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Description of a new species of *Anoplocheilus* MacLeay, 1838 from South Africa, with review of the genus (Coleoptera: Scarabaeidae, Cetoniinae)

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Abstract
A new species of *Anoplocheilus* (*Anoplocheilus*) MacLeay, 1838 closely related to *A.* (*A.*) *rusticus* (Gory & Percheron, 1833) is hereby described from freshly collected and revisited old material. Unlike its sister species, which is restricted to the west and south coastal regions of South Africa, the new species occurs inland, above the Great Escarpment and in adjacent mountain ranges of the Cape Fold Belt. The recently erected subgenus *Nselenius* Holm & Perissinotto, 2004, is here elevated to full genus, given the rather unique features of the only species currently known, *N. silvicola* stat. nov., and its closest proximity to *Lamellothyrea* Krikken, 1980, rather than *Anoplocheilus* s. str. Furthermore, another species also allocated originally to *Anoplocheilus* with great reservation by the original authors themselves, is now transferred to the genus *Diphrontis*, as *D. matilei* (Antoine & Lequeux, 2001) comb. nov., since it shares most external and aedeagal key characters with species belonging to that genus.

Keywords: Diplognathina, new and revised taxa, Afrotropical Region, South Africa.

http://zoobank.org/urn:lsid:zoobank.org:pub:D2A9D051-56D3-42F7-9659-89050F580304

Introduction

Recent material, emerged from both new and old collections, has revealed that there is at least one new, cryptic species of *Anoplocheilus* s. str. MacLeay, 1838 that may have been previously overlooked and confused with *A.* (*A.*) *rusticus* (Gory & Percheron, 1833). During the course of this work, after reviewing all the members currently recognised within the genus, it has also become obvious that a few species do not exhibit sufficient diagnostic characters of potential phylogenetic importance to continue being included in it. From its original inception, this genus has been used to include a variety of heterogeneous species, which often exhibit only vague to partial traits of the type species described by MacLeay (1838), i.e. *Macrominus* (*Anoplocheilus*) *spinitanis* MacLeay, 1838 [= *Anoplocheilus variabilis* (Gory & Percheron, 1833)], as designated by Marais and Holm (1989) on the basis of subsequent monotypy. A coherent definition of this genus has been further complicated by several subsequent amendments to the original list of diagnostic characters and the erection of several subgenera, in order to accommodate species of "*incertae sedis*" while avoiding the proliferation of new generic names.

In order to avoid further controversial placements and provide a more coherent structure to the characteristics of this genus, it is worthwhile to report here verbatim the original set of characters relevant to the modern taxonomy of the subfamily, as highlighted by MacLeay (1838) for what he intended to be a subgenus of *Macrominus* MacLeay, 1838: "*Head* small, subquadrate. *Body* convex and thick. *Epimeron* very visible between thorax and elytra. *Scutellum* large, triangular. *Mesosternum* blunt and not produced. *Feet* short and strong, with the fore tibiae tridentate, and the posterior femora sometimes incrassated, as are also the posterior tibiae, which are always externally subbidentate". It seems thus clear that the genus was intended to accommodate species with a globose (exceptional dorso-ventral convexity) body shape, a short head clypeus and short but robust legs, suitable to a fossorial

lifestyle. At least one monotypical subgenus and a species currently included in this genus do not appear to comply with these fundamental requirements and are actually more closely related to other genera of the Diplognathina than to *Anoplocheilus*. This will be dealt with in the Misplaced Species section further down, with a proposal to remove these two taxa from this genus and either elevate the current subgenus status to proper genus or reallocate the species to a different genus.

Materials and Methods

The recent series of specimens used in the description of *Anoplocheilus* (*A.*) *clarki* sp. nov. were collected by Derek Clark during routine monitoring surveys along the northern plateau of the Komsberg range, in the South African Northern Cape Province. All four specimens were retrieved by hand after drowning in farm troughs located on the banks of a dry river bed, immediately preserved with ethyl acetate fumes and subsequently preserved in a frozen state. The period spanning from the first to the last finding was approximately two weeks, during which intermittent rainfalls occurred across the region (D. Clark, pers. comm.). All other specimens recognised within this new species are from old collections currently reposited in the Iziko Museum (ISAM, Cape Town) or the Distsong Museum (TMSA, Pretoria).

Data on *Anoplocheilus* (*A.*) *rusticus*, including details of type specimens, collection localities and dates as well as general biological 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), Marais (1994), Holm & Stobbia (1995) and Sakai & Nagai (1998). Data records are accompanied by the sex of individuals in front of each entry only when provided by the collection owners or curators, otherwise such detail is omitted and only a generalized reference to number of individuals (n inds) is given.

The terminology used by Krikken (1984) and Holm & Marais (1992) is followed in this study in the description of specimens morphological characters. Specimen total length and maximum width were measured using a Vernier caliper, 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:

BMN – Natural History Museum, London, United Kingdom;
BMPC – Jonathan Ball and Andre Marais Private Collection, Cape Town, South Africa;
DMPC – Daniel Moore Private Collection, Oro Valley, USA;
EPPC – Ernest Pringle Private Collection, Bedford, South Africa;
GBPC – Gerhard Beinhundner Private Collection, Euerbach, Germany;
ISAM – Iziko South African Museum, Cape Town, South Africa;
MHNG – Muséum d'Histoire Naturelle, Genève, Switzerland:
OXUM – Hope Entomological Collections, University Museum, Oxford, United Kingdom;
PLPC – Philippe Léonard Private Collection, Embourg, Belgium;
PMPC – Petr Malec Private Collection, Brno, Czech Republic;
RBINS – Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium;
RPRM – Renzo Perissinotto, Research Material, Gqeberha, South Africa;
SANC – South African National Collection of Insects, Pretoria, South Africa;
TGPC – Thierry Garnier Private Collection, Montpellier, France;
TMSA – Ditsong National Museum of Natural History (formerly Transvaal Museum), Pretoria, South Africa.

Taxonomy

Genus ***Anoplocheilus*** MacLeay, 1838
Macrominus (*Anoplocheilus*) MacLeay, 1838: 21. Type species: *Macrominus* (*Anoplochilus*) *spinitarsis* MacLeay, 1838: 21.
Anoplocheilus. Burmeister 1842: 505; Krikken 1984: 57; Marais & Holm 1989: 3; Holm & Marais 1992: 111; Sakai & Nagai 1998: 311; Krajcik 1998: 81; Holm & Perissinotto 2004: 79; Beinhundner 2017: 501.
Anoplochilus. Péringuey 1907: 351; Distant 1911: 269.
Diathermus. Kraatz 1897: 402.
Odontothyrea. Schoch 1897: 45; Marais & Holm 1989: 3.
Onychotarsus. Schoch 1897: 7; Kraatz 1897: 404.

Anoplocheilus* (*Anoplocheilus*) *clarki sp. nov. (Figs. 1, 2)
Diagnosis. *Anoplocheilus* (*A.*) *clarki* can be separated from its closest relative, *A.* (*A.*) *rusticus,* by differences observed mainly at the level of the clypeus, pronotum, scutellum

and aeadeagal parameres (Figs 1-4). Firstly, the general clypeal shape is more squarish in *A.* (*A.*) *clarki* than in *A.* (*A.*) *rusticus*, in which the antero-lateral corners are actually smoothly rounded. Also, the denticles on the anterior margin of the clypeus are more raised and developed in *A.* (*A.*) *clarki* than in *A.* (*A.*) *rusticus* and the antero-lateral declivity on each side of the clypeus is substantially more pronounced in the former than in the latter species (Figs 2 A, 4 A). While the pronotal and scutellar surfaces in *A.* (*A.*) *rusticus* are always entirely black, even in specimens with predominatly testaceous elytra (Holm & Marais 1992; Marais 1994; Beinhundner 2017), in the light forms of *A.* (*A.*) *clarki* both surfaces exhibit some testaceous areas (Figs 1 A, 3 A), reminiscent of those observed in similar forms of *A.* (*A.*) *germari* (Wiedemann, 1823). The general body pubescence in *A.* (*A.*) *clarki* is remarkably thicker and longer than in *A.* (*A.*) *rusticus*, particularly on head vertex and ventral surfaces (Figs 1 B, 3 B). Finally, the aedeagal parameres of *A.* (*A.*) *clarki* are substantially shorter but wider than those of *A.* (*A.*) *rusticus* (Figs 2 C, 4 C), particularly at the apex where they form a rounded lateral expansion, which in frontal view imparts a width approximately twice as large as that observed in *A.* (*A.*) *rusticus* (Figs 2 E, 4 E).

Description of holotype male (Figs 1 A-C, 2 A-E)

Size. Total Length = 13.3 mm; Maximum Width = 7.1 mm.

Body: Mostly matte with head, pronotum and scutellum predominatly black but elytra testaceous with lines of brown spots on costal and umbonal elevations; dense, round to irregular sculpture on head and pronotum, becoming scattered, shallow and predominantly of horse-shoe type on scutellum and elytra; with dense and long, pale-yellow to tawny setae on head vertex and around all lateral margins, becoming shorter and scattered on pronotal and elytral declivities and disappearing on their discal areas as well as scutellum (Figs. 1 A, 2 A).

Head. Entirely black and relatively flat in central region; clypeus broadly squarish in shape, with marked sinuation on apical margin and sharply sloping declivities on antero-lateral margins; anterior margin sharply upturned and forming two pairs of symmetric denticles, with proximal more developed than distal pair (Fig. 2 A); entire surface covered in coarse dense sculpture; pale-yellow to tawny setae distributed along entire surface, but generally shorter and more scattered on clypeus and frons, becoming much longer and denser on vertex and antennal pedicel; antenna dark brown to black, with club approximately as long as flagellum; thin light setae scattered across flagellum, becoming thicker and denser on pedicel.

Pronotum. Black and matte, with shiny suprascutellar area exhibiting testaceous, horizontally elongate double macula, not reaching posterior margin; pair of symmetric brown maculae also on lateral declivities anteriad of marginal round angle; with dense round to crescent punctures across entire surface; virtually glabrous on disc but exhibiting short to medium light-yellow setae on lateral and anterior declivities and margins (Fig. 1 A); shape broadly octagonal with lateral margins smoothly rounded at centre, antero-lateral margins sharply rounded with pronounced angle, postero-lateral margins smoothly rounded and shifting posteriad, leading then to smooth pre-scutellar arch at middle.

Scutellum. Shiny and black, with two symmetric, longitudinally elongate, testaceous spots on each basal side of dark midline; exhibiting longitudinal incision running parallel to lateral groove from basal margin to middle of total scutellar length; few, shallow horse-shoe to crescent punctures along lateral margins inwards of incision, with occasional short pale setae emerging at centre of punctures; isoscelic triangular in shape with sharp apex; lateral grooves well-developed and deepening towards apex (Fig. 1 A).

Elytron. Testaceous and matte, with dark maculae of variable size spread in longitudinal lines along the length of each costa and on umbones; all costae moderately elevated across entire surface but fading on apical declivity, striae exhibiting sublineate and semicontiguous crescent to horseshoe sculpture; with shiny black to dark brown lining around scutellum and sutural margin; lateral margin reborded and dark, not covering lateral edges of abdominal tergites; humeral callus prominent but apical callus poorly raised; sub-humeral arch with extremely weak sinuation and posterior margin smoothly rounded without projections or upturning at apex; virtually glabrous on disc and humeral callus, but with scattered short and light setae distributed along lateral and apical declivities (Fig. 1 A).

Pygidium. Broadly triangular in shape, with smoothly rounded apex and unevenly domed; with dense but fine subconcentric rugulose sculpture across entire surface; with light-yellow to tawny short setae scattered throughout disc, becoming long and fine along lateral margins and apex (Fig. 2 B).

Legs. Black with occasional brown tips, short and robust with typical fossorial characters; tarsal segments of average cetonine length, with apical ones twice as long as preceding units; meso- and metatarsomeres with marked dorso-distal protrusions; tibiae densely sculptured with mid longitudinal ridge and numerous light-yellow setae present mainly on inner margin, becoming progressively longer and denser from protibia to metatibia; protibia broad and tridentate, with teeth blunt and all equally well-developed, but distance between distal and middle teeth shorter than that between middle and proximal teeth; mesotibia with double mid spine on outer carina sharply pointed and spurs elongate, thin and sharp; metatibia with outer carina bearing one blunt but robust distal tooth and two smaller teeth further up, spurs elongate and rather sharp (Fig. 1 A-C).

Ventral surface. Black and shiny, covered in dense and long light-yellow pubescence, except on femora, central part of abdominal sternites and metasternal region, where setae are short or very scattered; mesosternal lobe extreme-

ly reduced, smoothly rounded and not protruding forward; metasternal lobe with anterior portion of median sulcus exhibiting oblong groove of triangular shape; abdominal sternites with flat area at centre (Fig. 1 B-C).

Aedeagus. Parameres compact and dark, with dorsal lobes gradually tapering medially and then expanding slightly towards apico-lateral margin to form smoothly rounded apex, here slightly bending downwards and exhibiting flat tip surface (clearly visible in frontal view, Fig. 2 C-E); inner margin of dorsal lobes remarkably straight, bending outwards only slightly towards central region in dorsal view; ventral lobes generally narrower than dorsal lobes and emerging only towards base in dorsal view (Fig. 2 D).

Derivatio nominis. This species is named after Derek Clark, former conservation manager of a number of parks and farms in Namibia, South Africa and Ethiopia, who promptly brought the specimens retrieved from a farm trough in the Komsberg to the attention of the lead author. During the past three decades, Mr Clark has made a very significant contribution to the entomofauna of South Africa, discovering several new species from remote areas in his effort to enhance nature conservation and biodiversity knowledge in the region.

Distribution. This is obviously an inland sister species of the strictly coastal *A.* (*A.*) *rusticus*. The series collected most recently originates from the Roggeveldberge range to the south of Sutherland in the Northern Cape Province (Fig. 5). There are also a few other specimens retrieved from old collections and originating from adjacent mountain ranges of the Cape Fold Belt, namely the Cederberg, the Koue Bokkeveld, the Hexrivierberge, the Boland Mountains and the Langeberge, all in the Western Cape Province.

Type material. Holotype ♂: **South Africa**, NC, Komsberg, 1 Apr 2015, Derek Clark legit (ISAM). Paratypes: 1♂, idem (RPRM); 2♂, ibidem 8 Apr 2015, Derek Clark legit (RPRM); 1♂, Cold Bokkeveld, Ceres Dist, 15 Oct 1924, Versfeld (ISAM: COL-A066116); 1 ♂, Upper Sources Olifants River, Ceres C.P., 1 Dec 1949, South African Museum Expedition (ISAM: COL-A027029); 1♀ [missing head and pronotum], Wit River Valley, Bains Kloof, 1 Dec 1949, South African Museum Expedition (ISAM: COL-A027030); 1♀, Mitchell's Pass, Cape Province, 5 Oct 1975, MJ Duke (TMSA: CPH6312); 1♂ , Capland, Stellenbosch, Oct 1925, Dr H Brauns (TMSA- CPH6305); 1 ind, Tradouw Pass, Swellendam Dist., 1 Nov 1925 South African Museum Expedition (ISAM: COL-A027028); 1 ♀ [missing head and pronotum], South Africa WC, Bushmanskloof, on stream sand bank, 22 Sep 1997, R Perissinotto & L Clennell (BMPC)].

Remarks. Specimens range in size from 10.8 to 13.3 in total length and from 5.5 to 7.1 in maximum width. Their elytral colour varies from testaceous with longitudinal lines of dark spots (Fig. 1 A, C) to predominantly black with few testaceous to brown spots scattered across the disk. Intermediate forms to these show lines of spots joined together to compose transverse wave-like bands across the entire surface. No entirely black forms have been recorded yet, but in predominantly black forms the testaceous patterns on pronotum and scutellum fade away, and these areas become therefore entirely black. As expected, the only female specimen identified so far exhibits all the typical traits of their *A.* (*A.*) *rusticus* counterparts, namely a slightly broader protibia, blunter but wider metatibial spurs and a more convex area in the middle of abdominal sternites than in males. Also, the denticles on the clypeal apex are more pronounced and recurved in male specimens compared to the females. Adult activity in *A.* (*A.*) *clarki* has so far been recorded only throughout the southern spring (late September to early December) and in early autumn (April) and, like in its sister species, the life cycle seems to be linked to fine sandy substrata, on the banks of rivers and streams. All specimens collected recently in the Komsberg were retrieved from the same farm trough adjacent to a dry river bed exhibiting substantial sand banks (D. Clark, pers. comm.). A few old specimens also carry unmistakable clues that they were found along river beds (cf. label data above).

Anoplocheilus* (*Anoplocheilus*) *rusticus (Gory & Percheron, 1833) (Figs. 3, 4)

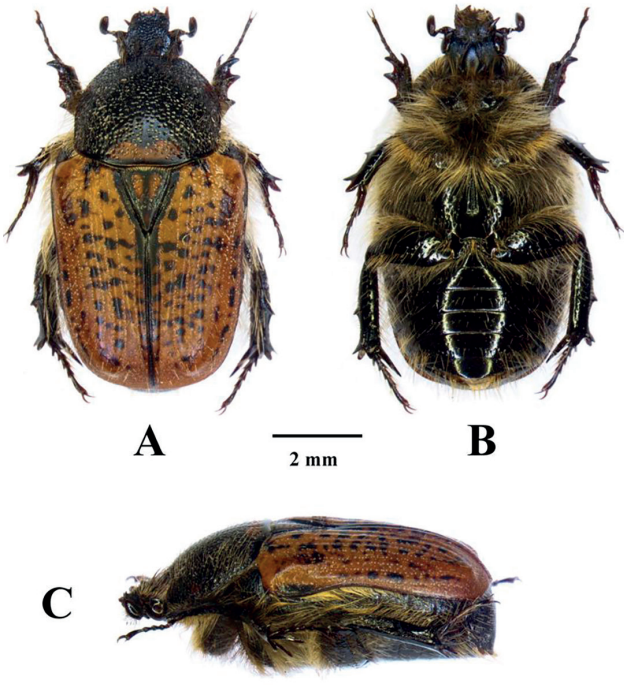

Fig. 1 – *Anoplocheilus* (*A.*) *clarki* sp. nov. Holotype male: A, dorsal habitus; B, ventral habitus; C, lateral habitus (Photographs by Lynette Clennell).

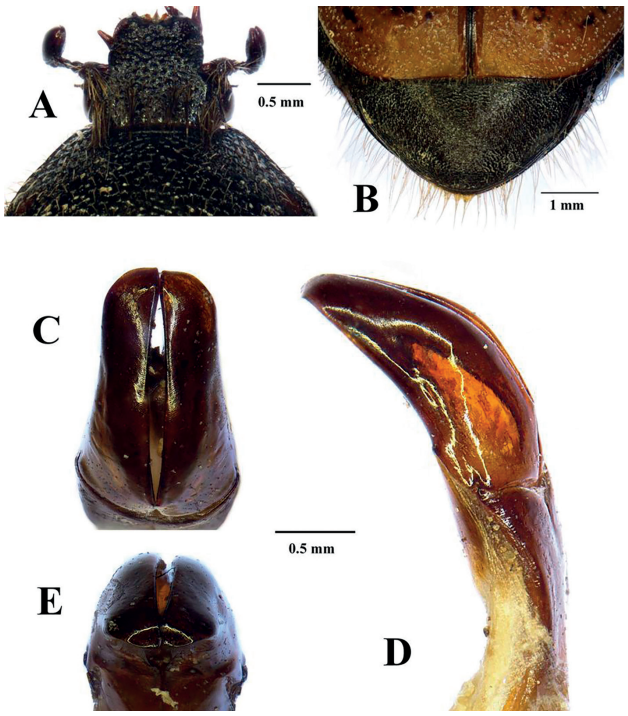

Fig. 2 – *Anoplocheilus* (*A.*) *clarki* sp. nov. Holotype male: A, clypeus; B, pygidium; C, parameres, dorsal view; D, parameres, lateral view; E, parameres, frontal view. Photographs by Lynette Clennell.

Cetonia rustica. Gory & Percheron 1833: 62, 263.
Anoplocheilus rusticus. Burmeister 1842: 507; Schenkling 1921: 316; Krajcik 1998: 81; Sakai & Nagai 1998: 311, pl. 109.
Anoplochilus rusticus. Péringuey 1907: 353.
Cetonia ruricola. Gory & Percheron 1833: 63, 264; Burmeister 1842: 507; Péringuey 1907: 353 (= *rusticus*); Schenkling 1921: 316 (= *rusticus*); Marais & Holm 1989: 7 (= *rusticus*); Holm & Marais 1992: 113 (= *rusticus*); Krajcik 1998: 81 (= *rusticus*); Beinhundner 2017: 504 (= rusticus).
Cetonia terrosa. Gory & Percheron 1833: 63, 264; Krajcik 1998: 81 (= *rusticus*).
Anoplocheilus terrosus. Burmeister 1842: 509 (= *rusticus*); Schaum 1849: 268 (= *rusticus*). Marais & Holm 1989: 7 (= *rusticus*).
Protaetia terrosa. Schaum 1849: 268. (= *rusticus*); Arrow 1910: 157 (= *rusticus*).
Eumimimetica terrosa. Kraatz 1881: 264 (= *rusticus*); Janson 1901: 183 (= *rusticus*); Mikšić 1987: 305 (= *rusticus*).
Anoplocheilus (*Anoplocheilus*) *rusticus.* Marais & Holm 1989: 7; Holm & Marais 1992: 113, pl. 15.3; Holm & Stobbia 1995: 292; Beinhundner 2017: 504.

Remarks. This is a strictly coastal species that occurs on the west and south coasts of South Africa. Péringuey (1907) had already noted that adults had subterranean habits, emerging to the surface in good numbers in submerged or flooded places. Both larval and adult stages seem to feed on the roots of salt-tolerant plants, such as *Senecio elegans* (Marais 1994) and *Arctotheca populifolia* (Lubke et al. 1988, RP pers. observ.). Adults appear to be active throughout the year, with peak from September to December. While head, pronotum and scutellum are consistently entirely black, the elytra can vary from almost completely testaceous with some irregular dark spots to completely black. Marais (1994) subdivided the elytral patterns into four categories: 1) brown/ochre with few dark spots; 2) totally black; 3) black with irregular reddish/brown spots around scutellum and elytral base; 4) intermediate, with reddish/brown and black colouration equally distributed. Brown/testaceous examples are, however, generally twice as frequent as black forms (Péringuey 1907, RP pers. obs.). Specimens range in size from 10 to 13.5 mm in total length and from 6 to 7 in maximum width (Péringuey 1907, Sakai and Nagai 1998, Beinhundner 2017). Observation records show that its distribution range is somewhat different to that reported in Marais and Holm (1989) and Holm and Marais (1992), and is now updated in Fig. 5. A detailed account of known data records is also reported here below, as this was not included in the revision of Marais and Holm (1989).

Data. Lectotypes: *Cetonia rustica,* mihi, b. ed. Cap. Bon sp. D. Lalande (MHNG); *Cetonia ruricola,* CBS ruricola nobis (OXUM, Type Col 729); *Cetonia terrosa,* Cetonia terrasia nobis, Terrosa Hope Gogo E.I., *Anoplocheilus rusticus* G & P, S. Africa, G. J. Arrow in BM 1907 (OXUM, Type Col 730). Paralectotype: *Cetonia rustica* "!" (MHNG). Other Material: 1 ind, S.A. (South Africa), (ISAM COL-A027031); 1 ind, Cape Town, 1 Jan 1887 (ISAM COL-A027032); 1 ind, Cape Town (ISAM COL-A027033); 1 ind, C.T. (Cape Town), 1 Oct 1886 (ISAM COL-A027034); 2 inds, Betty's Bay, Cape Province, 3 Dec 1994, AP Marais (ISAM COL-A027035); 1 ind, Vermont Dunes (nr Hermanus), 1 Sep 1977, VB Whitehead (ISAM COL-A066117); 1 ind, S. Afr., Kommetjie, 1 Mar 1979, A Prins (ISAM COL-A036099); 1 ind, S. Afr., Saldanah Bay, 1 Jul 1979, A Prins (ISAM COL-A036098); 1 ind, Katdoringvlei Farm, Namaqualand, 28 Oct 1979, Endrody-Younga E-Y: 1664 (TMSA-CPH6306); 1 ind, Melkboschstrand, Cape Town, Aug 1965, Dickson (TMSA-CPH6307); 1 ind, Pearly Beach, Bredasdorp, Sep 1959, South African Museum (TMSA- CPH6308); 3 ind, Strandfontein, Cape, 12 Oct 1973, NJ Duke (TMSA-CPH6309); 2 ind, ibidem 19 Oct 1973, NJ Duke (TMSA- CPH6310); 2 ind, ibidem 9 Nov 1975, NJ Duke (TMSA-CPH6311); 1 ind, Pella Mission, Cape, 14 Aug 1976 (TMSA-CPH6313); 1 ind, Scarborough, Cape, 17 Mar 1973, sandy ground, DL Theron (TMSA-CPH6314); 1 ind, Cape Flats, Feb 1948,

JG Theron (SANC-COLS-17175); 1 ind, Cape Town, Oct 1886 (SANC-COLS-14320); 1 ind, Cape Colony (SANC-COLS-14319); 1 ind, S. Africa, rusticus G & P, 59•57 Vigors' Coll (BMNH-NHMUK014400127); 1 ind, Simons Town, 12-20 Apr 1915, Dr M Cameron, Brit Mus 1932-121 (BMNH-NHMUK014400137); 1 ind, Rapenburg, Cape Flats, 1-14 Oct 1920, S. Africa, RE Turner 1920-424 (BMNH-NHMUK014400135); 1 ind, idem (BMNH-NHMUK014400136); 1 ind, South Africa WC, Bloubergstrand, 5 Oct 2011, R Perissinotto & L Clennell (BMPC); 1 ind, South Africa WC, Die Mond, 28 Sep 2006, dead on sand, R Perissinotto & L Clennell (BMPC); 3♂, RSA, Cape, Betty's Bay, 15 Oct 1995, Coll Alexis (RBINS); 1 ind, ibidem Oct 1995 (PMPC); n ind, idem (DMPC); 1♂, ibidem 2 Dec 1992, leg. CR Owen (GBPC); 1♀, ibidem 16 Dec 1992 (GBPC, PLPC); 1♂, ibidem Oct 1994 (GBPC); 5 ind, ibidem 20 Nov 1993, AP & ME Marais (BMPC, EPPC); 1 ind, ibidem 19 Nov 1993, AP & ME Marais (BMPC); 3 ind, ibidem 3 Dec 1994, AP & ME Marais (BMPC); 12 ind, ibidem 14 Nov 1993, AP & ME Marais (BMPC, TGPC, PLPC); 1 ind, ibidem 18 Dec 1994, Feeding on roots of *Senecio elegans*, P Stobbia (BMPC); 2 ind, ibidem 15 Sep 1998, G Gerber & D du Randt (BMPC); 3 ind, ibidem 24 Sep 1997, R Perissinotto & L Clennell (BMPC, TGPC); 1♀, ibidem, 16 Dec 1992, CR Owen leg. (Sakai & Nagai 1998: 311); 1♂, South Africa, Cape, Nov 1993 (Sakai & Nagai 1998: 311).

Misplaced Species

Anoplocheilus* (*Nselenius*) *silvicola Holm & Perissinotto, 2004 (Fig. 6 A)
Anoplocheilus (*N.*) *silvicola.* Holm and Perissinotto 2004: 82; Beinhundner 2017: 507

Remarks. *Anoplocheilus* (*Nselenius*) *silvicola* was originally described from a series of specimens collected in a very restricted area (Enseleni Nature Reserve) in the interior region of north-eastern KwaZulu-Natal, South Africa. Subsequently, a few drowned specimens were also retrieved from the False Bay part of Lake St Lucia, within the iSimangaliso Wetland Park (a UNESCO World Heritage Site), some 100 Km to the east of the type locality (cf. Beinhundner 2017). The species exhibits a very dorso-ventrally flattened shape, its legs are rather slender and in the male the tarsi are actually hypertrophic. Sexual dimorphism is extreme, with males testaceous with black/brown ornamentation and females completely black to dark green. Males also exhibit longer antennal clubs and a pronounced median groove on abdominal sternites, by comparison with their female counterparts. Their aedeagal parameres are actually very close to those of *Lamellothyrea* Krikken, 1980 species (cf. Holm and Perissinotto 2004, fig. 5), with which they share several other characters, such as tibial and tarsal features as well as pronotal and scutellar morphology (Fig. 6). They clearly belong to the same clade, however

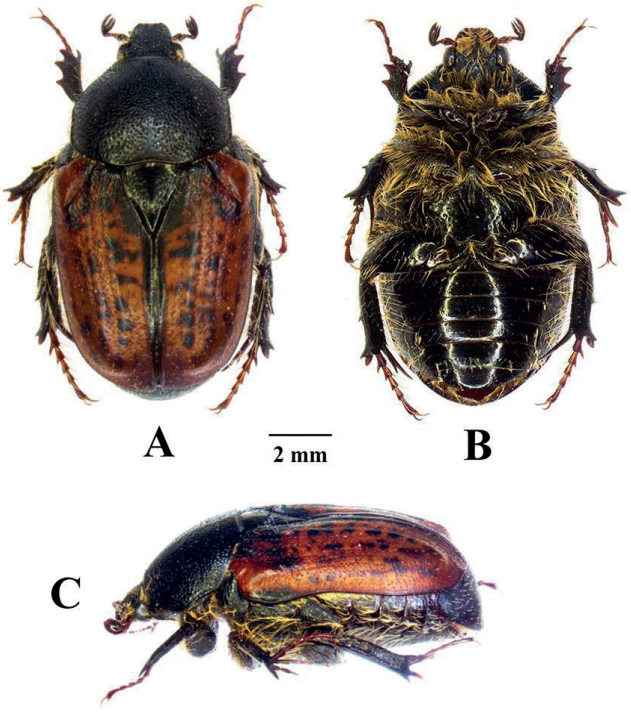

Fig. 3 – *Anoplocheilus* (*A.*) *rusticus* (Gory & Percheron, 1833). Male: A, dorsal habitus; B, ventral habitus; C, lateral habitus (Photographs by Lynette Clennell).

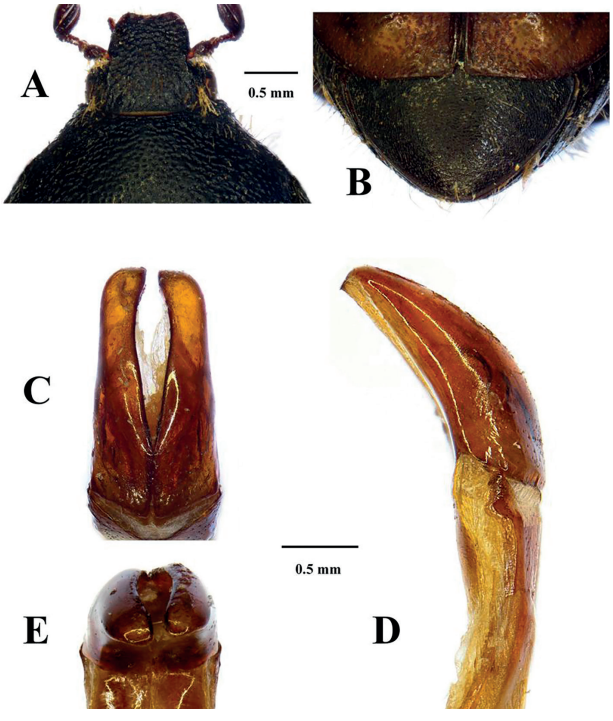

Fig. 4 – *Anoplocheilus* (*A.*) *rusticus* (Gory & Percheron, 1833). Male: A, clypeus; B, pygidium; C, parameres, dorsal view; D, parameres, lateral view; E, parameres, frontal view. Photographs by Lynette Clennell.

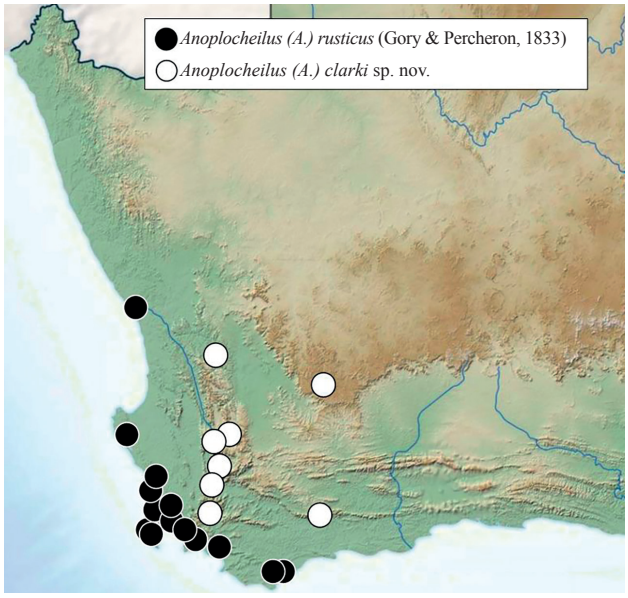

Fig. 5 – Known distribution of *Anoplocheilus* (*A.*) *rusticus* (Gory & Percheron, 1833) and *A*. (*A*.) *clarki* sp. nov. in the western South African region (map adapted from www.freeworldmaps.net).

other substantial differences prevent a confident re-allocation of *A*. (*N.*) *silvicola* to *Lamellothyrea* for now. These include in particular the short, unarmed shape of its clypeus, which is in sharp contrast to the elaborate clypeal armour of *Lamellothyrea,* consisting of a bifurcate horn on anterior margin complemented by three sets of transverse and longitudinal laminae on frons and vertex (Krikken 1980; Holm & Marais 1992; Beinhundner 2017). The marked sexual dimorphism observed in *A*. (*N.*) *silvicola* is also a characteristic not seen in either of the two species currently recognised within *Lamellothyrea* (Perissinotto 2017). In summary, and in the absence of more quantitative molecular genetic data, it is thus suggested that the continuing inclusion of *A*. (*N.*) *silvicola* within the genus *Anoplocheilus* is untenable and that the subgenus *Nselenius* should be elevated to full genus status: *Nselenius silvicola* (Holm & Perissinotto, 2004) **stat. nov**.

Anoplocheilus* (*Anoplocheilus*) *matilei Antoine & Lequeux, 2001 (Fig. 7)
Anoplocheilus (*A.*) *matilei.* Antoine and Lequeux 2001: 115; Beinhundner 2017: 504.

Remarks. This species was originally described from five specimens collected in the Udzungwa and Uluguru mountain region of central Tanzania. This is part of the Eastern Afromontane Biodiversity Hotspot (EABH), within the East African Great Rift Valley, and therefore the species probably represents a local endemic taxon related to the high genetic exclusivity and restricted gene flow among mountain ranges occurring in that region (Mairal et al. 2017). As pointed out from the onset by the authors, the systematic position of *A*. (*A.*) *matilei* Antoine & Lequeux, 2001 within the Diplognathini is far from clear-cut, because it exhibits a rather poor dorso-ventral convexity, its legs are rather slender and the tarsi elongated (Fig. 7 A). Above all it has a median pronotal expansion which partially covers the scutellum and is thus diametrically opposite to the arcuate/sinuate characteristic typical of *Anoplocheilus* in this body area. There are furthermore some apomorphic traits of sexual dimorphism, such as enlarged antennal clubs and presence of median longitudinal groove on abdominal sternites in the male. This again is in open contrast to the characteristics of *Anoplocheilus*, in which sexes are generally not recognizable on the basis of external morphology alone (Marais and Holm 1989). On the other hand, most of the key characters exhibited by *A*. (*A*.) *matilei* are actually typical of the *Charadronota/Diphrontis/Eriulis* clade, with the best fit shown with *Diphrontis* Gerstaecker, 1883, particularly in terms of aedeagal shape (e.g., presence of hook-like projections on apical margins), presence of median depression on abdominal sternites and expansion of posterior pronotal margin over the scutellar base (Fig. 7). Indeed, pretty much all the diagnostic characters of this species are found in *Diphrontis*, with the exception of its elongated male antennal clubs and the denticles on the clypeal anterior margin. However, as also recognised by the authors, these features are likely to represent derived apomorphies (Antoine & Lequeux 2001). It is thus proposed that the species be transferred to the genus *Diphrontis*, as one of its high altitude-derived forms: *Diphrontis matilei* (Antoine & Lequeux, 2001) **comb. nov.**

Discussion

Historically, the genus *Anoplocheilus* has been a difficult one to define with consistency and coherence. To start with, it had been positioned within different tribes by the various authors, with Sakai & Nagai (1998), for instance, placing it in the Cetoniini, but Krajcik (1998) in the Diplognatini during the same year. The recent consensus, however, clearly positions this genus among the earliest Diplognathini/Diplognathina (Marais and Holm 1989; Holm & Marais 1992; Holm & Perissinotto 2004; Beinhundner 2017). According to Marais & Holm (1989), the closest relatives to *Anoplocheilus* are the monotypical genera *Phonopleurus* Moser, 1919 and *Eriulis,* from which it can be distinguished by aedeagal type, tibial armature and clypeal and pronotal structure. However, being rather complex it has at times been used to accommodate taxa of *incertae sedis* and, as a consequence, species originally allocated to this genus have also regularly been shifted around, with the latest possibly represented by "*Anoplocheilus limbicollis* Fairmaire, 1884", which has finally been correctly placed within *Systellorrhina* by Beinhundner (2017).

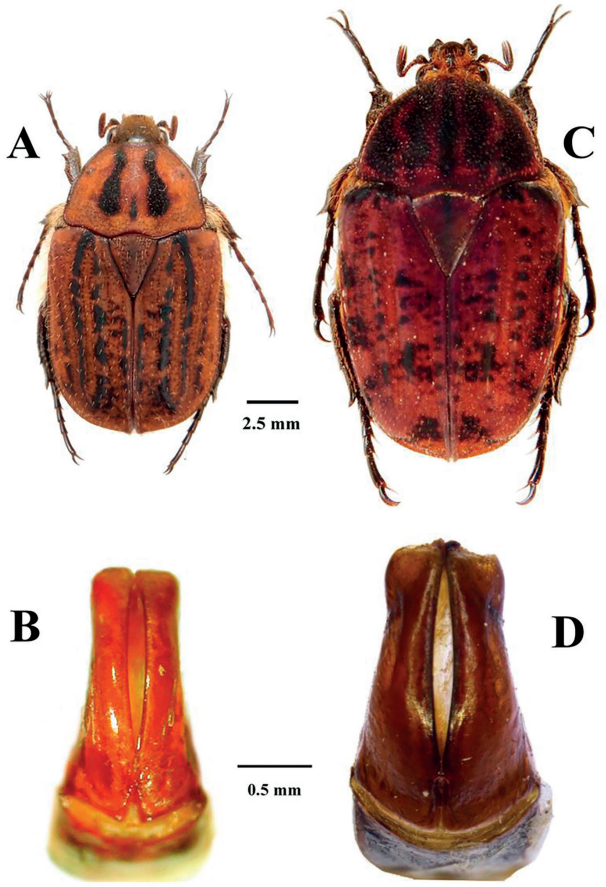

Fig. 6 – Comparative dorsal habitus (A) and aedeagus (B) of *Nselenius silvicola* Holm & Perissinotto, 2004 stat. nov. and of *Lamellothyrea isimangaliso* Perissinotto, 2017 (C, D). Photos: A-B, Gerhard Beinhundner; C-D, Lynette Clennell.

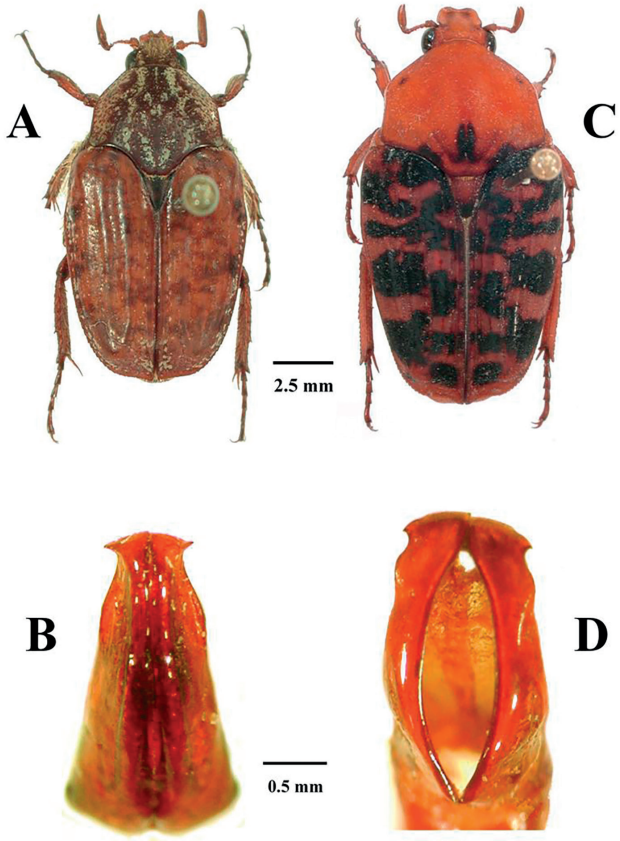

Fig. 7 – Comparative dorsal habitus (A) and aedeagus (B) of *Diphrontis matilei* (Antoine & Lequeux, 2001) comb. nov. and of *Diphrontis cruenta* Gerstaecker, 1883 (C, D), the type species of the genus. Photos: Gerhard Beinhundner.

Until now, *Anoplocheilus* has comprised ten valid species in four different subgenera (Beinhundner 2017). This review brings the total number of species to nine, because despite adding a new description it also removes *Nselenius silvicola* and *Diphrontis matilei* from its membership. As, the subgenus *Nselenius* is now elevated to full genus, the number of its subgenera is also reduced to three. With the proposed exclusion of *A.* (*A.*) *matilei*, all the species of the nominal subgenus are now from the southern African region, thereby enhancing the biogeographic coherence of this taxon.

The specimen illustrated in Beinhundner (2017: 506) under the provisional identification of "*Anoplocheilus* (*Anoplocheilus*) n. sp. Perissinotto *i.l.*" has now been analysed in greater detail and it turns out that it is actually a male of *Euphoria inda* (Linnaeus, 1758) (J Orozco pers. comm.). This is an American cetoniine with a wide distribution range across the entire USA, Mexico and southern Canada (Orozco 2012). The initial erroneous identification stems mainly from the fact that it carried a label with collection locality specified as "Letsitele, Kruger Park" (a well-known South African locality in the Limpopo Province) in the handwriting of the late Vincent Allard. Species in this genus superficially resemble members of the Afrotropical *Anoplocheilus* and other Old World genera and, unless a whole suite of diagnostic characters is examined, separating *Euphoria* from these can be quite difficult (Orozco 2012). This unfortunate specimen mislabelling and consequent misidentification has already happened in the past, when Péringuey (1907) was persuaded by another specimen of *E. inda* carrying a deceiving label with locality "Cape Colony (Ladysmith)" to erect a new genus and species (*Goraqua smithsana* Péringuey) in an attempt to accommodate it. This was only synonymised to the correct American species some 80 years later (Holm 1988).

Among the adults of the species constituting *Anoplocheilus* s.l., so far only those of *A. figuratus* Boheman, 1857 have been reported as feeding on ripe fruits, such as peaches, and on the stems of flowering plants like the dwarf marigold (Holm and Marais 1992). However, this species and all the others have repeatedly been observed feeding underground on the roots of a variety of plants, including the Cape beach daisy *Arctotheca populifolia* [*Anoplocheilus* (*A.*) *germari*, *A.* (*A.*) *rusticus*, *A.* (*A.*) *variabilis*; Lubke

et al. 1988, RP pers. obs.], the blackjack weed *Bidens pilosa* [*A.* (*A.*) *globosus*; Holm & Stobbia 1995], cultivated carrots *Daucus carota* [*A.* (*A.*) *figuratus*; Holm & Marais 1992], *Senecio elegans* [*A.* (*A.*) *rusticus*, *A.* (*A.*) *germari*, *A.* (*A.*) *variabilis*; Marais 1994, Holm and Stobbia 1995], *Senecio inornatus* (*A.* (*A.*) *globosus*; RP pers. obs.] and *Senecio lydenburgensis* [*A.* (*A.*) *figuratus*; Holm and Stobbia 1995]. Although no similar observations have been recorded yet for *A.* (*A.*) *clarki*, it is likely that both its adults and larvae may have an equivalent association with the roots of plants occurring on the sandy banks of rivers and streams within their distribution range.

Presumably, *Anoplocheilus* adults are deriving nutrition from these resources and therefore have a relatively prolonged life span. For instance, Malec & Šípek (2016) reported that after emerging in captivity, adults *A.* (*A.*) *figuratus* died "within weeks". Nevertheless, the small size and predominantly subterranean habits of species belonging in this genus, seem to prevent their ability to undertake long-range dispersal flights. Indeed, observations of adults in flight are extremely rare in the literature, with Péringuey (1907), for instance, describing the only observed movements in adult *A.* (*A.*) *rusticus* as "dragging itself along, much in the manner of the Dynastid species of *Heteronychus*". Marais (1994), however, was able to establish that adults of this species are actually capable of flying at rather high speed, on average 60 cm above the ground, but only under sunny and hot conditions and over short distances. This implies that historically the group may have experienced a relatively high rate of speciation, particularly in areas characterized by prominent physical barriers, such as mountain ranges and wide water bodies. Thus, it is possible that more cryptic species may be revealed in the future through more advanced searches and analyses.

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