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# A revision of the South African myrmecophile *Diplocotidus* (Coleoptera: Ptinidae)

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The southern African myrmecophilous ptinine genus, *Diplocotidus* Péringuey, is redescribed, and two new species are described. New species and collection localities increase the known distribution from the Cape region to the Kruger National Park in the east, and central Namibia in the west. There is little doubt that the species are associated with ants in some manner as typified by the trichomes located on the pronota.

**Key words:** spider beetle, Ptininae, southern Africa, myrmecophilous.

## INTRODUCTION

Southern Africa is one of the richest areas for morphological diversity within the Ptinidae, or spider beetles. A total of 14 genera are now known within this region, out of slightly more than 70 described genera worldwide. The 14 genera include the globally widespread species of *Ptinus* Linnaeus, *Dignomus* Wollaston from Europe, the circum-Mediterranean and African *Mezium* Curtis (including a few globally widespread pest species) and the southern African endemic genera *Cryptopeniculus* Philips & Foster (Philips & Foster 2004), a genus under description (Akotsen-Mensah & Philips, unpubl.) *Costatomezium* Pic, *Damarus* Péringuey, *Diplocotidus* Péringuey, *Eutaphrimorphus* Bellés, *Lepimedoziium* Bellés, *Meziomorphum* Pic, *Pseudomezium* Pic, and *Stethomezium* Hinton. *Gibbium* Scopoli and some cosmopolitan species of *Ptinus* are also found in southern Africa but their presence is probably due to accidental human introduction.

*Diplocotidus* currently contains the sole species *D. formicola* Péringuey, known only from the Cape region in South Africa. Collections made by the late S. Endrödy-Younga have substantially increased our knowledge of the diversity and distribution of *Diplocotidus* and other spider beetles in southern Africa. Herein we redescribe the genus and known species and describe two new species based in part on his collected material. We also document a rather surprising increase in the known distribution of the species of this genus into Namibia and northeastern South Africa.

## *Diplocotidus* Péringuey 1899

*Type species. Diplocotidus formicola* Péringuey

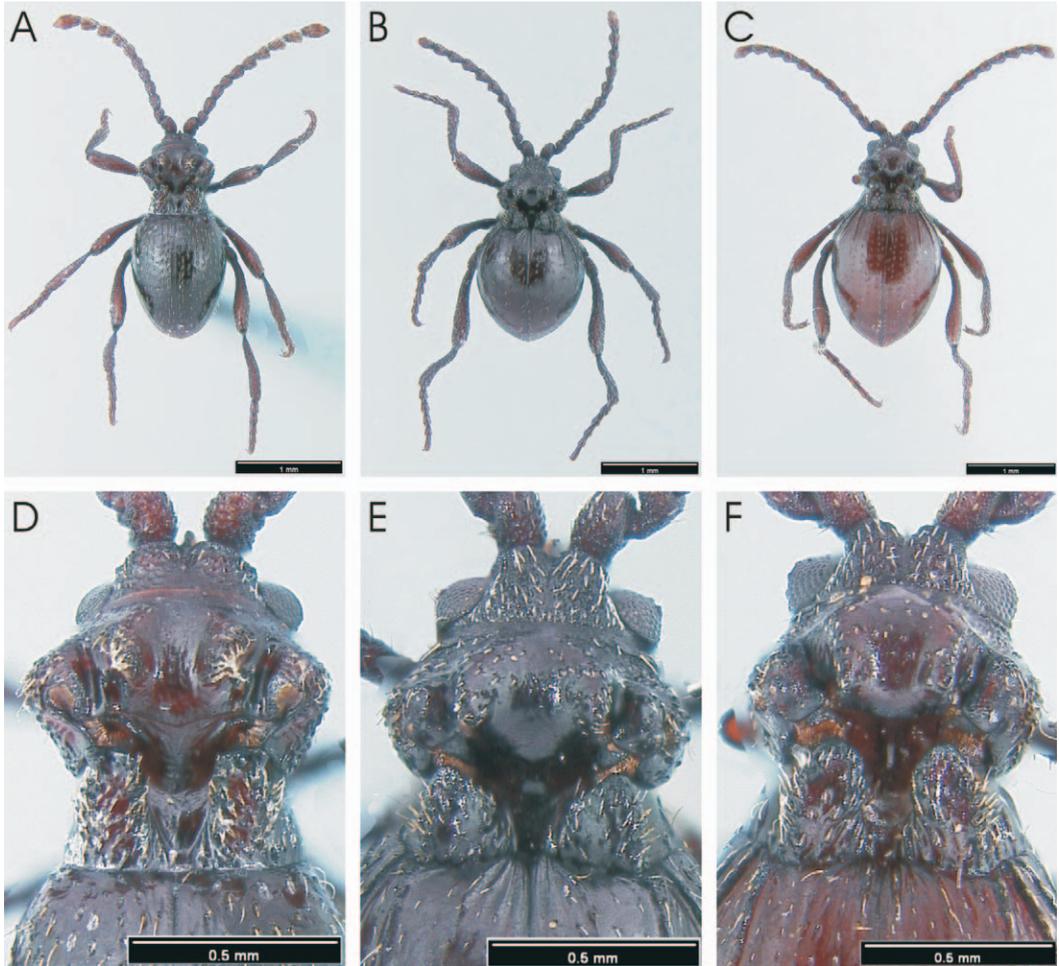
### Redescription

**Head.** Eyes large, clearly visible from above, convex, oval, with a carina separating equally sized dorsal and ventral halves; carinae present between antennal insertions and above each antennal insertion; clypeus subquadrate and concave; labrum width less than one third head width below eyes; maxillary palp with four segments, all shortened (Fig. 2F); labial palp with three segments, all shortened (Fig. 2E); mentum approximately rectangular in shape, edges laterally rounded, with longitudinal ridge on ventral surface (Fig. 2C,D); antennae filiform, 11-segmented, second antennomere attached towards lateral side of scape; mandible with two teeth, and a patch of setae in centre of underside (Fig. 2A,B).

**Thorax.** Pronotum broadened and expanded upwards to a point approximately one third of distance from anterior to posterior, narrow at anterior and posterior ends (Fig. 1D–F); two deep longitudinal grooves, approximately parallel, separated by half to two thirds pronotum width; two longitudinal carinae between grooves, approximately level with second elytral stria, parallel or converging slightly posteriorly; the posterior edge of these grooves and carinae is convoluted and folded, forming a hole at the posterior end at the lateral edge; two lobes attached at the posterior edge of the pronotum, protruding forwards, variable in length and spacing; surface of central portion of pronotum concave and smooth. Mesoscutellum barely visible, vertically oriented; scutum as in Fig. 2H.

Prosternum narrow, about twice as long as wide;

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**Fig. 1.** Habitus: **A**, *Diplocotidus formicola*; **B**, *Diplocotidus endrodyi*; **C**, *Diplocotidus khoisanensis*. Pronotum: **D**, *Diplocotidus formicola*; **E**, *Diplocotidus endrodyi*; **F**, *Diplocotidus khoisanensis*.

mesosternum as long as wide, about two thirds length of prosternum; metasternum broad, approximately half as long as wide, equal in length to mesosternum; median groove along entire length of prosternum, mesoventrite and metaventrite (Fig. 2G); procoxae projecting ventrally, mesocoxae less so, metacoxae flat, broadly obliquely fused to metaventrite.

*Elytra.* Convex, more strongly curved at anterior end; 10 elytral striae visible, sometimes with a series of carinae or lines of setae between the striae.

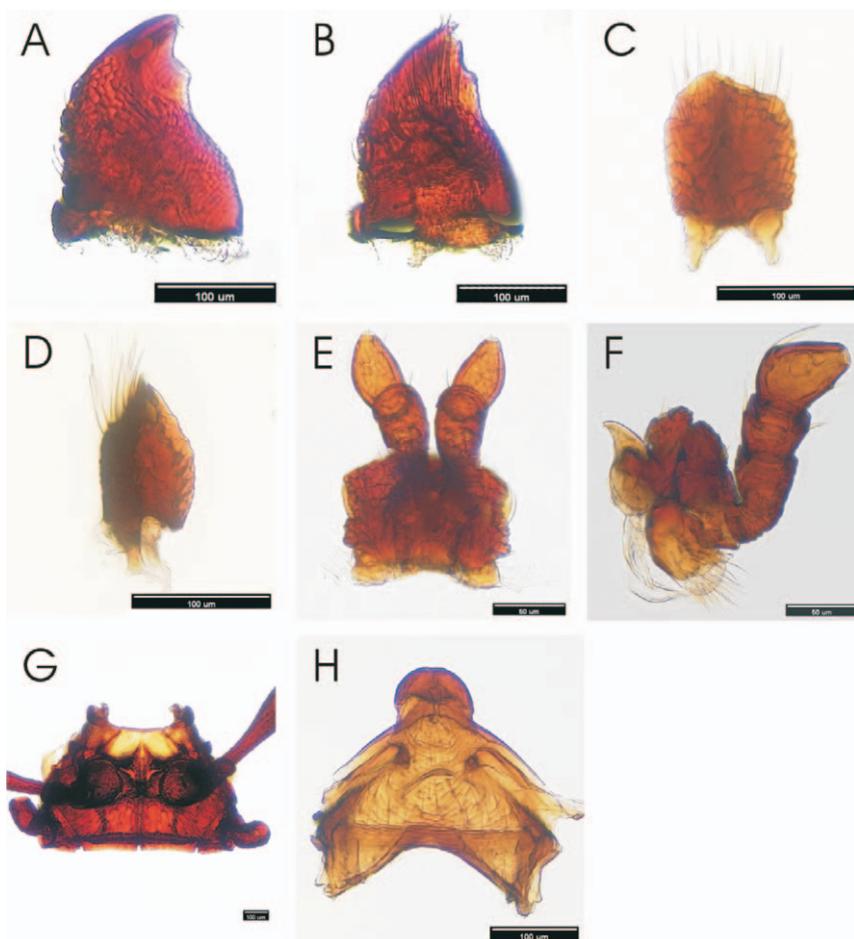
*Ventrites.* (Fig. 3F–H) First ventrite shortest in length, strongly curved, with length even throughout entire width; second ventrite longest, depressed medially, more so in male; lengths of

third and fourth ventrites even throughout width; third ventrite approximately half the length of second ventrite at longest point; fourth ventrite approximately half length of third ventrite; fifth ventrite with a shallow lateral indentation.

*Legs.* Femora and tibiae narrow proximally, gradually expanding distally; metatibia curved and equal in length to metafemur, protibia and mesotibia straight and shorter than respective femora; tarsomeres 1–4 equal in length, tarsomere 5 almost twice the length of tarsomere 1.

*Genitalia.* Male parameres extremely reduced; median lobe strongly curved basally, straighter and slightly thicker apically (Fig. 3A–D). Spiculum gastrale as in Fig. 3E.

*Remarks.* Péringuey first described this mono-

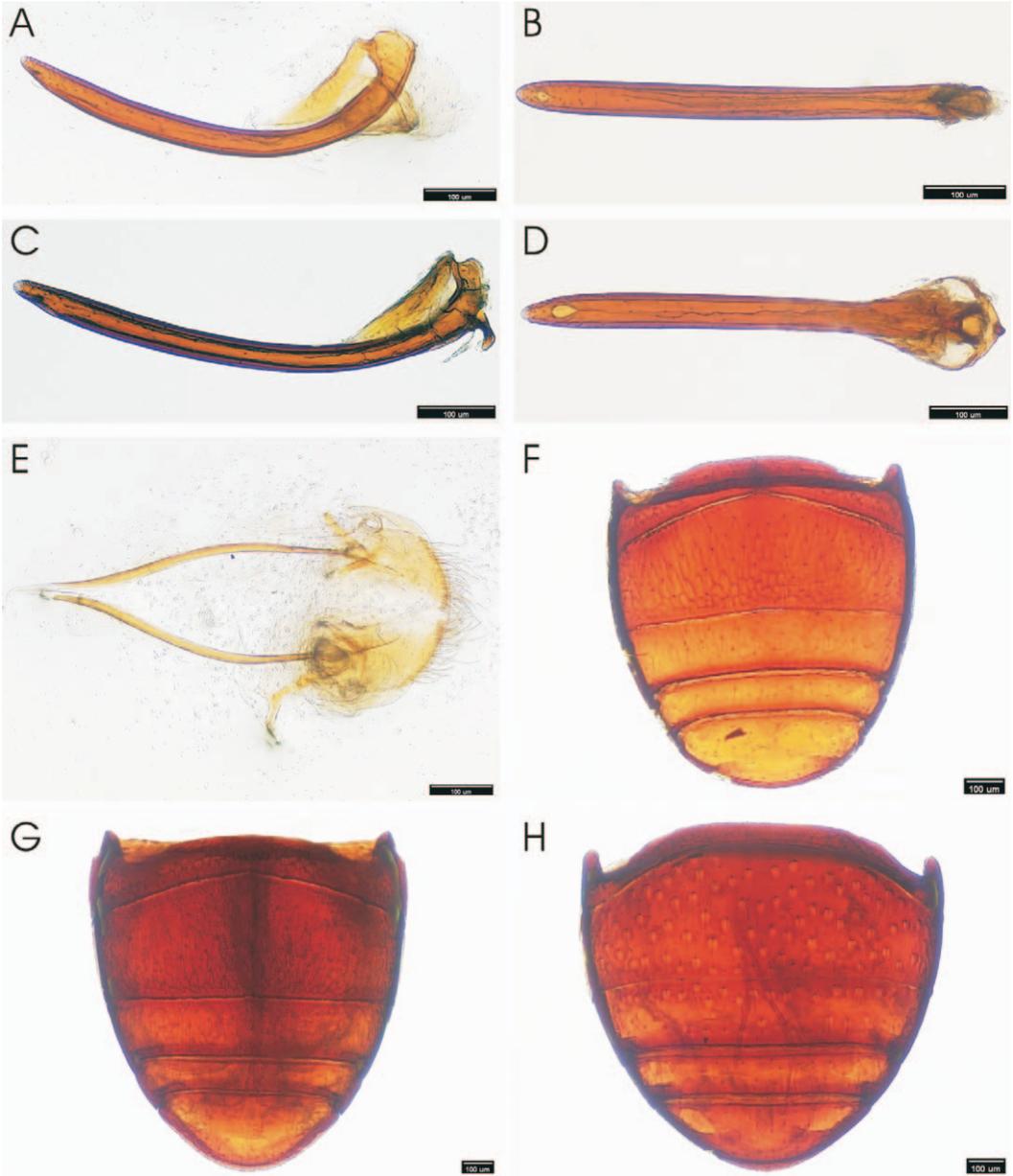


**Fig. 2.** *Diplocotidus formicola*. **A**, mandible, dorsal view; **B**, mandible, ventral view; **C**, labrum, dorsal view; **D**, labrum, lateral view; **E**, labium; **F**, maxilla; **G**, metasternum; **H**, scutellum.

typic genus in 1899, and we describe two more species here. Previously known only from the Cape region in South Africa, we now know that species can be found as far north as Kruger National Park, South Africa in the east and up into central Namibia in the west (Fig. 4). This seems a bit surprising given the restricted distributions of many of the endemic genera of spider beetles. Also, many taxa of organisms that are found in the Cape region are restricted to this area. In his studies on the biogeography of southern Africa, Endrödy-Younga (1978) identified a Cape-bilateral extension pattern, exemplified by the Oncotini and Litoborini (Tenebrionidae), which is similar to the distribution of *Diplocotidus*, with the exception of *D. khoisanensis* sp. n. This includes the region South of 32°S in the Western and Eastern

Cape Provinces, extending northwards on both ocean sides, but with dispersal halting abruptly on the southern edge of the Karoo in Little Namaqualand. There may be a greater number of species remaining undiscovered in this region and more surveys should be conducted to document the diversity of this group and others fully in what one might consider the strongly endemic and hyperdiverse fauna and flora of southern Africa.

The type series of *Diplocotidus formicola* was found in the nest of the ant *Acantholepis capensis* Mayr, and the species is also recorded from the nests of *Anoplolepis custodiens* (F. Smith) and *Anoplolepis steingroeveri* (Forel). There is little doubt that the species are associated with ants in some manner as typified by the trichomes located on the pronota. These are patches of setae presumably

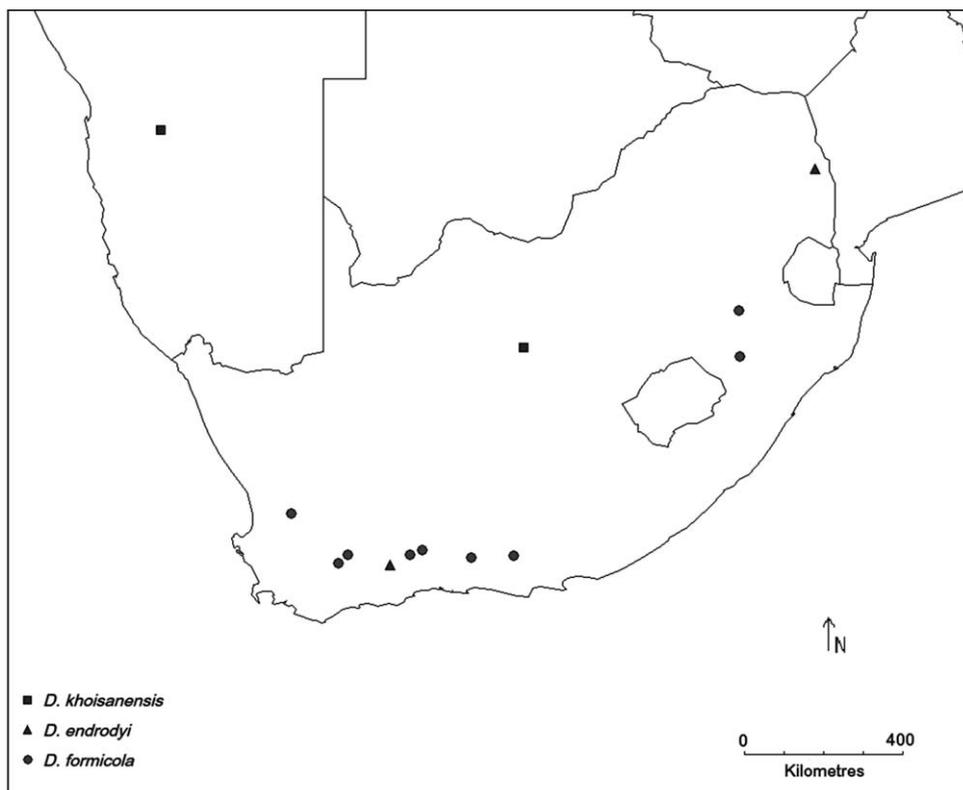


**Fig. 3.** **A**, *Diplocotidus formicola* aedeagus lateral view; **B**, *Diplocotidus formicola* aedeagus dorsal view (basal piece missing); **C**, *Diplocotidus endrodyi* aedeagus lateral view; **D**, *Diplocotidus endrodyi* aedeagus dorsal view; **E**, *Diplocotidus formicola* spiculum gastrale; **F**, *Diplocotidus formicola* ventrites; **G**, *Diplocotidus endrodyi* ventrites; **H**, *Diplocotidus khoisanensis* ventrites.

associated with glands that produce ant appealing chemicals as reviewed by Lawrence & Reichardt (1969).

The greatest diversity of myrmecophilous spider beetles is in Australia (including the genera

*Diplocotes* Westwood, *Polypliocotes* Westwood, *Ectrephes* Pascoe and *Enasiba* Olliff), and *Diplocotidus* shares several morphological and ecological traits with these species. Like the Australian taxa, species of *Diplocotidus* are wingless and are



**Fig. 4.** Distribution of *Diplocotidus* species: ● = *Diplocotidus formicola*; ▲ = *Diplocotidus endrodyi*; ■ = *Diplocotidus khoisanensis*.

associated with ground-nesting ants in open arid and semi-arid regions, but *Diplocotidus* is probably a completely independent lineage of ant-associated species because morphologically this clade differs considerably from any other myrmecophilous ptinids as first noted by Lawrence & Reichardt (1969). For example, the unusual pronotal modifications of *Diplocotidus* are very distinctive, and differ from those found in any of the Australian species. Lastly, unlike the Australian *Diplocotes* species (with the exception of *Diplocotes familiaris*), the antennae of *Diplocotidus* are not highly modified in shape and contain the normal number of antennomeres.

The myrmecophilous ptinine species are probably facultative scavengers that will feed on a variety of organic material including fruit, dung, and perhaps carrion (Crowson 1967). The relationships that occur inside an ant colony are unknown at present. We suspect that larvae and adults feed on ant colony detritus and perhaps even solicit food via oral trophollaxis from adult ants, as reported

for adults of the New World genus *Gnostus* Westwood (Thomas 1992).

**Key to the species of *Diplocotidus***

1. Circular hole at posterior end of lateral ridges on pronotum; hole absent at anterior end of lateral ridges (Fig. 1D); elytra at least 1.5 times as long as wide (Fig. 1A) ..... *D. formicola* Péringuey
- Narrow elongate oval hole at posterior end of lateral ridges on pronotum; laterally elongate hole present at anterior end of lateral ridges (Fig. 1E,F); elytra length less than 1.5 times width (Fig. 1B,C) ..... 2
2. Pronotum black and shiny; lobes at posterior of pronotum triangular or nearly so, with width of lobes at base almost equal to length (Fig. 1E) ..... *D. endrodyi* sp. n.
- Pronotum dull and reddish-brown; lobes at posterior of pronotum elongated, with length of lobes approximately twice width (Fig. 1F) ..... *D. khoisanensis* sp. n.

***Diplocotidus formicola*** Péringuey 1899, Figs 1A,D, 2, 3,A,B,E,F

**Redescription**

This species can be distinguished from other *Diplocotidus* by the narrow body shape (Fig. 1A), a more rounded hole anterior to the lateral ridges of the pronotum, and tufts of setae on the carinae and ridges of the pronotum (Fig. 1D).

**Habitus.** Length approximately 3 mm; body narrower relative to *D. endrodyi* and *D. khoisanensis*; reddish-brown; setae on head and anterior of pronotum shorter and sparser than those on elytra and posterior protrusions of pronotum.

**Head.** Sparsely covered in setae, relative to other two species.

**Thorax.** Pronotum dull and reddish-brown; lateral ridges covered in setae; longitudinal carinae steep-sided on both sides, converging slightly posteriorly, with setae at apex, some variation in height and spacing of carinae between individuals, on average similar in height to outer ridges; holes behind lateral ridges large and round; lobes on posterior end of pronotum centred between second and third elytral stria, length 2–3 times width, parallel-sided posteriorly, narrowing anteriorly, with a rounded point on outer side, spacing between protrusions approximately equal to width of protrusions.

**Elytra.** Length of elytra approximately 1.5–2 times width; surface evenly curved; without sharp carinae but sometimes with a row of setae between striae; length of setae along striae variable in length between individuals, but always longer than in *D. endrodyi* and *D. khoisanensis*.

**Material examined.** Four paralectotypes were selected by J. Borowski in 1998 as indicated by labels on the single pin holding the type series. To our knowledge this work was never published.

Data on separate labels on the pins is indicated by the “/” and is as follows: Lectotype female (dorsal side up) and three paralectotypes (two males and one female, ventral side up) on a single pin: Prince Albert Cape Colony / with *Acantholepis capensis* Mayr/ described as formicola/TYPE [red label]/ *Diplocotidus formicarius* type/ Type SAM, Ent 4850/ lectotype and three paralectotype labels with Bell and Philips (South African Museum). Prince Albert, W.F. Purcell / in nest of *Acantholepis capensis* Mayr (1). S. Afr. Cape-Cederbg east track, 650 m, 32.23 S – 19.24 E / 21.8.1983; E-Y:1958, groundtraps, 66 days, leg. Endrödy, Penrith /

groundtrap with faeces bait (1, Transvaal Museum). S. Afr., Cape-Karoo, Farm Zwartzkraal, 33.10S–22.32E / 8.11.1978; E-Y:1539, groundtraps, 69 days leg. R. Oosthuizen / groundtraps with faeces bait (3, Transvaal Museum). Same data except 25.10.1979; E-Y:1671b, 45 days / banana bait (1); 25.10.1979; E-Y:1673, 50 days / meat bait (1); 15.12.1979; E-Y:1692b, 45 days (4); 5.9.1979; E-Y:1638b, 50 days (2); 5.9.1979; E-Y:1640, 50 days (3) (all Transvaal Museum). S. Afr. Swartberge Hagas farm, 1050 m, 33.24S–22.46E / 17.12.1978; E-Y:1538, groundtraps, 75 days leg. Endrödy-Younga / groundtraps with meat bait (1, Transvaal Museum). S. Afr.; Cape-Swartbg., Seweweekspoort, 33.24 S–22.21 E / 18.II.1973; E-Y:268, from under stones, leg. Endrödy-Younga (1, Transvaal Museum). Ladysmith, Capland, Dr. Brauns, 5.10.12 (2). Willowmore Capland Dr. H. Brauns (2). Same data except 4-1917 (1); 4-1917 / with *Acantholepis capensis* (2); 1914 (1); June 20 1917 / with *Acantholepis capensis* (1); 9.9 / with *Plagiolepis custodiens* (2); Jan 1913 / with *Plagiolepis steingroeveri* (4). Matjesfontein. F. Purcell 1903 (2). Touwas R.C.C., W.F. Purcell (3) (all South African Museum).

***Diplocotidus endrodyi* sp. n.**, Figs 1B,E, 3C,D,G

**Description**

This species can be distinguished from *D. formicola* by its rounder body shape (Fig. 1B) and narrower hole anterior to the lateral ridges of the pronotum (Fig. 1E). It can be distinguished from *D. khoisanensis* by the shorter, triangular lobes at the posterior end of the pronotum (Fig. 1E).

**Habitus.** Length approximately 3 mm; body rounder relative to other two species; black to reddish-brown; setae on elytra longer, sparser and more irregular in orientation than setae on head and pronotum.

**Head.** Densely covered in setae relative to *D. formicola*. Eyes with setae on carinae.

**Thorax.** Pronotum black, shiny, smooth, sparsely covered in setae; longitudinal carinae parallel, steep sided laterally, more shallowly sloped on the medial side, the height of these carinae higher than lateral ridges; holes behind lateral ridges narrow; laterally elongated hole in front of each of the outer ridges, anterior to this hole is a shallow depression; centre of lobes on posterior end of pronotum level with third elytral stria, length slightly greater than width, almost triangular in shape, spacing between lobes approximately equal to half the width of lobes.

*Elytra.* Width of elytra almost equal to length; striae deeply but sparsely punctured; a series of longitudinal carinae, with irregular long setae, is present on the anterior portion of the elytra – between second and third striae approximately one sixth length of elytra, between fourth and fifth striae approximately one third length of elytra, between sixth and seventh striae approximately one third length of elytra, between eighth and ninth striae approximately half length of elytra, and between tenth stria and lateral margin approximately one third length of elytra; between the last two ridges is a concave area, with a series of shallower ridges.

*Type material.* Data on separate labels on the pins is indicated by the “/” and is as follows: Holotype, sex unknown: S. Afr: Kruger Nat. Pk, Pumbe Sands, 24.13 S–31.56 E/ 22.11.1994: E-Y:3059, groundtraps, 60 days, Endrödy, Bellamy/ groundtraps with meat bait (Transvaal Museum). Paratypes: Same data as Holotype except 21.12 S–31.55 E/ E-Y:3063 (4, Transvaal Museum); 24.1.1995: E-Y:3096, Endrödy-Younga/ groundtrap with banana bait (1, Transvaal Museum). S. Afr: Little Karroo, Gamkaberg, 1000m, 33.44 S–21.57 E/ 21.1.1993: E-Y:3069, groundtraps, 24 days leg. Endrödy-Younga/ groundtrap with banana bait (4, Transvaal Museum).

*Etymology.* This species is named after the late Sebastian Endrödy-Younga in honour of his contributions to the field of South African systematic entomology.

### ***Diplocotidus khoisanensis* sp. n., Figs 1C,F, 3H**

#### **Description**

This species can be distinguished from *D. formicola* by its rounder body shape (Fig. 1C), and narrower hole anterior to the lateral ridges of the pronotum (Fig. 1F). It can be distinguished from *D. endrodyi* by the longer lobes at the posterior end of the pronotum, approximately twice as long as wide (Fig. 1F).

*Habitus.* Body rounder relative to *D. formicola*, but not as round as *D. endrodyi*; reddish-brown in colour; setae denser on head and posterior protrusions of pronotum than on elytra and anterior of pronotum.

*Head.* Densely covered in setae relative to *D. formicola*, similar to *D. endrodyi*.

*Thorax.* Pronotum reddish-brown; sparsely and unevenly covered in setae; longitudinal carinae steep-sided laterally, more shallowly sloped on the

medial side, converging slightly posteriorly, the height of these carinae is higher than outer ridges; holes behind lateral ridges narrow; laterally elongated hole at front of each of the outer ridges, anterior to each hole is a shallow depression; centre of lobes on posterior end of pronotum level with third elytral stria, length approximately twice width, almost parallel-sided at posterior end, curving inwards to become rounded at anterior end, more densely covered in setae than the anterior portion of the pronotum; spacing between protrusions at the posterior end of the pronotum approximately equal to half the width of protrusions.

*Elytra.* Length approximately 1.3 times width; striae shallowly and sparsely punctured; longitudinal carinae on the anterior portion of the elytra in the same positions as those on *D. endrodyi*, but less prominent, and with shorter setae.

*Type material.* Data on separate labels on the pins is indicated by the “/” and is as follows: Holotype female: S.W.Afr., [Namibia] Khomas hl, Farm Hohenheim, 23.20 S–16.20 E/ 7.11.1974; E-Y:451, groundtraps, 27 days, leg. Endrödy-Younga / groundtrap with bait locusts (Transvaal Museum). Paratype: Same data as the Holotype except banana bait (1); 25.XII.1920, Dr. Brauns. Windsorton Cape Colony / SAM-COL-AO40193 (1, South African Museum).

*Etymology.* This species is named after Khoisan peoples that once populated the broad region where this species of beetle has been found.

*Remarks.* One specimen was labelled as ‘*Diplocotidus braunsi* Andr.’ It appears that H.K.C. Andreae, an honorary entomologist at the South African Museum ([http://www.iziko.org.za/sam/muse/hist/inverthist\\_staff.html](http://www.iziko.org.za/sam/muse/hist/inverthist_staff.html)), recognized this specimen as a distinct species. Unfortunately, we can find no record of this name ever being published. This does not appear to be the first time that a specimen had been tagged with a new name by Andreae without a completed publication to establish the name. Irish (1996) mentioned in his note on *Meziomorphum* sp. D, a new species that he recognized but did not validate due to poorly preserved material, that the two specimen pins were also labelled by Andreae as types of an unpublished species.

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