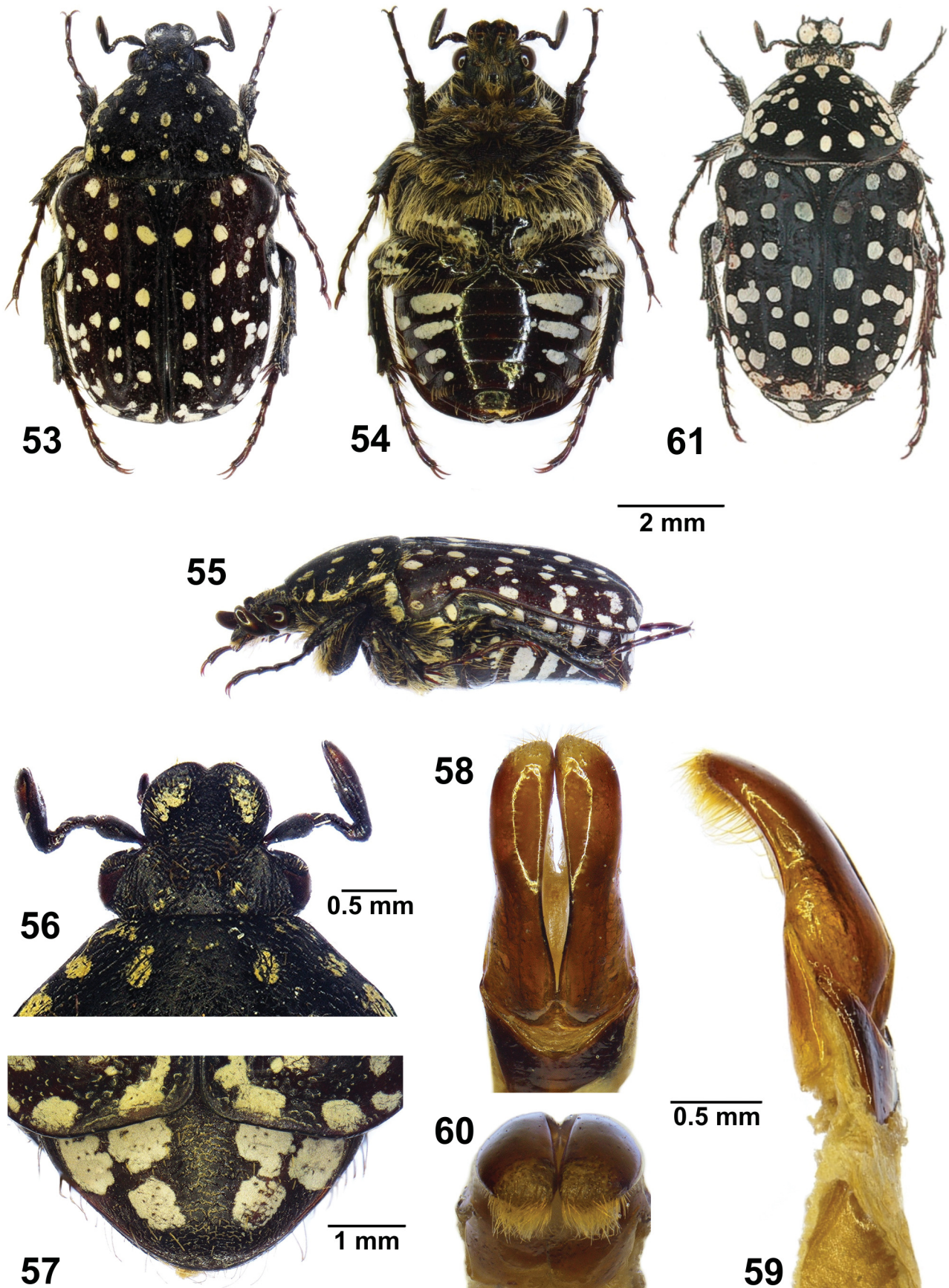
(Figs 44–52, 62)

Type material. HOLOTYPE: ♂, South Africa, KZN, Umtamvuna NR, 24 Oct 2004, R Perissinotto & L Clennell (SANC). PARATYPES: 3 ♂♂ 1 ♀, same data (BMPC); 3 ♂♂ 2 ♀♀, ibidem, 30 Oct 2004, R Perissinotto & L Clennell (BMCS, RPGS); 1 ♂ 1 ♀, ibidem, 8 Dec 2004, R Perissinotto & L Clennell (TGMF); 1 ♂ 3 ♀♀, ibidem, 1 Oct 2005, R Perissinotto & L Clennell (BMCS, RPGS); 3 ♂♂ 3 ♀♀, ibidem, 6 Oct 2011, R Perissinotto & L Clennell (RPGS, TGMF); 1 ♂ 1 ♀, ibidem, 17 Oct 2012, R Perissinotto & L Clennell (RPGS); 1 ♂, ibidem, 20 Nov 2012, R Perissinotto & L Clennell (TMSA); 1 ♀, ibidem, 10 Dec 2012, R Perissinotto & L Clennell (RPGS); 1 ♀, ibidem, 10 Nov 2013, R Perissinotto & L Clennell (RPGS); 1 ♀, ibidem, 27 Nov 2013, R Perissinotto & L Clennell (RPGS); 1 ♀, ibidem, 6 Dec 2013, R Perissinotto & L Clennell (TMSA).

Description of holotype male (Figs 44–51). *Body.* Black, velutinous, with dark grey maculation spread across entire



Figs 44–52. *Parelaphinis umtamvuna* sp. nov. 44–51 – holotype male; 52 – female. 44, 52 – dorsal habitus; 45 – ventral habitus; 46 – lateral habitus; 47 – clypeus; 48 – pygidium; 49 – parameres, dorsal view; 50 – parameres, lateral view; 51 – parameres, frontal view. Photographs: Lynette Clennell.



Figs 53–61. *Parelaphinis moesta* (Gory & Percheron, 1833). 53–60 – male; 61 – female. 53, 61 – dorsal habitus; 54 – ventral habitus; 55 – lateral habitus; 56 – clypeus; 57 – pygidium; 58 – parameres, dorsal view; 59 – parameres, lateral view; 60 – parameres, frontal view. Photographs: Lynette Clennell (53–60), Gerhard Beinhundner (61).

surface, turning pink to brick-red in some areas of pronotum and elytra as result of preservation; with moderately dense round sculpture on head, becoming more scattered and horse-shoe shaped on pronotal declivities but very sparse and horse-shoe to groove-shaped on pronotal disc, scutellum and elytra; dorsum virtually glabrous, with very sparse and short light setae on head surface, pronotal and elytral declivities but lacking completely on pronotal and elytral disc as well as scutellum (Figs 44, 46, 47).

Size. Total length = 11.3 mm; maximum width = 6.4 mm.

Head. Black with extensive grey tomentum across entire surface, except around apical sinuation; clypeus deeply concave with extremely narrow indentation at apex and lateral margins smoothly rounded; all margins sharply upturned and reflexed; entire surface covered in regularly spaced round punctures, but sculpture becoming more dense and irregular around clypeal apex and on margins; few sparse and extremely short pale-yellow setae distributed along entire surface, becoming longer and denser on ocular canthus; antenna black to dark brown, with club approximately as long as flagellum; thin light setae scattered across flagellum, becoming thicker and denser on pedicel (Fig. 47).

Pronotum. Black and velutinous, with grey (turning pink to brick red upon preservation) tomentose areas vaguely forming three coarse dotted longitudinal lines across disc and continuous lining on lateral margins, becoming most expanded just above postero-lateral corners; without any tubercle or ridge in apical area; with rather scattered and shallow round to horseshoe punctures on declivities, virtually disappearing on disc; few, extremely short light setae visible only along lateral margins and declivities; all margins smoothly rounded with minor angulation only on antero-lateral deflections (Figs 44, 46).

Scutellum. Black, velutinous and glabrous, without any trace of tomentose maculation; large but shallow horseshoe punctures equally scattered along entire perimeter, but absent in central part of disc; broadly equilateral triangular in shape, with acute apex and lateral margins inwardly arcuate; lateral grooves moderately wide and deep along entire margins (Fig. 44).

Elytron. Black and velutinous, with extensive grey maculation spread across entire surface (turning pink to brick-red in some areas due to preservation); first, third and fifth elytral costae moderately well developed and clearly visible; humeral callus protruding outwards and subhumeral arch deeply sinuate; posterior margin remarkably linear and without projections or upturning at apex; narrow and shallow horseshoe to grooved sculpture regularly distributed along basal half of striae and on antero-lateral declivities, becoming smaller and sparser on postero-lateral and apical declivities; surface generally glabrous, with few scattered minute setae on lateral and apical declivities (Figs 44, 46).

Pygidium. Hemispherical in shape, with smoothly rounded, domed apex and marked depressions on baso-lateral corners; with pair of larger, dark grey maculae in medio-basal position and two pairs of smaller maculae,

first in latero-basal position and second on sides of apical dome; with dense but shallow rugulose sculpture across entire surface, but hidden in areas covered by grey maculae; glabrous on disc, with few fine light-yellow setae scattered along lateral margins and apex (Fig. 48).

Legs. Black and densely sculptured, with brown claws and tips along spinal margins; tarsomeres moderately elongate, with apical ones about 1.5 times longer than preceding units and all claws gently arcuate; tibiae with coarse and irregular sculpture, covered in sparse and short light-yellow setae, becoming longer and denser on inner margins and from pro- to metatibia; protibia tridentate, with two apical teeth equally well developed, but proximal tooth drastically reduced in size; mesotibia with prominent bidentate medio-distal spine and tridentate apical spine, spurs brown and moderately elongate, thin and sharp; metatibia with outer carina bearing one large but blunt medio-distal tooth, spurs brown substantially more elongate than in mesotibia and sharp (Figs 44–46).

Ventral surface. Black and shiny with small grey tomentum spots visible only near lateral margins of abdominal ventrites; covered in dense and long light-yellow to tawny setae from pro- to metasternum, but setae becoming very sparse on metacoxa, central femoral surfaces, lateral margins of abdominal ventrites, and virtually disappearing in mesometasternal region and on disc of abdominal ventrites; mesosternal lobe flattish, smoothly rounded at apex and not protruding either forward or downwards; metasternal surface exhibiting sparse round to horse-shoe punctures with setae emerging at their centre, and wide concavity along entire median sulcus in shape of oblong arrow head; abdominal ventrites with slight concavity at centre (Fig. 45).

Aedeagus. Parameres elongate, with dorsal lobes laterally constrained at centre, expanding then slightly in apical half and smoothly rounded at apex (Fig. 49); apical area bending remarkably downwards, with dense and fine long pubescence extending posteriorly to about one third of total length of ventral lobes (Figs 50, 51); club-shaped dorsal flat surface drastically reduced and extending towards basal attachment by barely one third of total lobe distance; ventral lobes protruding laterally but visible in dorsal view only in basal third of their total length (Fig. 49).

Variability. This species is generally small, attaining the smallest size among the three species of *Parelaphinis*, in the range of 9.8–12.2 mm in total length and 5.3–6.9 mm in maximum width. Its body is consistently black and velutinous, with variable degrees of dark grey maculation, which may turn pink to brick-red in some preserved specimens (e.g. Fig. 44). In extreme cases, males may lack entirely any maculation, while females always retain some residual spots. Females are also slightly broader than their male counterparts, have wider protibiae but shorter protarsi and antennal clubs (Fig. 52). Their pygidium protrudes beyond the elytral apices and the abdominal ventrites exhibit a moderate convexity. Furthermore, the metatibial spurs of the female are spatulate and the apical edge of its metatibia is only

mildly serrated, while in the male these are bluntly acuminate and markedly serrated, respectively.

Differential diagnosis. As indicated above, under the description of *P. drakensbergica* sp. nov., this species lies at the other extreme of the gradient in morphological characters observed across the genus, exhibiting the narrowest body shape and the most regressive tomentose ornamentation among the three species (Figs 35, 44, 53). Unlike in the other two species, the maculation of *P. umtamvuna* sp. nov. is actually grey, not white, and it can get so dark to the point of becoming undetectable in some extreme male specimens. Other diagnostic characters can be observed at the level of clypeal shape, protibial denticles development and aedeagal parameres morphology. In *P. umtamvuna* sp. nov., the clypeus shows the most reduced apical sinuation, along with the most rounded lateral margins among the three species of the genus (Figs 38, 47, 56). The development of the three protibial denticles in *P. umtamvuna* sp. nov. is intermediate between the most expanded type exhibited by *P. drakensbergica* sp. nov. and the least pronounced type seen in *P. moesta* (Figs 35, 44, 53). Finally, the aedeagal parameres of *P. umtamvuna* sp. nov. possess the longest, and narrowest lobes among the three species. The flat to gently inward sloping club-shaped area of the dorsal lobes in this species extends merely one third behind the apex and is, therefore, the shortest among the three species (Figs 40, 49, 58). In frontal view, the apical region of the lobes shows an extreme degree of downward bending, while this is minimal in *P. drakensbergica* sp. nov. and intermediate in *P. moesta* (Figs 42, 51, 60).

Bionomy. Adult activity has been recorded throughout the Austral spring, with most records in October. Few specimens have been observed in low flight, just above the ground, in the hottest part of the day and only immediately after a substantial rainfall event. Most specimens were retrieved from underground, on rocky terraces where large accumulations of leaf litter with high moisture content had been retained by plant roots or networks of mosses and lichens (Fig. 62). Larvae and cocoons collected in the wild were also reared successfully in the laboratory, under environmental controlled conditions and using their natural food substrate, while spraying water at regular weekly intervals until pupation.

Etymology. The species is named after the Umtamvuna River, on the escarpment of which all specimens currently known originate from (Fig. 64). The specific epithet is a noun in the nominative singular.

Distribution. This species is so far only known from the upper valley of the Umtamvuna River, on the KwaZulu-Natal side (Fig. 66). Like the Drakensberg range, this area also experiences a much higher annual rainfall than the western interior of South Africa. Searches in adjacent rivers and tributaries have so far failed to reveal other populations in this province. It is, however, likely that the species occurs also on the Eastern Cape side of this and perhaps other rivers in its vicinities.

Parelapaphis moesta (Gory & Percheron, 1833)

(Figs 53–61, 63)

Cetonia moesta Gory & Percheron, 1833: 292.

Cetonia moesta: PÉRINGUEY (1907): 340; SCHENKLING (1921): 305.

Elaphinis moesta: BURMEISTER (1842): 598.

Atrichelaphinis moesta: KRAATZ (1898): 220.

Cetonia bella MacLeay, 1838: 46; LACORDAIRE (1856): 526; PÉRINGUEY (1907): 340.

Micrelaphinis brincki Schein, 1960: 99.

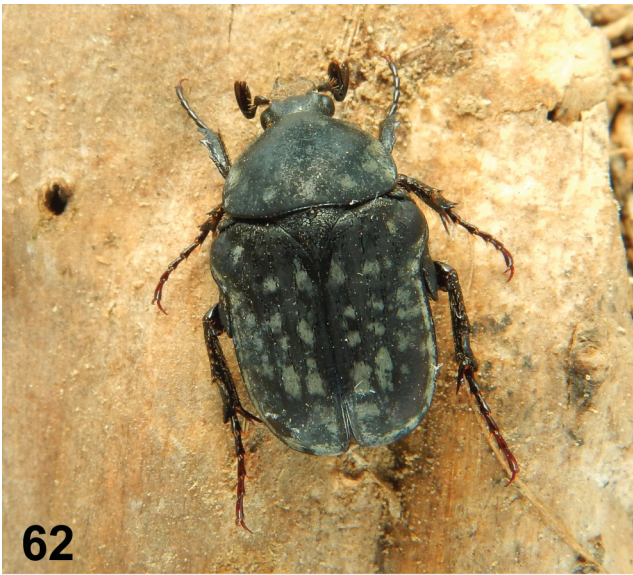
Parelapaphis moesta: MARAIS & HOLM (1989): 29; HOLM & MARAIS (1992): 174; HOLM & STOBIA (1995): 300; HOLM & PERISSINOTTO (2004): 87; MALEC & ŠÍPEK (2016): 62; MALEC & ŠÍPEK (2017): 71; BEINHUNDNER (2017): 258.

Type material. *Cetonia moesta*: HOLOTYPE: ♀, “Gory type”, “*moesta* GP, *bella* M. Leay, Caffria”, “Coll. Melly” (MHNG).

Cetonia bella: LECTOTYPE: ♂, “Int. S. Afr. 43 19”, “*Cet. multiguttata* Melly, Int. S. Afr., Earl of Derby” (BMNH).

Micrelaphinis brincki: HOLOTYPE: ♂, “S. Afr. Cape Prov, 2 miles W Rhodes, 11.III.1951, No 226”, “Swedish South Africa Expedition 1950-1951, Brinck-Rudebeck” (MZLU, Type no 3:1).

Additional material examined. LESOTHO: 1 ind., [Alwyns Kop?] 1500 m, Orange riv. Valley, SE 3027 Be (MARAIS & HOLM 1989: 32). SOUTH AFRICA: EASTERN CAPE: 1 ♂, *Micrelaphinis moesta*, Compared to Type, *Micrelaphinis brincki* Schein, ♂, type locality 2 miles W. Rhodes (Cape), Lund Univ. Sweden, Compared to Type, *moesta* Gory & Percheron, type locality Cape, Genève, Switzerland (TMSA-CPH2084); East London, SE 3327 Bb (MARAIS & HOLM 1989: 32); 1 ind., Middelburg, 18 Dec 1985, Pitfall trap (unbaited), M de Jager (SANC-COLS-14997); n inds, Steynsburg, SE 3125 Bd (MARAIS & HOLM 1989: 32); 1 ♂ 1 ♀, Compassberg, 15 Dec 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, 8 Feb 1998 (RPGS); 1 ♂ 1 ♀, ibidem, 8 Mar 1998 (BMPC); 1 ♂ 1 ♀, ibidem, Mar 1998 (GBEG); 1 ♀, Huntly Glen, Bedford, 25 Jan 1997, R Perissinotto & L Clennell (RPGS); 1 ♀, ibidem, 3 Feb 1999 EL Pringle (EPBS); 1 ♂, ibidem, 19 Jan 2004, EL Pringle (EPBS); 1 ♀, ibidem, 11 Jan 2006, EL Pringle (EPBS); 1 ♂, ibidem, 8 Jan 2008, EL Pringle (EPBS); 1 ♀, ibidem, 19 Jan 2009, EL Pringle (EPBS); 1 ♂, Bavianskloof, 25 Dec 1999, R Perissinotto & L Clennell (BMCS); 1 ♀, Nr Grahamstown, 10 Mar 1992, R Perissinotto & L Clennell (BMCS); 1 ♀, Mountain Zebra NP, 15 Jan 1997, R Perissinotto & L Clennell (BMCS); 1 ♂, Graaf-Reinet, 16 Dec 2004, R Perissinotto & L Clennell (BMCS); 1 ♂ 1 ♀, ibidem, Mar 2005, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, 31 Dec 2007, R Perissinotto & L Clennell (TGMF); 1 ♀, ibidem, Jan 2009, R Perissinotto & L Clennell (TGMF); 1 ♂, Hofmeyr, 26 Dec 2011, R Perissinotto & L Clennell (BMCS); 2 ♂♂, Aberdeen, 19 Jan 2009, EL Pringle (EPBS); 2 inds, Chris Hani (Camdeboo), Sneeuwege Mountains, Nieu-Bethesda, 31°50'39.34"S, 24°31'51.14"E, 1450 m, 30 Dec 2014, on *Helichrysum hamulosum* (MALEC & ŠÍPEK 2016: 62–63, fig 13); 1 ind., Chris Hani (Tsolwana), Winterberge Mountains, along R344, 1000–1650 m, 1 Jan 2015, on *Daucus carota* (MALEC & ŠÍPEK 2016: 62–63, fig 14); 1 ind., Sarah Baartman District (Dr Beyers Naudé Municipality); Naudésberg Pass 1445 m, 2 Jan 2017; dead along roadside (MALEC & ŠÍPEK 2017: 62). FREE STATE: 1 ♀, Zastron, 6 Jan 2000, R Perissinotto & L Clennell (HOLM & PERISSINOTTO 2004: 87). GAUTENG: 1 ♂, Transvaal, Klipportje, Parkhill Rd. [locality doubtful], Cornet (TMSA-CPH2086). NORTHERN CAPE: 1 ♀, Hantamsberg, Calvinia, 1 Jan 1997, Giannatelli, Stobbia & Marais (TMSA); 2 ♂♂ 1 ♀, ibidem, Dec 1996, R Giannatelli & P Stobbia (TGMF); 35 ♂♂, 15 ♀♀, Calvinia 15-16 Dec 1995, AP & ME Marais (BMCS, TMSA, ISAM COL-A027380); n inds, ibidem, 15.XII.1995, J Ball & AP Marais (HOLM & STOBIA 1995: 300); 1 ♀, ibidem, emerged 21 Mar 1996, AP & ME Marais (BMCS); 10 ♂♂ 6 ♀♀, ibidem, emerged 23 Mar 1996, AP & ME Marais, ex Coll. JB Ball & AP Marais (ISAM COL-A067949); 1 ♀, ibidem, 25 Dec 1996, AP & ME Marais (BMCS); 1 ♂ 1 ♀, ibidem, 27 Dec 1996, R Perissinotto & L Clennell (BMCS); 1 ♀, ibidem, 2 Jul 1997, Coll. R Alexis (RBINS); 1 ♀, Kikvorsberg, Mar 2005, R Perissinotto & L Clennell (BMCS); 1 ♂, ibidem, Oct 2005, R Perissinotto & L Clennell (BMCS); 1 ♂, Gr Tafelberg, 2 Jan 2006, R Perissinotto & L Clennell (BMCS). WESTERN CAPE: 1 ♂, Plettenbergbaai [upper Keurboom River], 23 Dec 1995, R Perissinotto & L Clennell (TMSA); 1 ♂, ibidem, 28 Dec 2010, R Perissinotto & L Clennell (BMCS). CAPE PROVINCE [not resolved]: 1 ♂, *Cetonia herschellii*, M.L. Caffria, *Elaphinis (Parelapaphis) moesta* G&P, det. E. Marais 1987, Macleay Museum, University of Sydney, 2006 Australia (TMSA-CPH2085).



Figs 62–65. 62–63 – males of *Parelaphinis umtamvuna* sp. nov. (62) and of *P. moesta* (Gory & Percheron, 1833) (63) in their respective natural habitats on the Umtamvuna and Sneeuberge, respectively. 64–65 – typical habitat of *Parelaphinis umtamvuna* sp. nov. on the escarpment of the Umtamvuna River valley in southern KwaZulu-Natal (64) and of *P. moesta* on the escarpment of the Hantamsberg plateau above Calvinia, Northern Cape (65). Photographs: Lynette Clennell (62, 64), Petr Malec (63), David Bilton (65).

Remarks. This species has recently been collected in several provinces on the western interior of South Africa, including Free State, Western, Eastern and Northern Cape, as well as Lesotho (Fig. 66). However, the records of smaller and more rounded specimens with merging spots on dorsum regarded as ‘north-eastern populations’ of this species in HOLM & PERISSINOTTO (2004) are actually representative of the new species *P. drakensbergica* sp. nov. described above. An unusually dark specimen (TMSA-CPH2086), with reduced white maculation on the dorsum and with label data referring to a locality in the Gauteng Province (Klipportje, Parkhill Rd.), appears to represent an outlier (Fig. 66). However, its aedeagus fits remarkably well into the typical shape observed in *P. moesta*. This, combined with the rather amateurish data label accompanying this specimen (handwritten, no date), and the fact that no other specimens have ever been recorded from this province despite it being one of the traditional centres of entomological research in the country, leads to the conclusion that the specimen in question may have been mislabelled with

a wrong locality. Another apparent outlier is the locality record of Hantamsberg, above the Northern Cape town of Calvinia (Fig. 65), which represents the westernmost range of the species distribution, being situated approximately 400 km to the west of the closest records currently known for this species (Fig. 66). However, repeated collections have been made at this locality and several specimens have been analysed in great detail, confirming their remarkable similarity to the typical morphology observed in *P. moesta* across its mainly Eastern Cape range. The Hantamsberg specimens can though attain the largest size observed in the species, with a total length at time reaching 15 mm, and consistently exhibit neatly rounded tomentose spots across their dorsal surface (HOLM & PERISSINOTTO 2004, BEINHUNDNER 2017).

As already reported in MARAIS & HOLM (1989) and HOLM & MARAIS (1992), sexual dimorphism in this species is rather moderate and similar to that observed in most other Cetoniini species. The female is slightly broader than its male counterpart, has wider protibiae but shorter protarsi

and antennal clubs (Fig. 61). Its pygidium protrudes beyond the elytral apices and the abdominal ventrites exhibit a moderate convexity; its metatibial spurs are spatulate rather than acuminate like in the male and its distal metatibial edge is undulated rather than serrated.

Most specimens of *P. moesta* have been dug out from underground, often within or around dunghills of hyrax, *Procavia capensis* (HOLM & PERISSINOTTO 2004, MALEC & ŠÍPEK 2016). In the Western and Northern Cape, specimens were also found on the roots of *Senecio leptophyllus* (HOLM & PERISSINOTTO 2004), while a few observations have also been made of specimens feeding on flowers of herb and shrub species, such as *Helichrysum hamulosum* (Fig. 63) and *Daucus carota* (MALEC & ŠÍPEK 2016; pers. obs.). Adults seem to be active from late Austral spring till the end of summer, with peak in December–January. Observations of airborne individuals are scarce, as flight generally occurs immediately after substantial rainfall and is generally limited to short distances and heights above the ground (pers. obs.). Both larvae and pupae in their cocoons were retrieved in number within detrital deposits on rocky platforms and crevices at the top of the Hantamsberg (Northern Cape) by AP and ME Marais in the mid 1990s. Many of these were successfully reared to adulthood, by keeping them in a garage at cool temperatures and with moisture regularly controlled (A. P. Marais, pers. comm.).

Identification key to the species of *Parelaphinis*

- 1 Dorsal habitus with extensive white tomentose maculation. 2
- Dorsal habitus with tomentose maculation grey and reduced in extent; body shape narrower than in other two species; clypeus with extremely reduced apical sinuation and sides smoothly rounded; aedeagal parameres narrow and elongate; distribution: South Africa (ZNS). *P. umtamvuna* sp. nov.
- 2 Dorsal maculation consisting of well-separated, round to oval spots; clypeus with moderate apical sinuation and sides smoothly rounded; body size larger, with TL = 11–15 mm; aedeagal parameres wide and elongate; distribution: South Africa (EC, FS, NC, WC), Lesotho. *P. moesta* (Gory & Percheron, 1833)
- Dorsal maculation dominated by coalesced spots, forming even longitudinal midline on pronotum; clypeus with wide apical sinuation and angulation along antero-lateral margins; body size smaller and more rounded in shape, with TL = 10–12 mm; aedeagal parameres short and wide; distribution: South Africa (FS, MP), eSwatini. *P. drakensbergica* sp. nov.

Discussion

Two subgenera are currently recognised within the genus *Elaphinis*, the nominal and *Micrelaphinis*. *Micrelaphinis* currently includes five species distributed across southern and east Africa (MARAIS & HOLM 1989, BEINHUNDNER 2017). On the other hand, *Elaphinis* s. str. has so far been regarded as monotypic, with the species *E. (E.) cinereonebulosa* as the only member of the subge-

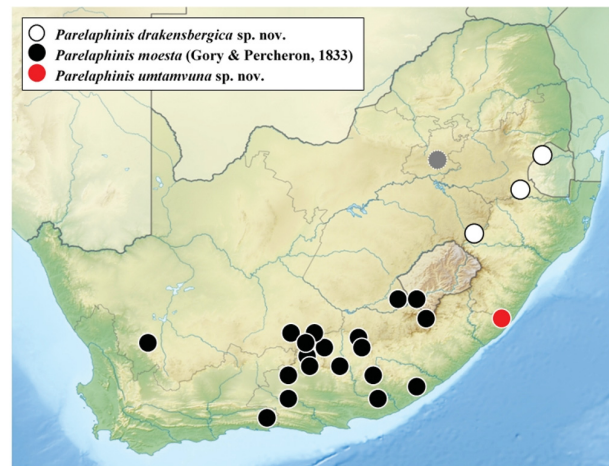


Fig. 66. Known distribution of *Parelaphinis moesta* (Gory & Percheron, 1833), *P. drakensbergica* sp. nov. and *P. umtamvuna* sp. nov. within southern Africa (map adapted from www.wikimedia.org); grey dot indicates doubtful record of *P. moesta* from Gauteng, as discussed in text.

nus and restricted to the western, semiarid half of South Africa (HOLM & MARAIS 1992, MALEC & ŠÍPEK 2017). Thus, the description of *E. (E.) matatiele* sp. nov. herein adds a second species adapted to the wetter, eastern part of South Africa on the foothill of the Drakensberg range (Fig. 23). This roughly mirrors the situation of its sister genus, *Parelaphinis*, which with the description of two new species in the eastern part of the country, now includes three species with distribution ranges demarcated by climatic and vegetation gradients.

The phylogenetic position of these two genera remains unfortunately still uncertain. MARAIS & HOLM (1989) had already highlighted the difficulties associated with the identification of their key characters as plesiomorphic versus apomorphic. Although they placed both genera unreservedly within the Cetoniini, they proposed a possible tracing link with some Diplognathini, with potential origin from genera such as *Anoplocheilus* MacLeay, 1838 or *Tetragonorrhina* Kraatz, 1896 (MARAIS & HOLM 1989). Although the inclusion of *Elaphinis*, *Micrelaphinis* and *Parelaphinis* in the Cetoniini appears to be consistent across all modern authors, this tribe is extremely large and has been subjected to numerous swaps of genera throughout its taxonomic history (cf. SCHOCH 1894, SCHENKLING 1921, KRIKKEN 1984, HOLM & MARAIS 1992, KRAJČÍK 1998, SAKAI & NAGAI 1998, BEINHUNDNER 2017). More recently, DNA sequences conducted on a comprehensive set of the Cetoniinae has shown that most of the currently recognised tribes, including the Cetoniini, are actually poly- or paraphyletic (ŠÍPEK et al. 2016). Quoting from these authors: ‘results suggest that Cetoniini (s.l.) is currently subject to ‘oversplitting’ and is in need of future reclassification’.

Elaphinis s. str. and *Parelaphinis* are genera restricted to southern Africa and are still very poorly known, due mainly to the remoteness and often inaccessibility of their mountain habitats (MARAIS & HOLM 1989; MALEC & ŠÍPEK 2016, 2017). Adult activity on the surface is very limited and apparently restricted to short periods immediately

after substantial rainfall, when the soil is replenished with moisture. To add to this, unlike the species in the subgenus *Micrelaphinis*, adults of *Elaphinis* s. str. and *Parelaphinis* generally do not feed, with the exception of a few *P. moesta* individuals, which have occasionally been observed on flowers (MALEC & ŠÍPEK 2016; pers. obs.). Thus, until fairly recently the specimens available for study were extremely few and collected on fortuitous occasions by amateur workers. However, since the late 1990s, more informed and dedicated searches have been undertaken, leading to the discovery of several well-established populations and even new species across the region, particularly in semiarid and high altitude habitats. All developmental stages of *Parelaphinis*, including adults, have generally been unearthed from rock crevices or terraces covered with leaf litter or hyrax dung deposits (HOLM & PERISSINOTTO 2004, specimens data labels), while those of *Elaphinis* s. str. were dug out from sandy terrain characterized by large accumulations of livestock (e.g. cattle, goats, sheep) dung at the surface (MALEC & ŠÍPEK 2017; pers. obs.). However, adults of this latter genus were most often found at the surface of such accumulations, either crawling or flying just above the substratum, but only immediately after rainfall when the soil was repleted with moisture. Adult specimens of either genera do not appear to emerge under drought conditions, even in summer under their normal peak period of activity, remaining rather in diapausal state within their cocoons until rain falls (pers. obs.).

Although the immature stages of both genera remain undescribed (cf. ŠÍPEK & KRÁL 2012), both larvae and pupae of most species have been collected in fair numbers in recent years (A. P. Marais, pers. comm.; MALEC & ŠÍPEK 2017). Larval growth is generally dependent on herbivore dung to a large extent. As reported above, larvae of the two *Elaphinis* s. str. species propagated in captivity have shown very long pre-pupal dormancy and high mortality rates (MALEC & ŠÍPEK 2017; P Malec, pers. comm.), but 3rd instar larvae of *P. moesta* and *P. umtamvuna* collected in the wild were successfully reared to adulthood under controlled conditions (pers. obs.). Notwithstanding these breeding issues, several larvae are now available for description and study, and this could reveal invaluable information on the phylogenetic position of these two genera and their broader clade.

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References

- ANTOINE PH. 1991: Révision des genres *Dolichosthetus* Kolbe et *Dulcinea* Péringuey (Coleoptera, Cetoniidae). *Revue Française d'Entomologie, Nouvelle Série* **13**: 1–3.
- BEINHUNDNER G. 2017: *The Cetoniinae of Africa*. Gerhard Beinhundner, Euerbach, 1199 pp.
- BOHEMAN C. H. 1848: *Insecta Caffraria, annis 1838-1845 a J.A. Wahlberg collecta, Vol. 1*. Ex Officina Norstedtiana, Holmiae, 626 pp.
- BOHEMAN C. H. 1857: *Insecta Caffrariae, annis 1838-1845 a J.A. Wahlberg collecta, amici auxilio suffultus Vol. 2*. Ex Officina Norstedtiana, Holmiae, 395 pp.
- BURMEISTER H. 1842: *Handbuch der Entomologie* 3. T.E.F. Enslin, Berlin, 828 pp.
- CARBUTT C. 2019: The Drakensberg Mountain Centre: A necessary revision of southern Africa's high-elevation centre of plant endemism. *South African Journal of Botany* **124**: 508–529.
- CHISHOLM H. 1911: "Kaffraria". *Encyclopædia Britannica*, 15 (11th ed.). Cambridge University Press, Cambridge, pp. 629–630.
- COLE M. J., BAILEY R. M., CULLIS J. D. S. & NEW M. G. 2018: Spatial inequality in water access and water use in South Africa. *Water Policy* **20**: 37–52.
- DE GEER C. 1778: *Mémoires pour servir à l'histoire des insectes, Tome septième*. Pierre Hesselberg, Stockholm, 950 pp.
- DISTANT W. L. 1911: *Insecta Transvaaliensia. A contribution to the knowledge of the entomology of Southern Africa, 1*. W.L. Distant, London, 299 pp.
- FABRICIUS J. C. 1798: *Supplementum entomologiae systematicae*. Hafniae, 572 pp.
- GERSTAECKER A. 1884: Bestimmungen der von Herrn Dr.G.A.Fischer während seiner Reise nach dem Massai-Land gesammelten Coleopteren. *Jahresbuch der Hamburgischen Wissenschaftlichen Anstalten* **1** [1883]: 43–63.
- GORY H. & PERCHERON A. 1833: *Monographie des cétoines et genres voisins, formant, dans les familles naturelles de Latreille, la division des scarabées mélicophiles*. J.-B. Baillié, Paris, 410 pp. + 77 pls.
- HOLM E. & MARAIS E. 1992: *Fruit chafers of Southern Africa (Scarabaeidae: Cetoniini)*. Ekogilde, Pretoria, 326 pp.
- HOLM E. & PERISSINOTTO R. 2004: New and lesser known species of African fruit chafers (Coleoptera Scarabaeidae Cetoniinae). *Tropical Zoology* **17**: 73–95.
- HOLM E. & STOBBIJA P. 1995: Fruit chafers of Southern Africa (Scarabaeidae: Cetoniinae). Appendix I. *Giornale Italiano di Entomologia* **7**: 289–300.
- JANSON O. E. 1878: Notices of new or little known Cetoniidae No. 4. *Cistula Entomologica* **2** [1875–1882]: 299–304.
- KRAATZ G. 1896: Ueber die Gattung *Micrelaphinis* Schoch. *Deutsche Entomologische Zeitschrift* **3**: 350–352.
- KRAATZ G. 1898: Bemerkungen zum Nachtrag VI von Schoch's "Genera und Species seiner Cetoniden-Sammlung". *Deutsche Entomologische Zeitschrift* **1898**: 217–224.
- KRAJČÍK M. 1998: *Cetoniidae of the World. Catalogue - Part I*. Typos Studio, Most, Czech Republic, 96 + 36 pp.
- KRIKKEN J. 1984: A new key to the suprageneric taxa in the beetle family Cetoniidae, with annotated lists of the known genera. *Zoologische Verhandlungen Leiden* **210**: 3–75.

- LACORDAIRE T. 1856: *Histoire naturelle des insectes. Genera des coléoptères ou exposé méthodique et critique de tout les genres proposés jusqu'ici dans cet ordre d'insectes. Tome troisième.* Librairie encyclopédique de Roret, Paris, 594 pp. + 40 pls.
- MACLEAY W. S. 1838: On the Cetoniidae of South Africa. Pp. 1–52. In: SMITH A. (ed.): *Illustrations of the zoology of South Africa; consisting chiefly of figures and descriptions of the objects of natural history collected during an expedition into the interior of South Africa, in the years 1834, 1835 and 1836; fitted out by the Cape of Hope Association for exploring Central Africa. Volume 5. Invertebrata.* Smith, Eider & Co., London, 72 pp. + 4 pls.
- MALEC P. & ŠÍPEK P. 2016: On the cetoniine fauna of Eastern Cape (EC) and KwaZulu-Natal (KZN) and the basic guidelines to captive breeding of these beetles (Coleoptera, Scarabaeidae, Cetoniinae). *Cetoniimania N. S.* **9**: 54–80.
- MALEC P. & ŠÍPEK P. 2017: Additional notes on the biology and ecology of the Cetoniinae fauna of Eastern Cape (EC) and KwaZulu-Natal (KZN) and remarks on captive breeding of these beetles (Coleoptera, Scarabaeidae, Cetoniinae). *Cetoniimania N. S.* **12**: 35–75.
- MARAIS E. & HOLM E. 1989: Synonymic notes on the African Cetoniinae IV: Genus *Elaphinis* Burmeister (including *Micrelaphinis* Schoch and a new genus) (Coleoptera: Scarabaeidae). *Cimbebasia* **11**: 19–32.
- MARAIS E. & HOLM E. 1992: Type catalogue and bibliography of the Cetoniinae of Sub-Saharan Africa (excluding Trichiini and Valgini) (Coleoptera: Scarabaeidae). *Cimbebasia Memoir* **8**: 1–125.
- OLIVIER G. A. 1789: *Entomologie, ou histoire naturelle des Insectes, avec leurs caractères génériques et spécifiques leur description, leur synonymie, et leur figure enluminée. Coléoptères. Tome premier.* Baudouin, Paris, xx + 433 + xxi pp [each genus paginated separately].
- PÉRINGUEY L. 1907: Descriptive catalogue of the Coleoptera of South Africa (Lucanidae and Scarabaeidae). *Transactions of the South African Philosophical Society* **13**: 1–546.
- PÉRINGUEY L. 1908: Descriptive catalogue of the Coleoptera of South Africa. Additions and corrections. *Transactions of the South African Philosophical Society* **13**: 547–752.
- SAKAI K. & NAGAI S. 1998: *The Cetoniine Beetles of the World. Mushi-Sha's Iconographic Series of Insects, Vol. 3.* Mushi-Sha, Tokyo, 421 pp.
- SCHEIN H. 1960: Chapter VI. Coleoptera (Scarabaeidae): Cetoniinae and Trichiinae. *South African Animal Life* **7**: 83–112.
- SCHENKLING S. 1921: Pars 72. Scarabaeidae: Cetoniinae. In: SCHENKLING S. (ed.): *Coleopterorum Catalogus. Volumen XXI.* W. Junk, Berlin, 431 pp.
- SCHOCH G. 1894: Über die Systematik der Cetoniden. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* **9**: 164–225.
- SCHOCH G. 1895: II. Teil: Tribes Cetoniadae, Diplognathidae und Cremastochilidae. Pp. 86–147 + 1. In: *Die Genera und Species meiner Cetoniden - Sammlung.* E. Zwingli, Zürich, 147 + 1 pp.
- SCHOCH G. 1896: Einige neue Cetoniden. *Entomologische Nachrichten* (Berlin) **22**: 328–332.
- SCHOCH G. 1897: Nachtrag V zu Schoch: Die Genera und Species meiner Cetonidensammlung. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* **10**: 37–60.
- SCHÖNHERR C. J. 1817: *Synonymia insectorum, oder: Versuch einer Synonymie aller bisher bekannten Insecten; nach Fabricii Systema Eleutheratorum geordnet. Erster Band. Eleutherata oder Käfer. Dritter Theil.* E. Brunelius, Upsala, XII + 506 pp.
- ŠÍPEK P., FABRIZI S., EBERLE J. & AHRENS D. 2016: A molecular phylogeny of rose chafers (Coleoptera: Scarabaeidae: Cetoniinae) reveals a complex and concerted morphological evolution related to their flight mode. *Molecular Phylogenetics and Evolution* **101**: 163–175.
- ŠÍPEK P. & KRÁL D. 2012: Immature stages of the rose chafers (Coleoptera: Scarabaeidae: Cetoniinae): a historical overview. *Zootaxa* **3233**: 1–26.

