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New taxa of *Leucocelis* Burmeister, 1842 from Namibia, and revision of *L.* (*L.*) *adspersa* s.l. (Fabricius, 1801) (Coleoptera: Scarabaeidae, Cetoniinae)

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Abstract
One new species, with two distinct subspecies, of *Leucocelis* Burmeister, 1842 is recognized and described from central and northern mountain regions of Namibia, the Erongoberge between Usakos and Omaruru and the Otaviberge above the omonimous town. The nominal subspecies, *L.* (*L.*) *claveaui claveaui* **sp.** et **subsp. nov.** has previously been confused with dark navy-blue specimens of the closely related *L.* (*L.*) *franki* Janson, 1888, which is endemic to western Namibia and the South African part of the Gariep Desert. *Leucocelis* (*L.*) *c. claveaui* can easily be separated from the latter species on the basis of background colour and maculation of it dorsal and pygidial habitus, as well as elytral sculpture and aedeagal parameres. The second subspecies, *L.* (*L.*) *claveaui otavi* **sp.** et **subsp. nov**., is currently known from a single male specimen collected on the summit of the Otaviberge, at an altitude of about 1900 m. It differs from the nominal subspecies by having a much more extensive white dorsal maculation, a black pygidium and light bluish-green elytral background colour. In the process of analysing the taxonomic relationships of this new species with its closest southern African relatives, it has also emerged that the intraspecific variability of *L.* (*L.*) *adspersa* s.l. (Fabricius, 1801) is actually more complex than previously recognized. As a result, two new subspecies are now included within this taxon, *L.* (*L.*) *a. orientalis* **subsp. nov.** and *L.* (*L.*) *a. giannatellii* Antoine, 2002 stat. nov., in addition to the two already established, namely *L.* (*L.*) *a. adspersa* and *L.* (*L.*) *a. umtalina* Péringuey, 1907. Further research is needed on the *Leucocelis* and other Cetoniinae of Namibia, as the country is still badly under-sampled and there are indications that other new or important taxa may be recognised or rediscovered using appropriate field surveys and identification methods.

Key words: Fruit chafers, biodiversity, endemic species, Afrotropical Region, southern Africa.

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Introduction

The genus *Leucocelis* s. l. exhibits an extreme radiation, being one of the most represented among the currently recognized genera of the Cetoniinae, numbering 99 confirmed species and 16 subspecies subdivided into three subgenera (*Leucocelis* s. s.*, Amauroleucocelis* Bourgoin, 1913 and *Heterostetha* Moser, 1911; Antoine 1997, 2002; Beinhundner 2017). Unlike its sister genus *Oxythyrea*, which is widespread across two large biogeographic regions, namely the Palaearctic and Afrotropical, *Leucocelis* is restricted to the Afrotropical region reaching smaller islands such as Sao Tomé, the Comores and Mayotte, but not Madagascar. Despite this impressive taxonomic diversity, larval stages have so far been described only for three species, namely *L.* (*L.*) *amethystina* (MacLeay, 1938)*, L.* (*L.*) *haemorrhoidalis* (Fabricius, 1775) and *L.* (*L.*) *rubra* (Gory & Percheron, 1833) (Donaldson 1987; Donaldson & van Tonder 1992; Šípek & Král 2012). Although this extraordinary taxonomic diversity of *Leucocelis* is generally well-demonstrated and substantiated by the existence of a strong degree of endemism from regional- to micro-scale, there are also several cases of synonymy that have been already resolved or are currently still under investigation. This is to a large extent due mainly to the extreme chromatic variability that characterizes the habitus of many species in this genus (Holm & Marais 1992; Beinhundner 2017), which has led to a proliferation of names particularly during the 19th century.

There are also, however, some cases of consistent geographic variability among different populations of the same species that in the past has been misinterpreted as "variation", rather than recognised as spatially distinct taxa. This has undoubtedly been caused mainly by the scarcity of material available for analysis, but as more specimens now become available from a larger range of spatial distributions, a reassessment of the intraspecific variability of several species within the genus is becoming

more necessary, and revealing when undertaken. A rather conservative approach is used here in defining the taxonomic status of this variability as "parapatric subspecies", when it can be shown not to be randomly distributed but actually geographically coherent and distinct, with intermediate forms found in transitional zones where physical barriers are not sufficiently developed to keep adjacent populations permanently separated (Perissinotto & Beinhundner 2022). However, it is very possible that more advanced analyses carried out in the future with the use of molecular DNA tools, for instance, will result in further changes, to either upgrade to species level or relegation to alternative transitional entities.

The western part of southern Africa is characterized by a vast region, dominated by arid and semiarid climatic conditions, which host a rich biodiversity with many species constituting regional or local endemisms (Holm & Marais 1992; Mucina & Rutherford 2006; Sabatelli et al. 2013). Among the Cetoniinae, several taxa are restricted to this region in their distribution range, including at least two species of *Leucocelis* Burmeister, 1842, namely *L.* (*L.*) *franki* Janson, 1888 and *L.* (*L.*) *giannatellii* Antoine, 2002, the latter now proposed as subspecies here below. Recently, one more endemic species, comprising two subspecies, has been identified in the central and northern mountainous part of Namibia, thanks to a close examination of specimens made available mainly by Dr Thierry Garnier (Montpellier, France) and by the author, who recognized in them the potential to represent a cryptic species, yet unknown to science. These are described in the section below, along with a comparative revision of their closest southern African allies.

Materials and Methods

Specimen repositories are abbreviated as follows:
BMCS – Jonathan Ball and Andre Marais Private Collection, Cape Town, South Africa;
DMSA – Durban Natural Science Museum, Durban, South Africa;
GBEG – Gerhard Beinhundner Private Collection, Euerbach, Germany;
SAMC – Iziko South African Museum, Cape Town, South Africa;
KWPG – Ex Karl Werner Private Collection, Peiting, Germany;
MAMU – MacLeay Museum, University of Sidney, Australia;
MHNG – Muséum d'Histoire Naturelle, Geneva, Switzerland;
MLUH – Zentralmagazin Naturwissenschaftlicher Sammlungen, Halle, Germany;
MNHN – Museum National d'Histoire Naturelle, Paris, France;
MRSN — Museo Regionale di Scienze Naturali, Torino, Italy;
MZUC—Museu de Zoologia da Universidade de Coimbra, Coimbra, Portugal
PARF— Ex Philippe Antoine Private Collection, Roubaix, France;
RGTI—Roberto Giannatelli Private Collection, Torino, Italy;
RMNH—Naturalis Biodiversity Center, Leiden, The Netherlands;
RPGS—Renzo Perissinotto Research Material, Gqeberha, South Africa;
SMWN—State Museum of Namibia, Windhoek, Namibia;
SRSF—Sébastien Rojkoff Private Collection, Sourcieux-les-Mines, France;
TGMF—Thierry Garnier Private Collection, Montpellier, France;
TMSA—Ditsong National Museum of Natural History, Pretoria, South Africa;
ZMHB—Naturkunde Museum, Berlin, Germany;
ZMKD—Zoologischen Museum Kiel, Christian-Albrechts-Universität zu Kiel, Germany.

Countries within the text are reported with their international ISO Alpha-3 codes (https://www.nationsonline.org/oneworld/country_code_list.htm, accessed on 22 October 2023), as follows: eSwatini—**SWZ**; Lesotho—**LSO**; Malawi—**MWI**; Namibia—**NAM**; South Africa—**ZAF**; Tanzania—**TZA**; Zimbabwe—**ZWE**. Within South Africa, the key area of this study, provincial codes are used as follows: Eastern Cape Province—**EC**; Free State Province—**FS**; Gauteng Province—**GP**; KwaZulu-Natal Province—**ZN**; Limpopo Province—**LP**; Mpumalanga Province—**MP**; Northern Cape Province—**NC**; North-West Province—**NW**; Western Cape Province—**WC**.

Type specimens for comparative taxonomic revision were either analysed directly or through high-resolution photographic material kindly provided by the curators or owners of the collections where they are currently reposited. Original collecting data accompanying each specimen were also obtained from key holders of material of interest. In particular, photos of the following historic type specimens were provided by the respective collection curators, as listerd here. *Leucocelis franki* Janson, 1888: Lectotype (LT) and 2 Paralectotypes (PLs), Oscar Vorst (RMNH); *Homalothyrea kybele* Kolbe, 1908: HT male, Jaeger Bernd (ZMHB); *Cetonia adspersa* Fabricius, 1801: LT and 2 PLs, Michael Kuhlmann (ZMKD); *Cetonia attalica* Schönherr, 1817: LT and 1 PL, Karla Schneider and Joachim Händel (MLUH); *Cetonia verreaux* Gory & Percheron, 1833: LT and 2 PLs, Giulio Cuccodoro (MHNG); *Cetonia amethystina* MacLeay, 1838: LT and 1 PLT (Matthew Huan (MAMU); *Cetonia dysenterica* MacLeay, 1838: LT and 1 PLT, Matthew Huan (MAMU).

Complementary observations and direct collections of recent specimens were undertaken by the author throughout the southern African region during the period 1993–2018. Searches were mainly conducted by direct inspection of flowering plants and sapping trees, while fruit-baited cylindrical traps were deployed in selected areas, whenever the duration of the visit to a specific area was long enough to result in meaningful catches. 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.

Taxonomic as well as distribution and ecological data were obtained from key literature sources providing quality illustrations and collecting data, mainly Gory & Percheron 1833, Péringuey 1907, Schein 1960, Holm & Marais 1992, Sakai & Nagai 1998, Antoine 2002 and Beinhundner 2017. Observations and data records were also obtained from the citizen science platform iNaturalist (www.inaturalist.org), using only research grade identifications and adequate verification. For each taxon, data records are reported with the number of individuals and their respective sex, if verified. Otherwise, such details are omitted and only a generalized reference to an unspecified number (n) of individuals (inds) is given.

The specific terminology used by Krikken (1984) and Holm & Marais (1992) for the Cetoniinae morphology is followed in this study for the description of specimen characters. Total individual 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, lateral and ventral habitus were taken with a Nikon CoolPix S9700 digital camera with macro setting, while photos of clypeal and pygidial surfaces as well as male genitalia were obtained using an OptikamB9 Digital Camera attached to a Kyowa SDZ-PL dissecting microscope. In order to increase the clarity of resolution, the background, pin holes and other disruptive features were removed from each photo using Microsoft Word 2010 (Picture Tools). The Combine ZP Image Stacking Software by Alan Hadley (alan@micropics.org.uk) was used to obtain z-stacking composite images.

Results / Taxonomy

***Leucocelis* (*Leucocelis*) *claveaui* sp. nov.**

(Figs 1–5, 7)

Two distinct populations of this new species have been recorded in the Erongoberge region and Otaviberge region, respectively. Given the relative spatial discontinuity between the two mountain ranges and the morphological differences observed between these two populations, it is proposed here that a second subspecies be erected alongside the nominal one. Both are high altitude (1500-1900 m) dwellers that have previously either been confused with similar sympatric species, or have not been recorded at all. Their key taxonomic characteristics as well as all available information on their distribution and biology are provided here below, along with a comparative revision of their closest relatives within the genus *Leucocelis*.

***Leucocelis* (*Leucocelis*) *claveaui claveaui* sp. et subsp. nov.**

(Figs 1, 2, 7)

Diagnosis. This new species resembles superficially dark-blue specimens of *Leucocelis* (*L.*) *franki* Janson, 1888 but there are clear diagnostic characters differentiating it from the more widespread latter species. In particular, *L.* (*L.*) *c. claveaui* exhibits a consistently black pronotum and reddish-orange pygidium, while in the dark specimens of *L.* (*L.*) *franki* the pronotum is rather dark blue or dark green and the pygidium is always black to dark brown. Light green, blue, orange or polychromatic specimens of *L.* (*L.*) *franki* also have a reddish-orange pygidium, but they differ drastically in many other ways from the new species that only dark specimens can potentially be confused with it. Specimens of *L.* (*L.*) *c. claveaui* also have their dorsal white maculae well rounded and reduced in diameter, by comparison with those of *L.* (*L.*) *franki*, which are particularly large around the apical and postero-lateral margins of their elytra. The ventral surface is markedly less setose and the mesosternal process narrower and more constrained in *L.* (*L.*) *c. claveaui* than in *L.* (*L.*) *franki.* The general body shape of *L.* (*L.*) *franki* is notably stockier than that of *L.* (*L.*) *c. claveaui,* with the former exhibiting a total length to maximum width ratio (TL:MW) of ≈ 2 and the latter of > 2 . Concerning aedeagal parameres, in *L.* (*L.*) *c. claveaui* the ventral lobes are laterally parallel and project forward forming a tubercle of medium size at the apex with setation on its inner declivity, while in *L.* (*L.*) *franki* the ventral lobes are short and smoothly rounded, projecting forward barely above the dorsal lobes at the apex, which does not exhibit any setation.

Description of holotype male

(Fig. 1 A-H)

Size. Total length = 11.2 mm; maximum width = 5.4 mm.

Dorsum. Black to dark navy-blue, shiny and glabrous, exhibiting 11 white maculae on each elytron, and one white spot on metacoxal dorsal ridge; with dense round sculpture on head, becoming finer and more scattered on pronotum, but much larger and predominantly of horseshoe to geminate type along elytral striae (Fig. 1 A, C).

Head. Black, with shallow concavity between frons and apex; clypeus with lateral and anterior margins steeply upturned, mildly sinuate at apex, with antero-lateral corners smoothly rounded and lateral margins subparallel; surface

entirely glabrous, but covered in round, dense and regularly spaced round sculpture, becoming more irregular along margins and on vertex; antenna dark brown, with club short approximately as long as flagellum, pedicel darker than flagellum, but both exhibiting few thin tawny setae scattered across their surface, longer on pedicel (Fig. 1 A, E).

Pronotum. Entirely black and shiny, glabrous with exception of few short and tawny setae on lateral margins; very round in shape along the entire perimeter, widening gradually towards base, with posterior angles smoothly rounded and basal margin evenly convex, without sinuation above scutellum; small and shallow round punctures regularly spaced across entire surface, becoming larger and denser along lateral declivities (Fig. 1 A, D).

Scutellum. Entirely black, shiny and glabrous, with weak signs of irregular sculpture only along basal margin; broadly isoscelic triangular and elongate, with concave lateral margins and extremely pointed at apex; lateral grooves well-defined and deep across entire length (Fig. 1 A).

Elytron. Dark navy-blue, shiny and glabrous, with two longitudinal sets of 4 white cretaceous round maculae on disc and 3 maculae on lateral declivity, largest ones being central juxtasutural round macula and lateral horizontally oblong macula; costae noticeable and moderately elevated, humeral callus prominent and protruding outwards as widest area, leading also to marked concavity in subhumeral arch; striae marked with lines of large horseshoe punctures, except on basal half of first and third, becoming geminate on medio-apical portion of disc; posterior margin upturned at the suture and forming a distinct spine at sutural apex (Fig. 1 A, D).

Pygidium. Brownish-orange, without cretaceous markings, but with large and regularly spaced round sculpture; smoothly rounded in shape, with bulging dome at centre and small indentations on latero-basal margins; short light-yellow to tawny setae scattered around apical margin (Fig. 1 F).

Legs. Black to dark brown and shiny; tarsi of average cetoniine length and as long as tibiae, or slightly longer, with basal segment of meso- and metatarsi much shorter than other segments; tibiae irregularly sculptured and covered in short and regularly spaced light-yellow setae, becoming longer and finer on inner margins; protibia narrow and bidentate, with apical denticle approximately twice as long as second and curving outwards; meso- and metatibia with apical margin bluntly tridentate; spurs on both legs approximately equal, rather well-developed and sharp (Fig. 1 A, B, D).

Venter. Black and shiny, with pygidium and anal plate brownish-orange; with tawny setation prominent on anterior portion of body, becoming shorter and more scattered towards the abdomen, and absent or extremely short on femoral bases, meso-metasternal lobes and central areas of abdominal sternites; mesosternal lobe very narrow and constrained, barely projecting forward but not downwards; metasternal lobe with shallow and narrow median sulcus,

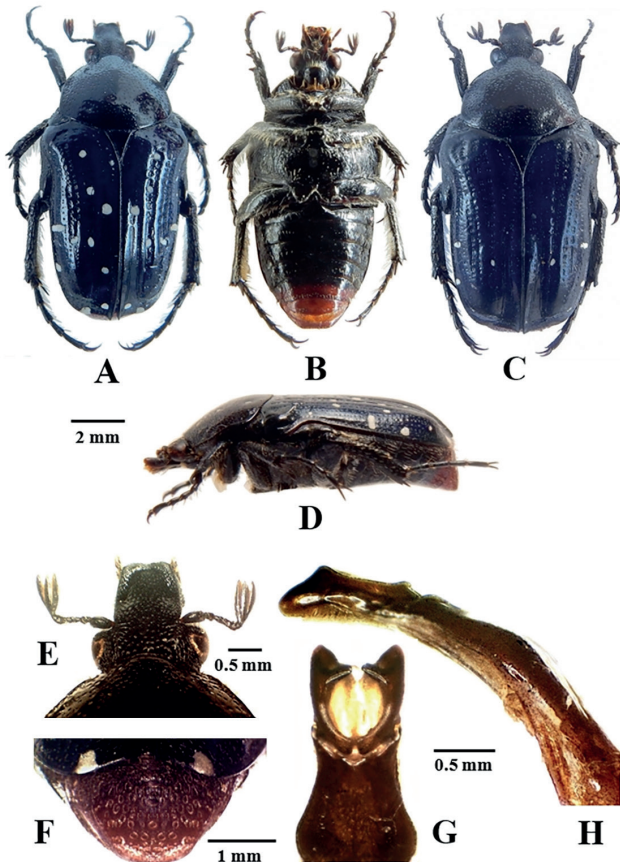

Fig. 1 – *Leucocelis* (*Leucocelis*) *claveaui claveaui* **sp. et subsp. nov**.: **A**, HT♂ dorsal habitus; **B**, HT♂ ventral habitus; **C**, PT♀ dorsal habitus; **D**, HT♂ lateral habitus; **E**, HT♂ clypeus; **F**, HT♂ pygidium; **G**, HT♂ parameres, dorsal view; **H**, HT♂ parameres, lateral view. Photos: Lynette Clennell.

flat and tapering markedly towards apex; abdominal sternites with marked concavity at centre (Fig. 1 B).

Aedeagus. Parameres approximately half the length of pars basalis; dorsal lobes forming arms with round apex curving inwards and converging at centre; ventral lobes substantially longer than dorsal ones, laterally subparallel and projecting way beyond dorsal arms to form pair of ear-like protrusions (Fig. 1 G, H).

Derivatio nominis. This species is named after Guy Claveau, long-term manager of the Epako Lodge (Omaruru, Namibia), enthusiastic beetle collector and personal friend of Dr Thierry Garnier, who helped and supported the latter entomologist during his surveys in the areas where the new species was collected.

Distribution. The nominal subspecies is so far only known from the Erongoberge region of Central Namibia, between Usakos and Omaruru (Figs 2, 7).

Data records. Type series. **Holotype** ♂, **NAM**: Usakos, Amoeb Ranch, 10 Feb 2002, on flowers of *Terminalia*

prunioides (Combretaceae), T. Garnier leg. (TGMF); **Paratypes**: 3♂+5♀, *ibidem* (TGMF, RPGS); 1♂+1♀, *ibidem*, 10 Nov 2012, on *Terminalia prunioides*, T. Garnier leg. (SRSF); 1♀, **NAM**: Epako Lodge (20 Km N Omaruru), 01.1996, T. Garnier leg. (TGMF).

Remarks. Across the series of the 10 specimens examined, the body size ranges from 10.9 to 12.3 mm in total length and from 5.2 to 5.9 mm in maximum width. The background colour is remarkably stable across specimens, while the white dorsal maculation is rather variable. This may extend even to the pronotal disc (as two longitudinal lines each with 3 small spots) in one male, but also become extremely reduced in two females, where only a set of residual spots remains on the apical third of the elytron.

As expected, females are slightly stockier than males (Fig. 1 C), have shorter protarsi and lack the concavity in the middle of their abdominal sternites. Their dorsal white maculation is more reduced than in males and, in particular, they consistently lack the white spot on the dorsal ridge of the metacoxa, which is on the other hand present in all known males (Fig. 1 C).

As shown by the small series of specimens available at present, sdult activity seems to be centred around the mid-summer months, January-February. This generally coincides with the period of highest rainfall in the region during the warm season, and typically adults would emerge immediately after a substantial rainfall event. All specimens collected so far, with the exception of the one female from the Epako Lodge near Omaruru, have been recorded feeding on flowers of *Terminalia prunoides*. Larvae and other early life stages are yet unknown.

***Leucocelis* (*Leucocelis*) *claveaui otavi* sp. et subsp. nov.**
(Figs 3-5, 7)

Diagnosis. *Leucocelis* (*L.*) *c. otavi* differs from the nominal subspecies mainly in having a much more extensive white maculation on its dorsal surface, which includes two marked central longitudinal lines of round spots and two symmetric large lateral maculae on the pronotum, as well as a few extra maculae on the lateral declivity of its elytron (Figs 3 A, C and 5), by comparison with a typical *L.* (*L.*) *c. claveaui.* Also, its elytral background colour is light bluish-green, rather than dark navy-blue like in *L.* (*L.*) *c. claveaui.* Furthermore, the pygidium of *L.* (*L.*) *c. otavi* is completely black (Fig. 3 E) and not brownish-orange like in the nominal subspecies, and the apical tubercle of the ventral lobes of its parameres are notably more rounded than those of *L.* (*L.*) *c. claveaui* (Fig. 3 F, G).

In terms of allied species, *L.* (*L.*) *c. otavi* superficially resembles more *L.* (*L.*) *adspersa* s. s., rather than *L.* (*L.*) *franki*. It can be separated from *L.* (*L.*) *adspersa* s. s. by exhibiting a blue-green elytral background colour, while in the latter species this is generally bright green to ferrugineous-green. Its pygidium is entirely black and lacks any sign of white markings (Fig. 3 E), while in *L.* (*L.*) *adspersa* s. s. this is dark coppery to brown with 1-2 pairs of white spots of variable size. The interstrial elytral sculpture of *L.* (*L.*) c. *otavi* is predominantly of horse-shoe type, extremely well-developed and large (Fig. 3 A), while in *L.* (*L.*) *adspersa* s. s. it is a combination of small and shallow horse-shoe punctures and geminate striae. The white spots are rounder in shape and larger in *L.* (*L.*) *c. otavi* than in *L.* (*L.*) *adspersa* s. s., particularly on the pronotal disc and on the apical and postero-lateral declivities

Fig. 2 – Erongoberge at Usakos with the typical habitat of *L. claveaui claveaui* **sp. et subsp. nov.** (Photo: https://www.facebook.com/AmeibNamibia/photos).

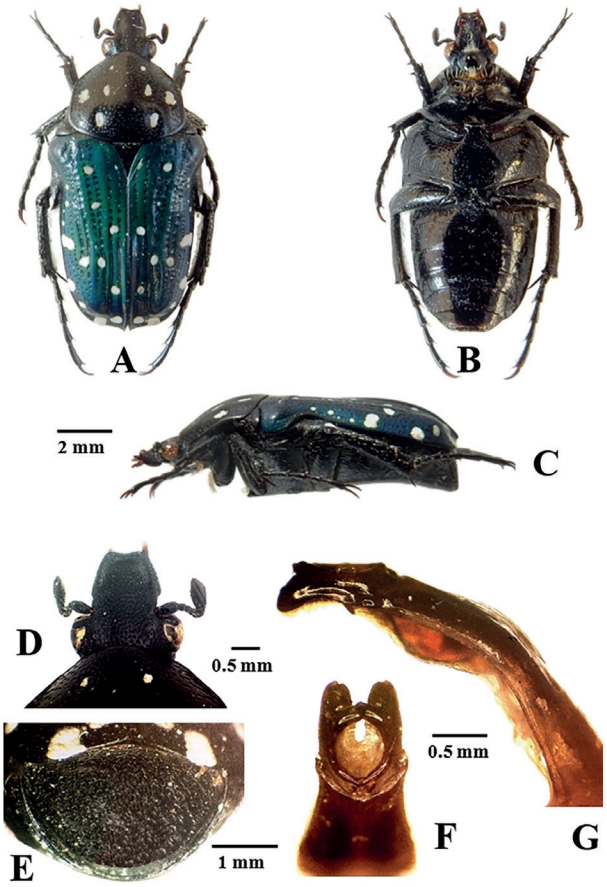

Fig. 3 – *Leucocelis* (*Leucocelis*) *claveaui otavi* **sp. et subsp. nov.**: **A**, HT♂ dorsal habitus; **B**, HT♂ ventral habitus; **C**, HT♂ lateral habitus; **D**, HT♂ clypeus; **E**, HT♂ pygidium; **F**, HT♂ parameres, dorsal view; **G**, HT♂ parameres, lateral view. Photos: Lynette Clennell.

of the elytron. On the ventral side, the setation is drastically reduced both in size and density in *L*. (*L*.) *otavi* (Fig. 3 B), by comparison to the prominent one observed in *L*. (*L*.) *adspersa* s. s., and the mesosternal process is also narrower and more constrained in the new species. Finally, as specified above the ventral lobes of the aedeagal parameres are laterally subparallel in *L*. (*L*.) *c*. *otavi*, rather than smoothly convex like in *L*. (*L*.) *adspersa* s. s., and they also extend much further apically into a prominent tubercle (Fig. 3 F), rather than terminating shortly beyond the dorsal arms like in *L*. (*L*.) *adspersa* s. s.

Derivatio nominis. This subspecies is named after the type locality of the only specimen currently known.

Distribution. The only specimen currently known originates from the summit of the Otaviberge, at about 1900 m of altitude (Figs 4, 7).

Data records. Type series. **Holotype** ♂, **NAM**: Bushmanland, Otavi Mtns., 27 Dec 2007, R. Perissinotto, L. Clennell (RPGS to be reposited in NMWN).

Remarks. The size of the holotype male is 11.9 mm in total length and 5.8 mm in maximum width. The female is yet unknown, but is expected to exhibit the same key characters of the female of the nominal subspecies.
Adult activity most probably peaks during the mid-summer months as the date of observation of the type specimen indicates. It is not known whether this subspecies is also floricolous like the nominal one, as the only specimen currently known was found resting on foliage and not feeding on flowers. Larvae and other early life stages are yet unknown.

***Leucocelis* (*Leucocelis*) *franki* Janson, 1888**
(Figs 6–7)

Leucocelis franki Janson, 1888: 109.

Homalothyrea franki (Janson); Péringuey 1907: 485; Schenkling 1921: 323; Schein 1960: 104.

Homalothyrea kybele Kolbe, 1908: 123; Péringuey 1908: 703 (cf. *franki*); Schenkling 1921: 323; Holm & Marais 1992: 275 (= *franki*).

Leucocelis (*Leucocelis*) *franki* Janson; Holm & Marais 1992: 275; Beinhundner 2017: 419.

Specimens of both sexes are rather stockier than the general *Leucocelis* spp., their elytral sides are subparallel, rather than tapering markedly towards the apex and the first tarsomere of their metalegs is remarkably compressed and flat. For these reasons, Kolbe (1895) erected a new genus (*Homalothyrea*) for the species, adding later a second species, *H. kybele* Kolbe, 1908, which eventually was synonymised with *L. franki* by Holm & Marais (1992). Both genus *Homalothyrea* and species *H. kybele* had earlier been questioned by Péringuey (1908), who believed that they were not sufficiently justified.

Distribution. The species is clearly an arid region specialist, being restricted to the drier parts of western Namibia, reaching to the south the Gariep Desert in the South African Northern Cape (Fig. 7).

Data Records. Type series. Leucocelis franki Janson: Lectotype ♂, NAM, Ovampo, Frank., Museum Leiden verz. F.T. Valck Lucassen (O.E. Janson) (RMNH.INS.1487340); Paralectotypes: 1♀, NAM: Ovumbo, Frank, Type, Franki n. sp. O. Jans., *Homalothyrea* Kolbe (RMNH.INS.1487341); 1♂, *ibidem*, Frank, Type, *Leucocelis franki* Jans. var. (RMNH.INS.1487342). Homalothyrea kybele Kolbe: Holotype ♂, NAM: Aar b Kubub, ix.04, L. Schultze S., Nr 5.42, Zool. Mus. Berlin, *Leucocelis franki* Janson Ph. Antoine det 1999 (ZMHB).

Other records: NAM: 1♂, Karibib, Museum Leiden verz. Valck Lucassen, *Homalothyrea franki* Jns. (RMNH.INS.1487344); 1♂, Windhuck, Museum Leiden verz. Valck Lucassen, *Homalothyrea franki* Jns. (RMNH.

INS.1487345); 3 inds, Herero Mission, Hist.-Coll. (Coleoptera), Nr. 56464, *Leucocelis haemorrhoidalis* Fab. var., Zool. Mus. Berlin (ZMHB); 1 ind., Lindt. S. (ZMHB); 3 inds, Windhuk-Swakopmund, Lindt S.G. (ZMHB); 1 ind., Windhuk-Swakopmund (ZMHB); 1 ind., Herero, Lübbert S.V. (ZMHB); 1 ind., D.S.W. Afrika, A. Minner S. (ZMHB); 8 inds, DSW Afrika, Okahandya, Casper S.G. (ZMHB); 2 inds, D.S.W. Afrika, Okahandja (ZMHB); 1 ind., Damara, bis Ngami-See, Fleck S. (ZMHB); 1 ind., Keetmanshoop, Sigurarto S., Wethlo G. (ZMHB); 1 ind., D.S.W.-Afrika, Karibib (ZMHB); 1 ind., D.S.W.-Afrika, Rehoboth (ZMHB); 1 ind., Windhuk, S. W. Afrika (ZMHB); 3 inds, D.S.W.A., G. Schauer (ZMHB); 3 inds., D.S.W.-Afrika, Gr. Barmen (ZMHB); 1 ind., no data (ZMHB); 1♂+3♀, Epako Lodge (20 km N Omaruru), 01.1996, T. Garnier leg. (TGPC); 19 inds, ibidem, 01.1998, T. Garnier leg. (TGPC); 4♂+1♀, NW, Reg. Omaruru, 1.1996, on flowers, T. Garnier leg. (GBPC); 1♂, Okahandja, 26.11.1957, F. Gaerdes, Homalothyrea? G. Ruter det. 1965 (GBPC); 2♂+1♀, 20 km S Karibib, 14.II.2006, Werner & Smrz leg. (GBPC); 2♂, Uis to Khorixas, 16.II.2006, Werner & Smrz leg. (GBPC); 1♀, Umg. Groß Barmen, 20.II.1999, Richter leg. (GBPC); 1♂, Ovumbo, Collection E. Candéze, Homalothyrea Franki Jans. Det. Moser 1908, Ex Collection Dr Vincent Allard received from Christophe Allard 21.II.2015 (GBPC); 2 inds, Orupembe, Kaokoland, 18°10'S 12°34'E, 22.IV.1991, E. Marais (SMWN); 12 inds, Khabus 146, 26°9′S 18°15′E, Keetmanshoop Distr., 21 Feb 1987, E. Marais (SMWN); 1 ind., *ibidem*, SE2618Ac, Apr 1988, N. & G. Olivier (SMWN); 3 inds, Vellorsdrift 93, Warmbad Dist., 28°43′S 18°18′E, 16-25.III.1988, Preserv. pitf. traps, J. Irish & E. Marais (SMWN); 1 ind., Omaruru Riv. at 21°58'S 14°23'E, Swakopmund Distr., 6-8 Apr 1987, J. Irish & E. Marais (SMWN); 1 ind., Plateau 38/Aar 16, Luderitz, SE2616Cb, 14-17 Jan 1972 (SMWN); 1♂, Naukluft Felseneck Reserve, 24.21S-16.04E, 11.3.1975, E-Y: 733 singled, leg. Endrödy-Younga (TMSA); 1♀, Upper Boomrivier, 27.52S-17.00E, 4.IV.2002, leg. E. Holm & M. Gebhardt (TMSA); 1 ind., Hardap Region, Maltahöhe, 24°50′S, 16°58′E, 1250 m, 1988-02-17, E. Grobbelaar (SANC-COLS-14395); 1 ind., Erongo Region, Gobabeb, downstream Narra Valley, 23°28′S, 14°55′E, 350 m, 1988-02-19, E. Grobbelaar (SANC-COLS-14775); 1 ind., Karas Region, 29 Jun 2021 15:10, Isabelle Joy (https://www.inaturalist.org/observations/88254965); 1 ind., Khomas, 8 Mar 2023, Tobias Seifert (https://www.inaturalist.org/observations/150596621). **ZAF**: 1♀, Namaqualand, Museum Leiden verz. Valck Lucassen, ex Bédoc Paris, ex Gérard Genève acq. 1927, Homalothyrea franki Jns det. Bourgoin (RMNH.INS.1487343); 1 ind., Augrabies NP, 07.01.1997, R. Perissinotto & L. Clennell (BMPC); 12 inds, Klein Pella, 23 Jan 2005, R. Perissinotto & L. Clennell (BMPC); 3♂+3♀, *ibidem* (RPRM); 4 inds, *ibidem*, 22 Jan 2005 (RPRM); 3♂, *ibidem*, 290269.4S-189739.1E, 22/23 January 2005, A.K.

Fig. 4 – The Otavi mountain range, with the typical habitat of *L.* (*L.*) *claveaui otavi* **sp. et subsp. nov.** on the foreground (Photo: Lynette Clennell).

Fig. 5 – Male specimen of *Leucocelis* (*L.*) *claveaui otavi* **sp. et subsp. nov.** in its natural habitat; Otaviberge 27 Dec 2007 (Photo: Lynette Clennell).

Brinkman leg. (SAMC-COL-A067950); 1 ind., Coboopduine, 28°45′S. 19°21′E, 16-25.iii.1988, Preserv. Pitf. traps, J Irish & E. Marais (SMWN); 7 inds, Soutrivier, 29°37'S 21°17'E, E. Marais & J. Irish (SMWN). **ZAF**: 1 ind., Natal [locality most probably erroneous] (ZMHB).

Remarks. Specimen size ranges between 9.6-12.1 mm in total length and 4.5-6.3 mm in maximum width. This species exhibits an extraordinary degree of variability in its elytral colour and ornamentation. These range from testaceous, brown, purple, reddish-orange, to light-green, dark green, blue and even polychromatic background colour with variable extent of white maculation superimposed on it (cf. Beinhundner 2017: 420, figs 1-12). A similar degree of variability is also observed on the pronotum, which however often exhibits a median, longitudinal dark band or macula. Also, there is a complete absence of white maculation on its surface (Figure 1A, C); a character that can be used in complex cases as diagnostic of the species.

Females differ from males by having stockier bodies, shorter protarsi, slightly enlarged protibias (Figure 1C) and a lack of concavity in the middle of their abdominal sternites. There is however no significant difference in the extent of white dorsal maculation between the two sexes.

Adults of this species emerge promptly only after major summer rainfall events, and are typically floricolous, having been recorded feeding on flowers of *Acacia* (= *Vachellia*) sp., *Catophractes alexandri, Ziziphus mucronata* and other unidentified plants (Holm & Marais 1992, pers. obs.). The larval stages are yet unknown.

***Leucocelis (Leucocelis) adspersa* (Fabricius, 1801)**
(Figs 8-12)

Cetonia aspersa Fabricius, 1801: 154; Mannerheim 1838: 136; Gory & Percheron 1833: 66, 297 (actually representing *Oxythyrea marginalis*).

Leucocelis adspersa (F.). Burmeister 1842: 426; Schoch 1895: 111; Péringuey 1907: 477, 480; Schenkling 1921:328.

Oxythyrea adspersa (F.); Schein 1960: 105; Sakai & Nagai 1998: 315, 392.

Cetonia attalica Schönherr, 1817: 138; Burmeister 1842: 426 (= *adspersa*); Péringuey 1907: 480 (= *adspersa*); Schenkling 1921: 328 (= *adspersa*).

Cetonia verreaux Gory & Percheron, 1833: 66, 296; Péringuey 1907: 481 (*verreauxi* erratim); Schenkling 1921: 328.

This was among the earliest described species in the genus, from material collected in the Cape Town area ("Cap: bon: sp:"), and should therefore represent the typical form occurring throughout the south-western parts of the current Western and Northern Cape provinces. Unfortunately,

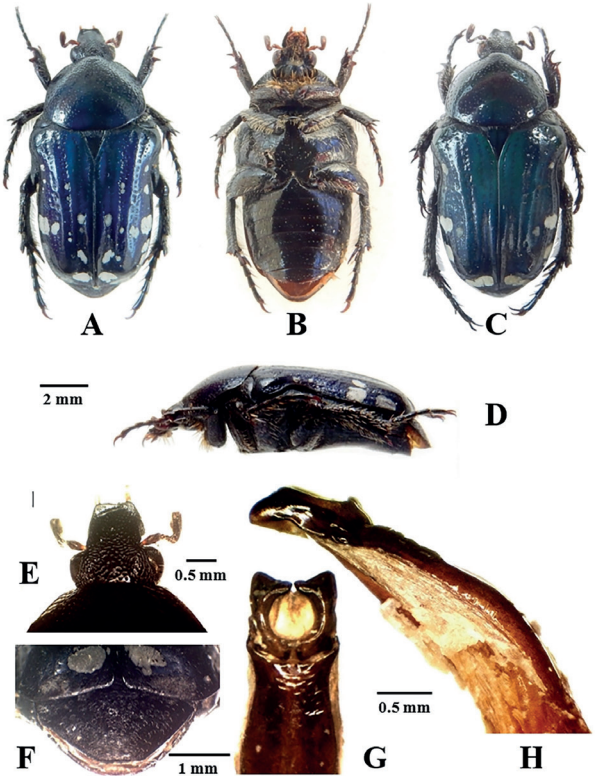

Fig. 6 – *Leucocelis* (*Leucocelis*) *franki* Janson, 1888: **A**, ♂ dorsal habitus; **B**, ♂ ventral habitus; **C**, ♀ dorsal habitus; **D**, ♂ lateral habitus; **E**, ♂ clypeus; **F**, ♂ pygidium; **G**, parameres, dorsal view; **H**, parameres, lateral view. Photos: Lynette Clennell.

Gory & Percheron (1833), Burmeister (1842) and Péringuey (1907) all confused its identification, first by providing a description of the superficially close *Oxythyrea marginalis* (cf. Gory & Percheron 1833: 297; plate 57, fig. 7; Holm & Marais: 1992: 279), then by including the reddish pronotal margins among its key characters (Burmeister 1842: 426 "*pronoti margine externo anoque rubido*"), and finally by using the invalid synonym of *L. verreauxi* to refer to the typical form of *L. adspersa*, in the belief that the latter was actually the eastern form with brownish-orange pronotal margins (cf. Péringuey 1907: 380).

Further confusion was generated by Schönherr (1817) with the use of the name *Cetonia attalica* in his synonymic work. The two type specimens of Schönherr actually represent two different subspecies of *L.* (*L.*) *adspersa*, but unfortunately none of them carry the LT designation mentioned for instance in Holm & Marais (1992: 280) and in Beinhundner (2017: 406). Since Schönherr in his listing of this taxon referred specifically to "*Cet. adspersa*" earlier described by Fabricius (1801) from the Cape of Good Hope ("Cap. bon. Spei."), it seems appropriate to assume that the correct LT of *C. attalica* is the specimen with the black/coppery pronotum, typical of the nominal subspecies from the southwestern Cape. As the second specimen exhibits brownish-orange margins on the pronotum, it almost certainly originated from further afield, in the eastern part of the then Cape Colony, and should consequently be regarded as a PT of the new subspecies, *L.* (*L.*) *a. orientalis* subsp. nov., described here below (Figs 8 and 9).

Leucocelis giannatellii Antoine, 2002, described on the basis of a comparative analysis with *L. franki* is actually also a subspecies of *L. adspersa* s.l., as it exhibits all the key characters of this species, but also an extreme reduction in white dorsal maculation and a marked darkening of its background colour, ranging from ferrugineous, to dark olive-green and even brown.

So, apart from the two subspecies currently recognised within this species, another two are added here, either as rectification of old descriptions or as result of new analyses.

***Leucocelis* (*Leucocelis*) *adspersa orientalis* subsp. nov.**
(Figs 8-11)

Péringuey (1907: 480) had already pointed out in his redescription of *L.* (*L.*) *adspersa* that "The variety *L. verreauxi* differs from the type in the absence of the reddish marginal band of the prothorax, and the dark bronze pygidium". While unfortunately, his reference to *L. verreaux* was erroneous, this highlighted the consistent differences existing between the nominal form and the populations occurring in the eastern parts of the country, a pattern now confirmed by review of several hundreds of specimens (Figs 8 and 11). Apart from the pronotal marginal bands, *L.* (*L.*) *a. orientalis* differs further from the nominal subspecies by

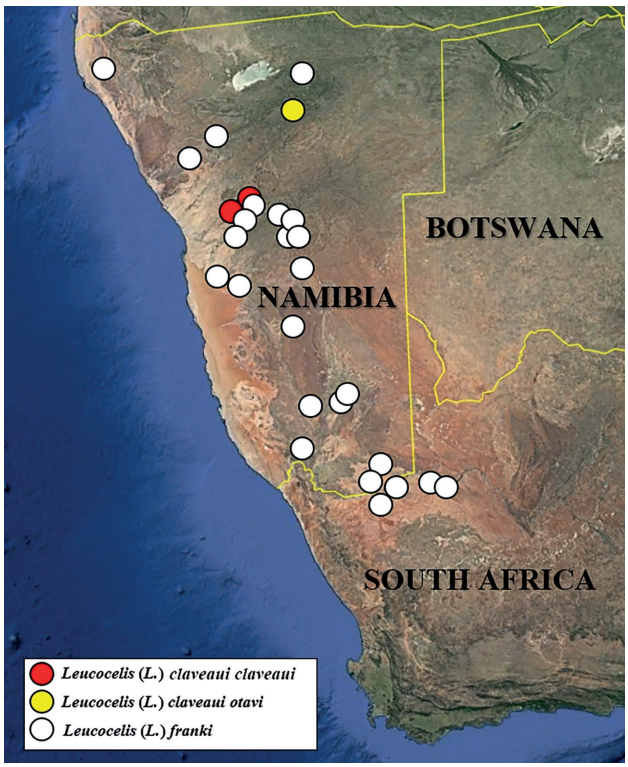

Fig. 7 – Known distribution range of *Leucocelis* (*Leucocelis*) *claveaui claveaui* **sp. et subsp. nov.**, *L.* (*L.*) *claveaui otavi* **sp. et subsp. nov.** and *L.* (*L.*) *franki* Janson, 1888 in South Africa and Namibia (Map: Google Earth Pro with image from Landsat/Copernicus 12/14/2015).

usually having a much more extensive dorsal white maculation and often a reddish-brown pygidium with 2-4 pairs of white spots, in contrast to the consistently dark coppery pygidial surface observed in *L.* (*L.*) *a. adspersa*, where white spots are either absent or extremely reduced in size and number. Although a few exceptions of intermediate forms exhibiting a residual brown-orange lateral margins on their pronotum and reddish pygidium can be found in the Klein Karoo of the Western Cape, the geographic distribution of the two forms is sufficiently coherent and distinct (Fig. 10) to warrant the erection of a new subspecies.

Distribution. This subspecies occurs east- and northwards from the easternmost parts of the Western Cape to the Gauteng Province of South Africa in the north and to Mpumalanga and eSwatini in the east (Fig. 10). Serrano et al. (2020) report of a female specimen housed in the MZUC, superficially resembling *L.* (*L.*) *a. orientalis* and carrying a label with locality "Angola". However, given its obvious old age, the lack of precise collection data, its incoherent biogeographic position and the fact that no other specimens were found in that country during the recent surveys, it is doubtful that this specimen indeed originated from that country. Alternatively, if it did, it would almost certainly represent a different taxon.

Data Records. Type Series. **Holotype** ♂, **ZAF-EC**: Compassberg, 27 Feb 1998, R Perissinotto & L. Clennell (RPGS to be reposited in TMSA). **Paratypes**: **ZAF-EC**: 1♂+2♀, *ibidem* (RPGS); 1♀, *ibidem*, 29 Dec 2011, R. Perissinotto & L. Clennell (RPGS); 1 ind., *ibidem*, 25.11.1995, R. Perissinotto & L. Clennell (BMCS); 2♂, Graaf-Reinet, 16 Dec 2004, R. Perissinotto & L. Clennell (RPGS, BMCS); 2 inds, *ibidem*, Jan 2.005, R Perissinotto & L Clennell (BMCS); 1♀, Willowmore, Jan 2005, R. Perissinotto & L. Clennell (RPGS); 3 inds, *ibidem*, 9 Jan 2004 R. Perissinotto & L. Clennell (BMCS); 4 inds, *ibidem*, Nov 1904, G. Kobrow (TMSA-CPH2269); 7 inds, *ibidem*, Dr. Brauns (TMSA-CPH2267); 2 inds, *ibidem*, Jerryida, 20.10.1920, Dr. Brauns (TMSA-CPH2268); 1 ind., Winterberg, 27 Dec 2002, R. Perissinotto & L. Clennell (BMCS); 3 inds., Baviaanskloof, 33°38′S 24°27′E, 6.12.1995, C.L. Bellamy, E-Y: 3171 Beating (TMSA-CPH2308); 3 inds, *ibidem*, Swartbg., 10.11.1982, W. Breytenbach, Beating (TMSA-CPH2309); 1 ind., *ibidem*, S Kouga Mts, 1 Jan 2000, Derek Clark (BMCS); 1 ind., *ibidem*, 24.09.1995, R. Perissinotto & L.. Clennell (BMCS); 4 inds, *ibidem*, 22.01.1995, R. Perissinotto & L.. Clennell (BMCS); 10 inds, *ibidem* (W), 9.10.1981, E. Holm (TMSA-CPH2286); 1 ind., *ibidem* (Top), 9.10.1981, E. Holm (TMSA-CPH2285); 1 ind., *ibidem*, Valley c. 120 km NW of Port Elizabeth, 23-24/11/1983, Prinsloo GL & Grobbelaar NC (SANC-COLS-15742); 1 ind., Huntley Glen, 03.03.1996, R. Perissinotto & L. Clennell (BMCS); 3 inds, Near Riebeeck East, 30.12.1994, R. Perissinotto & L.. Clennell (BMCS); 2 inds, Fort Brown, 10.11.1996, R. Perissinotto & L. Clennell (BMCS); 2 inds, Groendal WA, 12.11.1996, R. Perissinotto & L.. Clennell (BMCS); 3 inds., M. Zebra NP, 06.04.1994 (BMCS); 1 ind., *ibidem*, 06.03.1994 (BMCS); 2 inds, Sam Knott NR, 6.11.1994, R. Perissinotto & L.. Clennell (BMCS); 1 ind., Addo Elephant NP, 23.10.1994, R. Perissinotto & L.. Clennell (BMCS); 1 ind., Joubertina, Dec 2009, Rodger Smith (BMCS); 1 ind., Morgans Bay, 16.10.1994, R. Perissinotto & L.. Clennell (BMCS); 1♀, Misgund, 4 Oct 2015, R Perissinotto & L Clennell (RPGS); 2 inds, Tarkastad, 1.1986, Ex Collection Dr Vincent Allard, received from Christophe Allard, 21.II.2015 (GBEG); 2 inds, Queenstown, Nov 1966, Ruter 254, Ex Collection Dr Vincent Allard, received from Christophe Allard, 21.II.2015 (GBEG); 1♂, Port Elizabeth, 1.1973, Ex Collection Dr Vincent Allard, received from Christophe Allard, 21.II.2015 (GBEG); 1♀, East London, XI.1975, Ex Collection Dr Vincent Allard, received from Christophe Allard, 21.II.2015 (GBEG); 1 ind., *ibidem*, Quinba River, 10.11.1979, N.J. Duke (TMSA-CPH2262); 1 ind., Tylden, 25.12.1970, N.A. Brown (TMSA-CPH2261); 5 inds, *ibidem*, Beacon Bay, 29.10.1979, N.J. Duke (TMSA-CPH2264); 1 ind., *ibidem*, 5.11.1989, N.J. Duke (TMSA-CPH2263); 1 ind., Enon, -33.375S 25.625E, Nov 1891, Brauer (SAMC-COL-A028230); 1 ind., Port St Johns, -31.625S 29.625E, Mar 1967, Gess (SAMC-COL-A028362); 10 inds., Resolution, Albany Distr., -33.166S 26.616E, Oct-Nov 1928, Miss Walton (SAMC-COL-A028364); 1 ind., *ibidem*, Sep 1928 Miss Walton (SAMC-COL-A028365); 1 ind., *ibidem*, 1930, Miss Walton (SAMC-COL-A028366); 5 inds, *ibidem*, 1929, Miss Walton (SAMC-COL-A063034); 1 ind., *ibidem*, 26.11.1928, A. Walton (TMSA-CPH2284); 1 ind., *ibidem*, 23.12.1928, A. Walton (TMSA-CPH2283); 5 inds, *ibidem*, 12.2.1928, A. Walton (TMSA-CPH2282); 1 ind., *ibidem*, Jun1928, A. Walton (TMSA-CPH2266); 3 inds, *ibidem*, Jan 1929, A. Walton (TMSA-CPH2265); 1 ind., Steynsburg Div., -31.375S 25.875E, Oct 1935, South African Museum Expedition (SAMC-COL-A028369); 9 inds, Middelburg Division, Nov 1935, South African Museum Expedition (SAMC-COL-A028370); 1 ind., Grahamstown, 22.11.1890, Chew (SAMC-COL-A028376); 1 ind., no data (SAMC-COL-A028514); 1 ind., Grahamstown, 33°18'S 26°32'E, 22-11-1890 (SANC-COLS-17223). **ZAF-ZN:** 1♂, Impendle, Good Hope For., 4-5 Dec 2004, R. Perissinotto & L. Clennell (RPGS); 1 ind., Karkloof, 20 Feb 2002, R. Perissinotto & L. Clennell (BMCS); 1 ind., Umtamvuna, 8 Nov 1998, R Perissinotto & L Clennell (BMCS); 1♂, Mt. Currie, 21 Dec 2008 (RPGS); 1 ind. (missing head & pronotum), van Reenens Pass, -28.375S 29.375E, 1908, Barker (SAMC-COL-A028374); 1♂+1♀, Ithala Game Reserve, 27o32'670"S 31o16'819"E, 13 Dec 2005, Open savana, on flowers of *Acacia* sp., R. Perissinotto & L. Clennell (DMSA); 1 ind., *ibidem*, 27°28′S 31°16′E, 25.2.1993, On *Lantana* flowers, O. Bourquin (TMSA-CPH2260); 1 ind., Hluhluwe Game Res., 24°08′S 32°02′E, Summer 1970, O. Bourquin (TMSA-CPH2259); 1 ind., Oribi Gorge, 5.1.1989, T. Beyers (TMSA-CPH2258); 1 ind., Upper Tongaat, 2931CA, 29o34′S 31o11′E, C.N. Barker (DMSA-10434); 1 ind., V. Reenen N, 2829AD, 28o22′S 29o23′E, C.N. Barker (DMSA-10435); 7 inds,

Fig. 8 – Left: *Leucocelis* (*L.*) *adspersa orientalis* **subsp. nov.**, Kleinpoort, Cacadu, Eastern Cape, South Africa, Oct 27, 2021 15:18 (Photo: Felix Riegel). Right: *Leucocelis* (*L.*) *adspersa.* Pixley ka Seme District Municipality, Northern Cape, South Africa, Dec 31, 2013 8:12 (Photo: Johan Heyns).

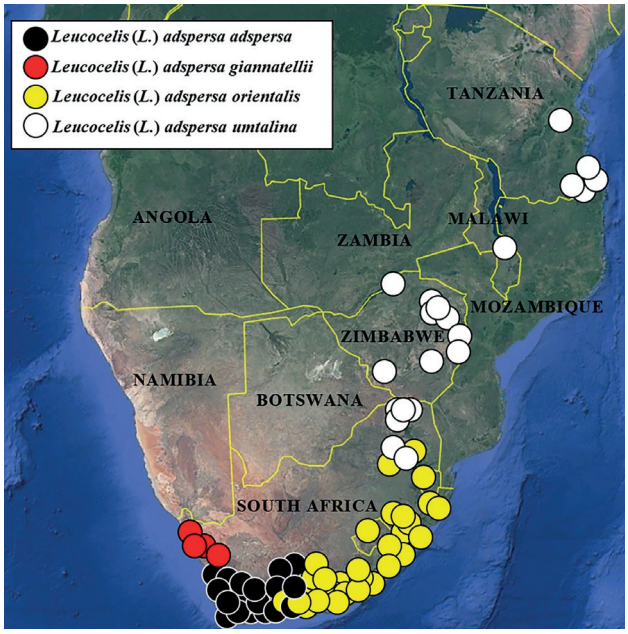

Fig. 9 – Distribution range of the four subspecies of *Leucocelis* (*L.*) *adspersa* within the southern and East African regions. (Map: Google Earth Pro with image from Landsat/Copernicus 12/14/2015).

Hankey, 33°5′S 25°54′, 6.12.1995, C.L. Bellamy, E-Y: 3166 Flower *Buddleja* (TMSA-CPH2289); 8 inds, Middelburg, 31°30'S 25°00'E, 28/01/1991, on Rose flowers, De Jager M (SANC-COLS-15740); 1 ind., Windham (SANC-COLS-17109); 1 ind., Ngubhu Loop Road, Ithala Game Reserve 3200 ft., 27°34'S 31°16'E, 13/12/1993, Collected from flower(s) of Dombeya sp., Bourquin O (SANC-COLS-17110). **ZAF-FS**: 2 inds, Harrismith, 10 Jan 2002, R. Perissinotto & L. Clennell (BMCS). **ZAF-WC**: 1 ind., Rust en Vrede, Oudtshoorn Distr., -33.4S 22.36E, Oct 1951, South African Museum Expedition (SAMC-COL-A028361); n inds, Oudtshoorn, 10 km N, Little Karoo, 33°29′S 22°15′E, 22.10.1993, Endrody-Younga, E-Y: 2894 White flowering bushes (TMSA-CPH2307); n inds, Kamanasiberg, Little Karoo, 33°37′S 22°33′E, 2.11.1993, Endrody-Younga, E-Y: 2928 Beating bushes (TMSA-CPH2306); 3 inds, ibidem, 2.11.1993, Endrody-Younga, E-Y: 2929, *Protea* flowers (TMSA-CPH2302); 1 ind., Phantom Pass, 10.10.1981, E. Holm (TMSA-CPH2288. **ZAF-MP.** 1 ind., Lydenburg Distr., 1896, P.A. Krantz (TMSA-CPH2257). **ZAF-GP.** 1 ind., Pretoria, Mar 1970 (TMSA-CPH2256); **ZAF (no locality)**. 1 ind., no data, Paralectotype, Cetonia adspersa Fabricius 1801(ZMUC: 00031551; ZMUKFabricius 002304); 1 ind., idem (ZMUC: 00031552; ZMUKFabricius 002305); 1 ind, Paralectotype, attalica Schn, Pr. b. Sp. Drg, congener Dg 487 (MLUH); **LSO**: 1 ind., Malealea, 35 km E of Mafeteng, 29°51'S 27°34'E, xii.1993, Holm E (SANC-COLS-17111). **Sine Patria**: 1 ind., [no data] (SAMC-COL-A028226); 1 ind., [no locality], Dec 1890, Swanzie (SAMC-COL-A028372).

Other records. **ZAF-EC**: 1♂+1♀, Chris Hani (Camdeboo), Sneeuberge Mountains, Nieu-Bethesda 31°50'39.34"S 24°31'5l.14"E, 1150 m, 30-X11-2014, several imagos observed feeding on flowering *Wahlenbergia albens* (Malec and Šípek 2016: 66, fig. 21); n inds, Chris Hani (Tsolwana), Winterberge Mountains along R344, 1000-1650 m, 1-I-2015, several adults found on *Daucus carota* (Malec and Šípek 2016: 66); 1 ind., Sarah Baartman District (Dr Beyers Naudé Municipality), 15 km NW of Willowmore, 33°15'24.13"S 23°20'1.95"E, 870 m, 4-I-2017; one adult found in pellets of hyrax (dassie) *Procavia capensis* (Pallas, 1766) (Malec and *Šípek* 2017: 71); 1 ind., Kleinpoort, Cacadu, 27 Oct 2021 15:18, Felix Riegel (https://www.inaturalist.org/observations/125180984). **ZAF-WC:** 1 ind., Camferskloof, Outeniquas, 15 Nov 2019 12:59, Sandra Falanga (https://www.inaturalist.org/observations/37740820); 1 ind., Meiringspoort, 25 Oct 2020 12:24, Sally Adam (https://www.inaturalist.org/observations/63706752); 1 ind., Hillside, South Cape DC, 30 Oct 2022 10:59, Nicola van Berkel (https://www.inaturalist.org/observations/141377266). **LSO**: 4♂+6♀, Mamathes, Sammler C. Jacot-Guillarmod (Schein 1960: 105). **SWZ**: 1 ind., Usuthu forest, Mbekhetulu, 19 Oct 2023, Kate Braun (https://www.inaturalist.org/observations/188872554).

Remarks. In this subspecies, body size ranges from 9.5 to 12.8 in total length and from 4.6 to 6.2 in maximum width. Dorsal background colour varies widely both on the elytra and pronotum. The former can range from a mixture of ferrugineous and light green, to dark green, orange, purplish and even brown, while in the latter the testaceous-orange bands can be constrained to the central part of the lateral margins or show an expansion to the entire lateral margins, the posterior margin and on rare occasions even to the entire disc (Figs 8, 9 and 11). The pygidial surface too can vary from the more common reddish brown variety (Figure 9E) to dark coppery, but there is always at least one pair of white spots, increasing to three pairs in some specimens, where the baso-central pair assumes a longitudinally elongate shape and eventually splits into a basal and an apical portion. This is most often observed in the more eastern and northern populations. The white maculation varies widely in extent and density, on both pronotal and elytral surfaces, but is always rather prominent (Fig. 11).

Adults are active from early spring to early autumn, with a peak in mid-summer. They are typically floricolous and have been found feeding on a variety of flowers, including *Protea* spp., *Buddleja* sp., *Lantana* sp., *Dombeya* sp. and *Vachellia* spp. (Holm & Marais 1992, pers. obs.), as well as *Wahlenbergia albens* and *Daucus carota* (Malec and Šípek 2016). Both adults and larvae have been obtained in numbers from middens of hyrax (*Procavia capensis*) dung, and the latter have been reared successfully on this medium (A.P. Marais, pers. comm.). Captivity breeding has also been described by Malec and Šípek

(2016), who reported that this subspecies does not undergo dormancy in any phase of its development, and as such is easy to reproduce under controlled conditions. These authors concluded that its entire life cycle takes 2-3 months to complete, using a dry substrate containing a mixture of 30% silty to sandy soil and 70% rotten wood and leaf litter. However, the larval stages remain still undescribed at present.

***Leucocelis (Leucocelis) adspersa adspersa* (Fabricius, 1801)**
(Figs 8, 10 and 11)

Leucocelis (*L.*) *adspersa adspersa* (Fabricius); Holm & Marais 1992: 279; Beinhundner 2017: 405.

This is the original taxon described by Fabricius (1881) from the south-western Cape region and, as his LT specimen shows, it exhibits completely black to coppery pronotum and pygidium. However, the two PLTs included in the same Fabricius'series are not accompanied by locality of collection and show a pronotum with marked orange lateral margins. These, therefore belong in the new subspecies described here below and were probably originating from the eastern part of the then "Cape Colony", in what is now the Eastern Cape Province or the easternmost region of the Western Cape Province. On the other hand, the entire Gory's type series of "*Cetonia verreaux*" originating from the Cape of Good Hope represents indeed the nominal subspecies and exhibits a completely dark pronotum.

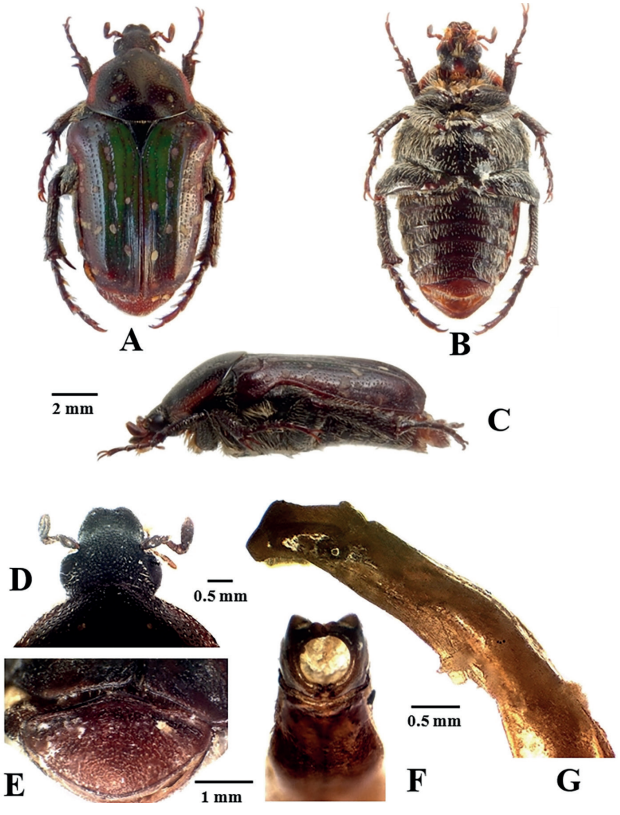

Fig. 10 – *Leucocelis* (*Leucocelis*) *adspersa orientalis* **subsp. nov.**: **A**, HT♂ dorsal habitus; **B**, HT♂ ventral habitus; **C**, HT♂ lateral habitus; **D**, HT♂ clypeus; **E**, HT♂ pygidium; **F**, HT♂ parameres, dorsal view; **G**, HT♂ parameres, lateral view. Photos: Lynette Clennell.

Distribution. The nominal subspecies occurs mainly in the south-western parts of the Western Cape, but also in some southern areas of the Northern Cape (Fig. 10).

Data Records. Type series. *Cetonia adspersa* Fabricius: Lectotype ♂, ZAF-WC, Cap: bon: sp:, Paykul, Mus. G. & P., L: (ZMUC: 00031550; ZMUK Fabricius 002303). *Cetonia verreaux* Gory & Percheron: Lectotype♀, ZAF-WC, Cap. b. sp., adspersa F.B., Verreaux GP, Gory Type, Coll. Melly (MHNG-ENTO-0248014); Paralectotypes: 1♀, ZAF-WC, Cap B. E. Dupont,
Adspersa Fab., Verreaux Gory (MHNG-ENTO-0248016); 1♀, ibidem, Gory Type, Verreaux G. et P., (MHNG-ENTO-0248015). Cetonia attalica Schönherr: Lectotype, ZAF-WC, Pr. b. Sp., Drg, congener Dg 487 (MLUH).

Other records. ZAF-WC. n inds, Swartbergpas, Platberg, 5000 Fuß, Loc. Nr. 120 Schein 1960: 105); 1♂, Gordon's Bay, ix.1985 (Sakai & Nagai 1998: Plate 111, Fig. 1281); 60 inds, *ibidem*, Sep 1985, C.R. Owen (TMSA-CPH2297); 8 inds., *ibidem*, 1994/09/04, AP Marais (SAMC-COL-A028357); 5 inds, Gamkaberg Nat. Res., Little Karoo 1000 m, 33°43′S 21°46′E, 8.11.1993, Endrody-Younga, E-Y: 2950 Flower, vegetation (TMSA-CPH2301); 1 ind., *ibidem* 33°42′ 21°54′, 8-9.12.1995, C.L. Bellamy, E-Y: 3175 Beating (TMSA-CPH2300); 1 ind., *ibidem* Zebra Rug 1000 m, 33°44′S 21°57′E, 8.11.1993, Tom Berry, E-Y: 3067 Ground traps, 20 days (TMSA-CPH2299); 1 ind., Grootdrif Farm, 32°49′S 19°27′E, 17.9.1985, Endrody-Younga, E-Y: 2248 Grassnetting (TMSA-CPH2303); 1 ind., Reubenheimer Dam E, Little Karoo, 33°25′S 22°19′E, 23.10.1993, Endrody-Younga, E-Y: 2897 Grassnetting (TMSA-CPH2304); 1 ind., Robinson Pass N, Little Karoo, 33°52′S 22°02′E, 6.11.1993, Endrody-Younga, E-Y: 2943 Flowering meadow netted (TMSA-CPH2305); n inds, Oudtshoorn, 10 km N, Little Karoo, 33°29′S 22°15′E, 22.10.1993, Endrody-Younga, E-Y: 2894 White flowering bushes (TMSA-CPH2307); n inds, Kamanasiberg, Little Karoo, 33°37′S 22°33′E, 2.11.1993, Endrody-Younga, E-Y: 2928 Beating bushes (TMSA-CPH2306); 1♂+1♀, Grootvadersbosch, 11 Jan 2009, R Perissinotto & L Clennell (BMCS, RPGS); 5 inds, Leipoldtville, 26 Sep 2010, R. Perissinotto & L. Clennell (BMCS, RPGS); 1♀, Elandsberg, 2 Jan 2013, R. Perissinotto & L. Clennell (RPGS); 2♂+1♀, Seweweekspoort, 24 Dec 2017, R. Perissinotto & L. Clennell (RPGS); 2 inds, *ibidem*, Oct 1954, G. van Son (TMSA-CPH2271); 1 ind., *ibidem*, 17.11.1940, G. van Son (TMSA-CPH2272); 2 inds, *ibidem* 33°26′S 21°25′E, 10.12.1995, Endrody-Younga, E-Y: 3178 Beating (TMSA-CPH2295); 1 ind.,

ibidem 33°24′S 21°21′E, 18.11.1973, Endrody-Younga, E-Y: 267 Grassnetting (TMSA-CPH2296); 2 inds, *ibidem*, 1100 m Klein Swartberge, 33°24'S 21°24'E, 01/12/1988, Grobbelaar E (SANC-COLS-15738); 6 inds, Rocklands Farm, near Clanwilliam, 900 m Pakhuis Pass, 32°08'S 18°58'E, 25/11/1996, on flowers and foliage of *Aspalathus hystrix*, Oberprieler RG, Neser OC & Stiller M (SANC-COLS-15741); 1 ind., Ceres, 33°22'S 19°19'E, 11/10/2004, Holm E (SANC-COLS-15743); 1 ind., Warmwaterberg, c. 30 km NE of Barrydale, 33°46'S 20°53'E, Eardley CD & Oberprieler RG (SANC-COLS-15883); 1 ind., ZAF-WC, 80 km W Ladismith, 33°40'S 20°32'E, Holm E. (SANC-COLS-16056); 2 inds, Tierberg Karoo Research Centre 800 m, near Prince Albert, 33°10'S 22°16'E, 25/10/1987, Dean W.R.J. & Dean S.J. (SANC-COLS-17108); 1 ind., Villiersdorp, 33°59'S 19°17'E, 01/12/1964, Capener A.L. (SANC-COLS-17171); 1♂+1♀, Cederberg, Welbedacht, 27 Sep 2010, R. Perissinotto & L. Clennell (RPGS); 1 ind., *ibidem*, Bushmanskloof, 22.09.1997, R Perissinotto & L Clennell (BMCS); 1 ind., ibidem, Middelberg 5000 ft, Oct 1967 (TMSA-CPH2275); 2 inds., Bainskloof, 27.10.1975, N.J. Duke (TMSA-CPH2278); 2 inds, Mitchells Pass, 26.10.1975, N.J. Duke (TMSA-CPH2279); 1 ind., ZAF-WC, Du Toits Kloof, 2.11.1975, N.J. Duke (TMSA-CPH2280); 1 ind., Franschoek Pass, 30.11.1975, N.J. Duke (TMSA-CPH2281); 1 ind., Clanwilliam Dam, 7.9.1990, E. Holm, K. Stamhuis & S. Gussmann (TMSA-CPH2287); 6 inds, Hawaquas Rad. Tower, 33°41′S 19°06′E, 8.11.1973, Endrody-Younga, E-Y: 225 Single (TMSA-CPH2290); 8 inds, Hawaquas For. St., 33°19′S 19°08′E, 7.11.1973, Endrody-Younga, E-Y: 219 Flowering *Prunus* (TMSA-CPH2294); 2 inds, Hawaquas Mt, 33°34′S 19°08′E, 6.11.1973, Endrody-Younga, E-Y: 207, Beaten from bushes (TMSA-CPH2291); 5 inds, ibidem, 5.11.1973, Endrody-Younga, E-Y: 204 Netted and singled, yellow Compositae (TMSA-CPH2292); 1 ind., *ibidem*, 4.11.1973, Endrody-Younga, E-Y: 197 Singled, on white flowers (TMSA-CPH2293); 1 ind, Yzerfontein, 12.9.1986 (TMSA-CPH2276); 1 ind., Potberg, De Hoop, 25 Sep 1997, R Perissinotto & L Clennell (BMCS); 1 ind., Karoo Nas Prk, 20.12.1996, R Perissinotto & L Clennell (BMCS); 1 ind., Swellendam, -34.0333S 20.43333E, 1930/11, Lawrence (SAMC-COL-A028227); 1 ind., Barrington, 23 km NW Knysna, Nov 1971, L. Schulze (TMSA-CPH2273); 2 inds, Tradouw Pass, S of Barrydale, Nov 1971, L. Schulze (TMSA-CPH2274); 1 ind., Tulbagh, Dec 1924, Dr. Brauns (TMSA-CPH2270); 1 ind., *ibidem*, Gt Winterhoek 4500 ft, -33.1333S 19.1667E, 1916/11, Lightfoot (SAMC-COL-A028228); 1 ind., Ceres Road, 1984/11, de Sozir (SAMC-COL-A028229); 1 ind., *idem* (SAMC-COL-A028231); 1 ind., Fernkloof Nature Res., Die Mond se Kop, 150 m, Hermanus, -34.4S 19.3E, 1993/10/24, van Noort (SAMC-COL-A028358); 1 ind., Hex Riv. (River), 1985/07 (SAMC-COL-A028359); 88 inds., Goede Hoop (Farm), Heidelberg District, -33.9833S 20.85E, 1951/10, South African Museum Expedition (SAMC-COL-A028360); 1 ind., Rust en Vrede, Oudtshoorn Distr., -33.4S 22.36E, Oct 1951, South African Museum Expedition (SAMC-COL-A028361); 3 inds, Sevenweekspoort, -33.4S 21.4E, 1935/11, South African Museum Expedition (SAMC-COL-A028363); 3 inds, Tradouw Pass, Swellendam Dist., 1925/11, South African Museum

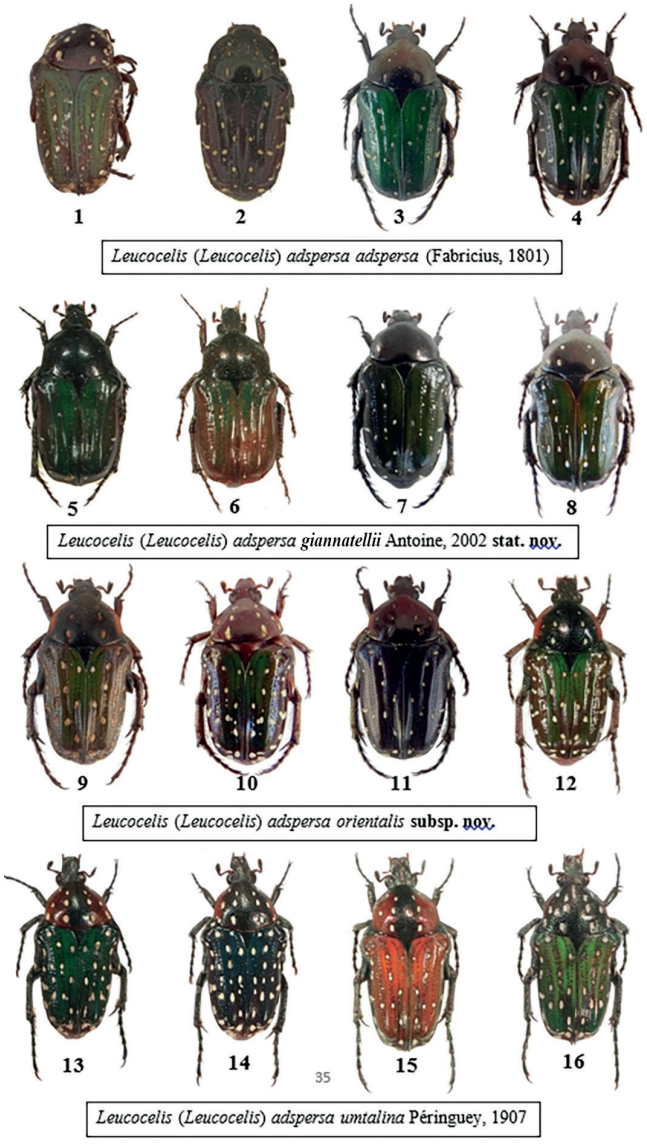

Fig. 11 – Examples of dorsal habitus variability among the different subspecies of *Leucocelis* (*Leucocelis*) *adspersa* s.l. *Leucocelis* (*L.*) *a. adspersa*: **1**, *Cetonia adspersa*, Fabricius LT ("Cap: bon: sp:"); **2**, *Cetonia verreaux* Gory LT ("Cap. b. sp."); **3**, ♂, ZAF-WC, Cederberg; **4**, ♀, ZAF-WC, Elandsberg. *Leucocelis* (*L.*) *a. giannatellii*: **5**, ♀, ZAF-NC, Steinkopf-Springbok; **6**, ♀, ZAF-NC, Near Kamieskroon; **7**, ♂, ZAF-NC, Kamieskroon; **8**, ♂, ZAF-NC, Nieuwoudtsville. *Leucocelis* (*L.*) *a. orientalis*: **9**, ♂, ZAF-ZN, Mt Currie; **10**, ZAF-EC, Fort Brown; **11**, ♂, ZAF-EC, Willowmore; **12**, ♀, ZAF-EC, East London. *Leucocelis* (*L.*) *a. umtalina*: **13**, ♂, ZIM Kwekwe; **14**, ♀, ZIM Masvingo; **15**, TAN Lindi-Masasi; **16**, MAL Cape Maclear. (Photos: 1, Michael Kuhlmann; 2, Giulio Cuccodoro; 3,4, 7-12, Lynette Clennell; 5,6, 13-16, Gerhard Beinhundner).

Fig. 12 – *Leucocelis* (*L.*) *adspersa umtalina* Péringuey, 1907 in its typical habitat. Left: Mashovhela, Morning Sun Nature Reserve, Soutpansberge near Louis Trichard, appr. 500 m NN, 10 Feb 2010 (Photo: Hanna Roland); right: Tsindi Ruins, Murehwa, Zimbabwe, 7 Dec 2022 15:58 (Photo: Glenn Stockil).

Expedition (SAMC-COL-A028367); 4 inds, South Africa, Swellendam Distr., 1925/11, South African Museum Expedition (SAMC-COL-A028368); 4 inds, ZAF-WC, Tulbagh, -33.2833S 19.15E, 1902, Lightfoot (SAMC-COL-A028371); 3 inds, Newlands, 2001/10/12, Hosford (SAMC-COL-A045117); 1 ind., Wit River Valley, Bains Kloof, 1949/12, South African Museum Expedition (SAMC-COL-A063032); 2 inds, Harold Porter Nature Reserve, Betties Bay, on *Scabiosa incisa*, 2009/10/28, Reavell (SAMC-COL-A070084); 1 ind., Riversdale, -34.125S 21.375E, Phillips (SAMC-COL-A028375); 1 ind., Mitchell's Pass, near Ceres, 33°23'S 19°27'E, 19/11/1982, Eardley C.D. & Oberprieler R.G. (SANC-COLS-15645); 1 ind., Tradouw Pass, near Barrydale, 33°57'S 20°42'E, 17/11/1982/, Eardley CD (SANC-COLS-15659); 2 inds, Limietberg Nature Reserve, Zachariashoek near Paarl, 33°50'S 19°04'E, 1976/10/07, Geertsema H. (SANC-COLS-15736); 1 ind., Garcia's Pass, N slope 700 m Langeberg, 33°59'S 21°14'E, 01/12/1988, Grobbelaar E. (SANC-COLS-15737); 13 inds, Ashton, 33°49'S 20°03'E, 19/10/1983,Tribe GD (SANC-COLS-15739); 1 ind., Between Calitzdorp and Ladismith, 26 Nov 2008, Johan Pretorius (https://www.inaturalist.org/observations/11038122); 1 ind., lower Welbedagt ascent Cedarberg Wilderness Area, 3 Nov 2018 11:57, Tony Rebelo (https://www.inaturalist.org/observations/18410948); 2♂+1♀, *ibidem*, 3 Nov 2018 11:49, Tony Rebelo (https://www.inaturalist.org/observations/18411141); 1 ind., Helderberg Rural, Sir Lowry's Pass, 25 Nov 2018 8:52, Nikola S (https://www.inaturalist.org/observations/18622139); 1♀, *ibidem*, 29 Apr 2019 13:29, Magriet B (https://www.inaturalist.org/observations/24026186); 1 ind., Kogelbaai Steenbras NR, 29 Apr 2019 13:38, Linkie (https://www.inaturalist.org/observations/24269520); 1 ind., Rietvlei nr 2, Montagu, 29 Oct 2017 18:14, Marion Maclean (https://www.inaturalist.org/observations/30299426); 1 ind., South Cape DC, 21 Sep 2019 12:09, Brian du Preez (https://www.inaturalist.org/observations/33203654); 1 ind., Phillipskop Mountain Reserve, Stanford, Overberg, 29 May 2021 11:26, Heather & Andrew Hodgson (https://www.inaturalist.org/observations/85317192); 1 ind., *ibidem*, 19 Oct 2021 9:03, Felix Riegel (https://www.inaturalist.org/observations/117323782);

1 ind., Waterval Nature Reserve, Tulbagh, 27 Oct 2021 11:45, Ismail Ebrahim (https://www.inaturalist.org/observations/99986598); 1 ind., Mount Hope, Doringrivier west, South Cape DC, 20 Nov 2021 11:39, Nicola van Berkel (https://www.inaturalist.org/observations/106759609); 5 inds, Saint Blaize Hiking Trail, Mossel Bay, 20 Aug 2023 14:17, Josh Durie (https://www.inaturalist.org/observations/179388407); 1♂+1♀, Overberg District Municipality, 17 Oct 2023 14:44, Andrew Morton (https://www.inaturalist.org/observations/187995081). **ZAF-NC**. 4 inds, Gr. Tafelberg, 2 Jan 2006, R. Perissinotto & L. Clennell (RPGS, BMCS); 1 ind., ZAF-NC, Pixley ka Seme District Municipality, 31 Dec 2013 8:12, Johan Heyns (https://www.inaturalist.org/observations/145870558).

Remarks. Specimen size range between 8.9-11.7 mm in total length and 4.2-6.1 mm in maximum width. The dorsal habitus exhibits a rather constant pattern of white maculation, with spots being generally very small in size and rather shallow. On the pronotum, in particular, all specimens examined show the presence of two symmetric longitudinal lines of often oblong white spots on the disc and also a few, less regular spots along the lateral margins. The elytral background colour is most often of an emerald green, but ferruginous to brown and even dark purplish specimens have been recorded on numerous occasions (Fig. 11).

Females differ from males in having the usual shorter protarsi and slightly more enlarged protibiae, as well as an absence of concavity at the centre of their admominal sternites. Adults are active from late winter till late autumn, with a peak in late spring and early summer. They have been found feeding on several flowering plants, notably *Protea* spp., *Prunus* sp., *Aspalathus hystrix* and *Scabiosa incisa.* The larval stages are yet unknown.

***Leucocelis* (*Leucocelis*) *adspersa umtalina* Péringuey, 1907**
(Figs 10,11 and 12)

Leucocelis umtalina Péringuey 1907: 477, 482; Schenkling 1921: 334.

Leucocelis (*L.*) *adspersa umtalina* Péringuey; Holm & Marais 1992: 281; Beinhundner 2017: 406.

Holm & Marais (1992), downgraded with some reluctance this taxon, originally described by Péringuey (1907) on the basis of a small series of specimens originating from central Zimbabwe, from species to subspecies. The known area of its extent has now increased drastically across the whole southern African region, where despite exhibiting remarkable variability in its dorsal ornamentation the structure of its aedeagal parameres remains rather stable. These differ from those of the nominal subspecies only slightly in the extent of setation on the ventral lobes and the more triangularly expanded apical area of the dorsal arms. These, however, are characters that exhibit a whole gradient of progressive development within the species, from the most basic found in *L.* (*L.*) *a. giannatellii* to the most pronounced in *L.* (*L.*) *a. umtalina*, with intermediate levels observed in the nominal form and in *L.* (*L.*) *a. orientalis*. It is parapatric with the new subspecies *L.* (*L.*) *a. orientalis* in the northern Gauteng Province, where transitional forms appear to occur when physical barriers are not sufficiently developed to keep adjacent populations permanently separated. Its subspecific status appears therefore justified so far.

Distribution. This subspecies occurs from the extreme north of the Gauteng Province of South Africa to southern Malawi and Tanzania, across the whole of Zimbabwe and probably into adjacent areas of Mozambique and Zambia as well (Fig. 10).

Data records. Type series. Not traced (as also reported in Holm and Marais 1992 and Beinhundner 2017).

Other records. **ZAF-GP**: 1 ind., Ezemvelo Nat Res., Telperion 1350 m, 25.42S 29.00E, 17.11.2008, D. MacFadyen (TMSA-CPH2254); 1 ind., ibidem, 24.10.2006, D. MacFadyen (TMSA-CPH2255). **ZAF-LP**: 1 ind., Amatola Scott Farm, 22°56′S 29°23′, 26.1.1998, E-Y: 3313 Fruit traps, R. Müller (TMSA-CPH2320); 1 ind., Pietersburg Univ., 17.11.1975, P.E. Reavel (TMSA-CPH2321); 3 inds, Wylies Poort, Soutpansberg, 24-26.1.1988, N.J. Duke (TMSA-CPH2322); 1 ind., ibidem, 11.3.1995, N.J. Duke (TMSA-CPH2323); 1 ind., Warmbaths, 12.1907, G. Kobrow (TMSA-CPH2253); 1 ind., Louis Trichardt, c. 20 km N, Junction N1–R523, N of Verwoerd Tunnels, 22°55'S 29°56'E, 26/12/1994, Zwart KWR (SANC-COLS-17172); 1 ind., Thabaphaswa, Groenkom Farm, N of Mokopane, 24°03'S 29°02'E, 29/03/2006, Beating from vegetation of *Clematis brachiata*, Breytenbach W (SANC-COLS-17173); 2 inds, Ingwe Motel, near Wyllie's Poort, Soutpansberg (Mountain Range), 22°58'S 29°57'E, 20-22/01/1982, Mansell MW (SANC-COLS-17174); 1 ind., Mashovhela, Morning Sun Nature Reserve, Soutpansberge near Louis Trichard, appr. 500 m NN, 10 Feb 2010, Wolf-Achim and Hanna Roland (https://www.inaturalist.org/observations/11005742). **ZWE**: 1♂+1♀, Matopos, Lumane Valley, 2033 S 2854 E, Host plant *Acacia* sp (Mimosaceae), 03/xi/1994, AJ Gardiner leg. (BMPC); 1♂+1♀, Mazoe, 22-3-1970, 383, Duke 52, Ex Collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♂, Salisbury, 20 Oct 1969, 360, Duke 34, Ex Collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1 ind., *ibidem*, Epworth, 8.10.1972, A.J. Duke (TMSA-CPH2324); 1♂, *ibidem*, Christon Bank, 617, Ex Collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1 ind., *ibidem*, 17.11.1973, N.J. Duke (TMSA-CPH2312); 1 ind., *ibidem*, 25.11.1973, N.J. Duke (TMSA-CPH2313); 2 inds, *ibidem*, 29.12.1973, N.J. Duke (TMSA-CPH2314); 1 ind., ibidem, 21.11.1971, N.J. Duke (TMSA-CPH2315); 1 ind., *ibidem*, 9.10.1971, N.J. Duke (TMSA-CPH2316); 1 ind., *ibidem*, 4.11.1973, N.J. Duke (TMSA-CPH2317); 1 ind., Kariba, 26.1.1973, N.J. Duke (TMSA-CPH2318); 1 ind., Hot Springs, 1.12.1969, N.J. Duke (TMSA-CPH2319); 1 ind., Great Zimbabwe National Monument, near Masvingo, 20°17'S 30°56'E, 28-29/12/1992, Stals R (SANC-COLS-17222); 2 inds, Tsindi Ruins, Murehwa, Dec 7, 2022 15:58, Glenn Stockil (https://www.inaturalist.org/observations/144001193); 2♂+2♀, centr., Mushandike Sanct. (Masvingo env.), 9-11.XII.1998, S Bečvář leg. (GBEG, RPGS). **MWI**: 8♂, Lake Njassa, Mc Lear, 20-30.I.1998, Mráček leg. (GBEG, RPGS); **TZA**: 35♂+50♀, Newala, Jan 2007, V. Kayombo leg. (GBEG, RPGS); 19♂+21♀, Uruguru, Sep 2007, H. Ntangeki leg. (GBEG, RPGS); 10♂+9♀, Masasi, Jan 2007, H. Ntangeki leg. (GBEG, RPGS); 5♂+1♀, Lindi and Masasi, Nov 2009, H. Ntangeki leg. (GBEG); 9♂+1♀, Mtwara, Mt Namajani,

Nanyumbu District, 1-24.XII.2011, A. Adera leg. (RPGS); 7♂, Nambuju Village, Mtwara, Nov 2009, S. Husein leg. (GBEG).

Remarks. Specimens range in size from 9.4 to 10.1 in total length and from 4.5 to 4.7 in maximum width. Although this is the smallest on average among the four subspecies, specimens exhibit a more elongate body shape than any other conspecifics. Despite having been originally described from specimens exhibiting light-green elytral colour with large and pronounced white maculae as well as widely orange pronotal margins, this subspecies also shows a wide range of chromatic variations (Figs 11 and 12). These range from dark green to ferrugineous and even reddish-orange elytra with orange pronotal margins varying in extension from thin lines to wide wedges occupying up to two thirds of the total surface (cf. Beinhundner 2017: 406, Figs 1-6).

Females are rather stockier than males, and also exhibit shorter protarsi, more expanded protibiae and flatter abdominal sternites than their male counterparts. The period of adult activity spans from early spring to mid summer. Adults are mainly floricolous, but details on the preferred flowering plants are lacking, with only *Acacia* sp. (= *Vachellia*) identified thus far.

***Leucocelis* (*Leucocelis*) *adspersa giannatellii* Antoine, 2002 stat. nov.**
(Figs 10 and 11)

Leucocelis (*Leucocelis*) *giannatellii* Antoine, 2002: 83; Beinhundner 2017: 420.

Antoine (2002) based his original description of *L.* (*L.*) *giannatellii* on a comparison with *L.* (*L.*) *franki,* however the closest relative to this taxon is actually *L.* (*L.*) *a. adspersa.* The two share virtually identical parameres (cf. Antoine 2002: 84, Fig. 32 versus Holm & Marais 1992: 279, Fig. 161a) and biogeographically are parapatric, with transitional forms observed at the southern margins of the Namaqualand region (e.g. Nieuwoutdville) and the northern part of the Cederberg (Clanwilliam). These forms exhibit the typical reddish-brown to dark green elytra and black to dark brown pronotum of *L.* (*L.*) *giannatellii,* but also numerous white spots across the entire dorsal surface, like in a typical *L.* (*L.*) *a. adspersa* (Fig. 11). For these reasons, it is here proposed that the rank of this taxon should be tentatively changed to subspecies: *L.* (*L.*) *adspersa giannatellii* Antoine, 2002 **stat. nov.**

Distribution. This subspecies is mainly restricted to the Namaqualand region, reaching the northern end of the Cederberg in the south and the southern edge of the Gariep Desert in the north (Fig. 10)

Data Records. Type series. **Holotype** ♂, **ZAF-NC**: R.S.A., Cape, Namaqualand, Kamieskroon, II.1997, Giannatelli & Stobbia leg. (MNHN). AT♀: *idem* (MRSN). **Paralectotypes**: 4♂+3♀, *idem* (RGTI, BMCS); 1♂+1♀, *idem* (PARF); 1♀, Cape, Steinkopf-Springbok, 26.X.1996, Werner leg. (GBEG); 2♂+1♀, near Kamieskroon, Namaqualand, 31.X-1.XI.1996, Werner leg. (GBEG).

Other records: **ZAF-NC**: 3♂+2♀, Kamieskroon, Dec 1996, A.P. & M.E. Marais (BMCS, RPGS); 8♂+5♀, *ibidem*, Jan 1997, A.P & M.E. Marais (RPGS); 1 ind., *ibidem*, 28 Dec 2003, R. Perissinotto & L. Clennell (BMCS); 1♀, *ibidem*, Feb 2004, R. Perissinotto & L. Clennell (RPGS); 1♂, *ibidem*, Mar 2004, R. Perissinotto & L. Clennell (RPGS); 2 inds, *ibidem*, Oct 2004, R. Perissinotto & L. Clennell (BMCS); 1♂+3♀, Nov 2004, R. Perissinotto & L. Clennell (RPGS); 3♂+2♀, *ibidem*, 30 Sep 2010, R. Perissinotto & L. Clennell (RPGS); 1♂, Witwater, 2 Oct 2010, R. Perissinotto & L. Clennell (RPGS); 1 ind., *ibidem*, 14 Sep 2013, R. Perissinotto & L. Clennell (BMCS); 1♂, Nieuwoudtville, 20 Sep 2010, R. Perissinotto & L. Clennell (RPGS); 2 inds, Grootvlei 500 m, 30°12′S 17°47′E, 16 Sep 1983, C.L. Bellamy (TMSA-CPH2310).

Remarks. In this subspecies, body size ranges from 9.2 to 11.6 mm in total length and from 4.6 to 5.6 mm in maximum width. Unlike in the other subspecies, the dorsal background colour of *L.* (*L.*) *a. giannatellii* is consistently dark, ranging from olive green to brown. White maculation can be very faint to absent in specimens from the northermost range of distribution, becoming more numerous and larger in specimens from the southern areas (Figure 11). On rare occasions, parts of the lateral margins of the pronotum are infused with a reddish-brown colour. The pygidial surface is black to brown or coppery and may occasionally exhibit two symmetric lateral white spots. Females have the usual shorter protarsi, wider protibiae and flatter abdominal sternites than males. They also do not exhibit any signs of white maculation on either pronotum or pygidium in the specimens examined here, while males often do, expecially in the southern part of their distribution range.

Adults are active from early spring to late summer, with peaks shortly after major rainfall events. They appear to be mainly floricolous but there are no records of host plants that have been identified yet. Both adults and larvae have been obtained from middens of hyrax (*Procavia capensis*) dung, and the latter have been reared successfully on this medium (A.P. Marais, pers. comm.).

***Leucocelis* (*Leucocelis*) *amethystina* (MacLeay, 1838)**

MacLeay's types previously reported as "not traced" (Holm and Marais 1992) have actually been found in the MAMU, with data and accession numbers as follows. Lectotypus *Cetonia amethystina* MacLeay, 1838 / MacLeay Museum, University of Sidney, 2006 Australia / MAMU

EN 141332; Paralectotype *Cetonia amethystina* MacLeay, 1838 / *Oxythyrea haemorrhoidalis* Fabr., var. *amethystina* C.G. Hope / The head attached to this specimen is not the original, E.M. 1987 / MacLeay Museum, University of Sidney, 2006 Australia / MAMU EN 141333.

***Leucocelis* (*Leucocelis*) *haemorrhoidalis* (Fabricius, 1775)**

A type pair of *Cetonia dysenterica* MacLeay, 1838 (= *Leucocelis haemorrhoidalis* var. *nigricollis,* Péringuey, 1907) has also been found in the MAMU with the following details. Lectotypus *Cetonia dysenterica*, MacLeay, 1838 / ♀ / *Oxythyrea haemorrhoidalis* var. *dysenterica* C.G. Hope / MacLeay Museum, University of Sidney, 2006 Australia / MAMU EN 141278; Paralectotype *Cetonia dysenterica*, MacLeay, 1838 / ♀ / MacLeay Museum, University of Sidney, 2006 Australia / MAMU EN 141279.

Discussion

The genus *Leucocelis* s. l. exhibits an extraordinary taxonomic diversity, which badly needs a modern revision possibly based on molecular and other advanced techniques. The current systematics of the genus is very confused and complicated by issues of poor traceability of type material, extreme intraspecific chromatic variability and a relatively conservative aedeagal structure.

There are also issues of biogeography and coherent distribution patterns. For instance, Antoine (2002) argued for the placement of *L.* (*L.*) *damarina* Kolbe, 1907 in synonymy with *L.* (*L.*) *haemorrhoidalis* (Fabricius, 1775), rather than with *L.* (*L.*) *amethystina* (MacLeay, 1838), as earlier proposed by Holm & Marais (1992). However, the typical distribution of *L.* (*L.*) *haemorrhoidalis* is restricted to the wetter south and eastern portions of South Africa (Holm & Marais 1992, pers. obs.), and therefore a disjunct occurrence of this species in the middle of a largely semiarid region, situated over a 1000 km away from the closest confirmed records for the species, does not make sense in terms of biogeographic coherence. The illustration of the aedeagal parameres of the *L.* (*L.*) *damarina* "Type ♂" presented by Antoine (2002: 84, Fig. 28) shows indeed a structure not compatible with the typical aedeagus observed in *L.* (*L.*) *haemorrhoidalis*, as for instance detailed in Holm & Marais (1992: 272, Fig. 156a). In this case, it seems reasonable to suggest a reassessment of the validity of *L. damarina* as a distinct species to both *L.* (*L.*) *amethystina* and *L.* (*L.*) *haemorrhoidalis.*

On the other hand, the taxonomic history of species such as *L.* (*L.*) *niveoguttata* (Blanchard, 1850) and *L.* (*L.*) *haemorrhoidalis* shows that in some instances a whole range of synonyms were applied to as many varieties of individuals belonging to the same species. In particular, there appears to have been a proliferation of species names in the broader area of the Great Lakes region of East Africa, where just in Tanzania 34 between species and subspecies (accounting for almost 1/3 of the total known for the genus) are currently recognised (cf. Beinhundner 2017). While this may be largely correct, and a reflection of the hotspot nature of the region for biodiversity and endemism, it raises the possibility that several of them may actually represent junior synonyms not yet currently identified because of a lack of modern revisions of the genus and adequate access to type material.

Among other issues, this highlights the need for more widespread and coordinated surveys in regions that are vast and poorly sampled because of their inaccessibility and/or remoteness. Namibia is a prime example of this, particularly its central and southern semiarid regions that are largely still pristine, with little road infrastructure and often dominated by mountainous terrain. As shown by the two new *Leucocelis* taxa described here and the yet unresolved status of *L.* (*L.*) *damarina,* these regions almost certainly harbour several other taxa that are still unknown to science or poorly known. Perhaps the most charismatic case is that of *Xiphosceloides antoini* Holm, 1992, a rather enigmatic species currently known only from the holotype male currently preserved in the MNHN (Paris). It does not carry any locality on its label, but only a misidentification as "*Phonopleurus costipennis* Moser" by the French entomologist Gaston Ruter. *Phonopleurus costipennis* occurs only in the western part of Namibia, and the type specimen of *X. antoini* was obtained as exchange from the Berlin Museum, where presumably most specimens from the then "Deutsch-Südwestafrika" (currently Namibia) would have been housed at that time. Its stocky morphology, with very short but robust legs (note the expanded metatibia, in particular) also suggests that it may be fossorial, dwelling mainly underground like all *Rhinocoeta* species do, undertaking only short dispersal flights immediately after rainfall events. It is possible that like all the *Rhinocoeta* spp. it also uses herbivore dung accumulations as food source for the early life stages (Holm 1992; Smith et al. 1998). These features, combined with its characteristic uniformly dark colour and well-developed costal ridges on its elytral surface indicate adaptation to hot and arid/semiarid climatic conditions. Thus, putting all this together it seems most likely that this enigmatic species originates indeed from one of the poorly investigated regions of Namibia.

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