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A PECULIAR NEW GENUS OF ARBORICOLOUS LEBIINAE FROM
INLAND AUSTRALIA (INSECTA: COLEOPTERA: CARABIDAE)

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A new genus and species of arboricolous lebiine ground beetles, *Brigalowia setifera*, gen. et sp. nov., is described from central and northwestern Queensland and adjacent parts of the Northern Territory. This tiny and very peculiar species is tentatively placed in the tribe Dromiini, but is outstanding, *inter alia*, for its remarkably wide, depressed body and the extreme length of all tactile setae. These structural modifications are probably due to its preferred microhabitat within deep cracks in the bark of rough-barked acacias in arid and semi-arid inland Australia. □ *Coleoptera, Carabidae, Lebiinae, Australia, new genus, new species.*

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Recently, Dr Geoff Monteith of the Queensland Museum, Brisbane, sent me a photo of a bizarre, small carabid beetle that he had captured while pyrethrum fogging the rough bark of acacia trees (*Acacia harpophylla* F. Muell. ex Benth., *A. cambagei* R.T. Baker) in semi-arid inland Queensland. My first impression of the photo was that these beetles might represent a very unusual species of the carabid subfamily Perigoninae. However, after receiving the small sample of specimens I recognised that they belonged to the subfamily Lebiinae, and most probably to the tribe Dromiini, although in shape and structure they are outstanding within the tribe and do not resemble any other dromiine beetles known to me.

These beetles are part of a still largely unknown invertebrate community living in the deep cracks of the rough bark of acacias and diverse eucalypts in Australia, that can only be sampled by fogging the bark. This method, however, has been mainly employed in rainforest where it has been used with great success, especially by staff of Queensland Museum (for method see Baehr, 1995), and much less commonly in open forest and woodlands. However, from my own experience it can yield surprisingly numerous and diverse results even in semi-arid and arid country (e.g. Baehr, 2002). The present paper should serve to stimulate collectors to use this method more widely, even in semi-desert areas throughout Australia. Such sampling will bring to light many outstanding new species, not only within Carabidae, but probably in many other insect and non-insect invertebrate groups.

MATERIAL AND METHODS

A small sample of 7 specimens was captured during 2000–2003 at several localities in central and northwestern Queensland and adjacent eastern Northern Territory. All specimens were fogged from the bark of brigalow (*Acacia harpophylla*) and gidgee (*A. cambagei*) using aerosol pyrethrum.

The male genitalia and female stylomeres were removed from specimens, softened for a night in a jar in moist atmosphere, then cleaned for a short while in hot KOH.

ABBREVIATIONS. QM, Queensland Museum, Brisbane; CBM, Collection M. Baehr, Munich.

Measurements were taken using a stereo-microscope with an ocular micrometer. Body length was measured from the apex of labrum to the apex of elytra. Length of the pronotum was measured along its midline. Length of the elytra was taken from the most advanced part of humerus to the most advanced part of apex.

Brigalowia gen. nov.

TYPE SPECIES. *Brigalowia setifera* sp. nov.

DIAGNOSIS. Genus of subfamily Lebiinae and within this, most probably of the tribe Dromiini. Characterised by the following: body shape extremely wide, depressed; all tactile setae on body extremely elongate; labrum short and wide, 6-setose; mentum tooth present; glossa elongate, bisetose apically; paraglossae hyaline, united with glossa; lacinia sparsely setose; palpi acute,

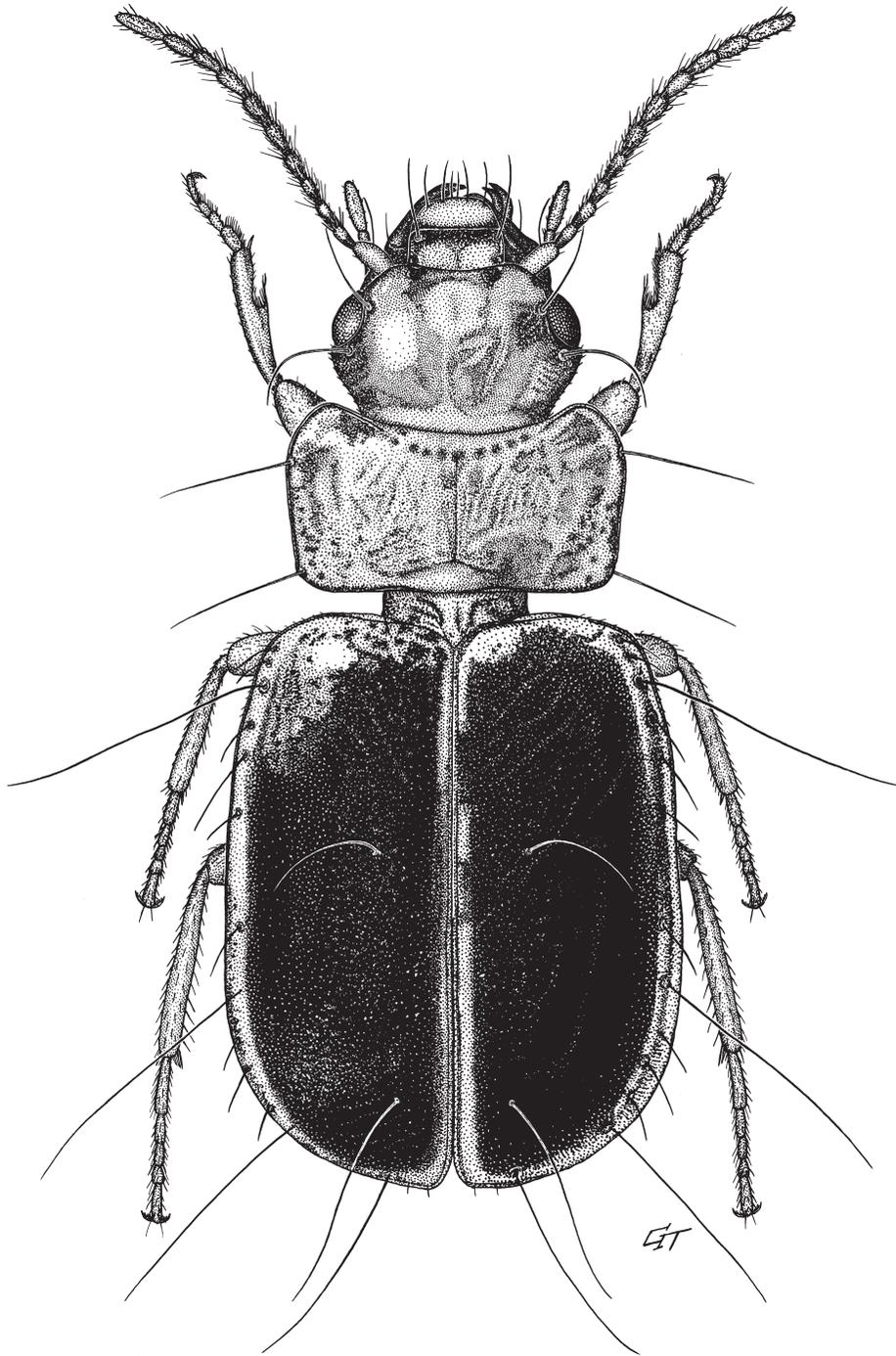


FIG. 1. *Brigalowia setifera* gen. et sp. nov.; habitus, body length 3.4mm.

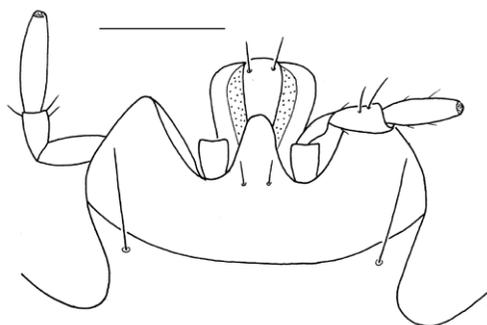


FIG. 2. *Brigalowia setifera* gen. et sp. nov.; mouthparts, ventral view showing mentum, left maxillary palp and right labial palp, scale: 0.25mm.

not widened at apex; notch near apex of male mesotibia absent; tarsi denticulate; aedeagus short, with the orifice on left side; internal sac with a coiled, sclerotised plate; 2nd female stylomere straight and elongate, devoid of ensiform setae but covered at tip by a fringe of a few minute hairs.

ETYMOLOGY. The generic name is feminine and refers to its occurrence on brigalow acacias (*Acacia harpophylla*).

DISTRIBUTION. Central and northwestern Queensland, and adjacent eastern Northern Territory.

RELATIONSHIPS. The tribal placement of *Brigalowia* is problematic. The form of the female stylomere 2, which is elongate, finely pilose apically and lacks any lateral ensiform setae, and the shape and setosity of the glossa and paraglossae are most similar to those of *Anomotarus* and its allies in the tribe Anomotarini. However, the short, wide labrum, the narrow, un-widened palpi, and the shape and structure of the aedeagus indicate dromiine relations. Because there are no similar genera known at present, the problem cannot be resolved now. If *Brigalowia* does indeed belong in Dromiini, then it is outstanding within this tribe and is certainly without close relatives.

***Brigalowia setifera* sp. nov.**
(Figs 1–4)

MATERIAL. HOLOTYPE: ♂, QLD: 23°32'S × 145°02'E, Barcaldine, 27km W., 9 Jul 2003, GB Monteith. pyreth./gidgee. [11359] (QMT 123607). PARATYPES: 1 ♂, same data (CBM); 2 ♀♀, QLD: 20°59'S, 140°55'E, Scrubby Ck., SE of Cloncurry, 8 Jul 2003. G. Monteith. pyreth./gidgee. [11349] (CBM, QM); 1 ♀, QLD: 24°49'S, 149°45'E, Brigalow

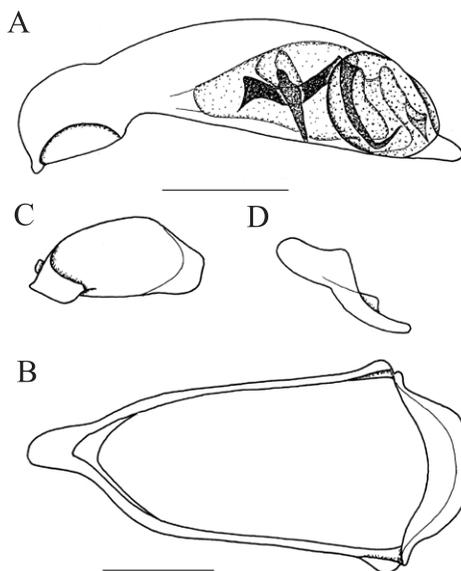


FIG. 3. *Brigalowia setifera* gen. et sp. nov.; male genitalia; A, aedeagus; B, genital ring; C, left paramere; D, right paramere, scale: 0.25mm.

Res. Stn. site 2, 13 Oct 2001, G. Monteith, C. Burwell. 170m, Pyrethrum, brigalow trunks. [10222] (QM); 1 ♂, SEQ: 24°48'S, 149°45'E, Brigalow Res. Stn. site 5, 16 Dec 2000. G. Monteith, vinescrub. 160 m. pyrethr.-trunks & logs. [9863] (QM); 1 ♀, NT: 19°56'S, 137°19'E, Barkly Hwy, 6-Mile Ck. 7 Jul 2003. G. Monteith. pyrethr./gidgee. [11347] (QM). (Numbers within square brackets are Queensland Museum sample codes).

DIAGNOSIS. As for genus.

DESCRIPTION. *Measurements.* Length: 3.20–3.55mm; width: 1.45–1.65mm. Ratios. Width/length of pronotum: 2.15–2.25; width base/apex of pronotum: 1.28–1.35; width of pronotum/width of head: 1.30–1.34; length/width of elytra: 1.24–1.32; width of elytra/width of pronotum: 1.27–1.35.

Colour. Head, pronotum, humerus and narrow lateral margin of elytra light reddish, disc of elytra more-or-less light brown; mouthparts and antennae reddish; lower surface reddish, except for much of thorax which is light brown; legs yellow.

Head. (Figs 1, 2) Large, short and wide, laterally strongly rounded. Eye small, gently convex, as long as distance from orbit to neck sulcus. Orbit very oblique, laterally slightly protruding over eye, anteriorly convex and incurved towards

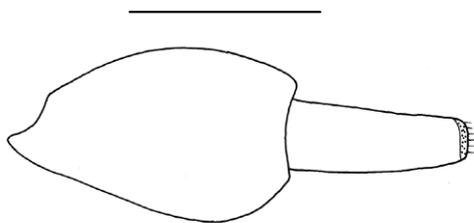


FIG. 4. *Brigalowia setifera* gen. et sp. nov.; female stylomeres, scale: 0.1mm.

eye. Therefore, neck considerably narrower than widest part of head, though still very wide. No distinct frontal sulci perceptible. Labrum short, wider than long, 6-setose, setae not unusually elongate. Mandibles rather short, with acute, strongly incurved apex. Mentum with elongate, anteriorly convex but not triangular tooth, with 2 minute setae behind tooth. Submentum laterally with a single seta on each side. Both pairs of palpi narrow, elongate, narrowed towards apices. Preapical palpomere of labial palpus bisetose, apical palpomere sparsely pilose. Maxillary palpus impilose, except for some terminal setae on preapical palpomere. Antenna rather short, barely surpassing base of pronotum, median antennomeres little longer than wide, antenna pilose from middle of 4th antennomere. Clypeal, supraorbital, and submental setae and seta on basal antennomere, extremely elongate. Posterior supraorbital seta situated behind eye. Surface of head without microreticulation, very glossy, with extremely fine, sparse punctation, impilose, but orbits laterally with very short, sparse pubescence.

Pronotum. (Fig. 1) Very wide and short, much wider than head, surface depressed. Apex very deeply excised, apical angles strongly protruding, almost enclosing basal part of head, though broadly rounded at tips. Lateral margins anteriorly convex, gently concave in basal two-thirds. Basal angles rectangular though rounded at tips. Base very gently bisinuate, laterally produced towards basal angles. Median line inconspicuous, apical and basal transverse furrows barely indicated. Marginal channel wide throughout, evenly widened towards apex, explanate. Apex not margined, base narrowly margined. Both pairs of marginal setae extremely thick and elongate, anterior setae situated at widest diameter at anterior third, posterior setae situated precisely on basal angle. Pronotal surface without microreticulation, highly glossy, with extremely

fine and sparse punctation, impilose, though margins with sparse fringe of extremely short, fine hairs that run around apical and basal angles.

Elytra. (Fig. 1) Short and very wide, markedly rectangular, surface depressed. Humerus rounded, basal margin almost transverse, narrowly margined to scutellum. Lateral margins almost parallel, apex obliquely rounded, not sinuate. Striae absent, though position of inner striae, under high magnification, indicated by extremely fine, barely recognisable rows of minute punctures. Elytral surface without microreticulation, highly glossy, with extremely fine and sparse punctation, impilose, though margin at humerus with sparse fringe of extremely short and fine setae that extends around base. Disc with two remarkably elongate setae situated at position of 3rd interval slightly in front of mid-length and near apex; anterior seta apparently situated near 3rd stria, the posterior one near 2nd stria. Lateral margin with 5 anterior, 1 intercalary and 5–6 posterior marginal setae, and with one additional apical seta located close to suture. All setae extremely elongate. Hindwings fully developed.

Lower Surface. Metepisternum elongate, c. 2x as long as wide. Abdominal sterna with sparse, very short pilosity, each sternum bisetose in middle. Terminal abdominal sternum in ♂ bisetose, in ♀ quadrisetose. Terminal setae extremely elongate, other setae shorter though still unusually elongate.

Legs. Rather narrow and elongate. Femora sparsely pilose. Tarsi impilose on upper surface; claws pectinate, with 3–4 small teeth. 2nd - 4th tarsomeres of ♂ protarsus with asymmetrical vestiture of adhesive hairs.

Male Genitalia. (Fig. 3) **Large compared to body size.** Genital ring (Fig. 3B) narrow, elongate, slightly triangular, barely asymmetric, with elongate apex. Aedeagus (Fig. 3A) slightly asymmetric, short and stout, not depressed, orifice short, situated on left side; lower surface gently convex, apex short, stout, situated on right side. Internal sac with rather complex folding, in middle with a spirally-coiled, heavily-sclerotised plate that is apically produced into a less-sclerotised rod. Parameres very dissimilar, asetose; left (Fig. 3C) large, wide, markedly triangular, right (Fig. 3D) small, elongate.

Female Genitalia. (Fig. 4) Stylomeres elongate, 1st stylomere without setae at apex, 2nd stylomere narrow, elongate, straight, without ensiform



FIG. 5. Gidgee trees (*Acacia cambagei* R.T. Baker); A, tree habit; B, detail of bark. (Photos: G.B. Monteith)

setae, but with fringe of 4-6 extremely minute hairs at apex.

Variation. Apart from minor differences in relative shape of pronotum and elytra, very little variation noted.

DISTRIBUTION. Central and western Queensland, adjacent eastern Northern Territory.

COLLECTING CIRCUMSTANCES. All specimens were sampled by pyrethrum fogging the bark of rough-barked acacias, namely brigalow (*Acacia harpophylla*) and gidgee (*A. cambagei*). Nothing else is recorded about the habits and life history.

ETYMOLOGY. The species name refers to the extreme length of all tactile setae.

REMARKS

The wide, remarkably depressed body shape and the extremely elongate, tactile setae on the pronotum and elytra render these tiny beetles outstanding within the Australian lebiine carabid

beetles. The Australian carabid fauna is particularly rich in such tree living and mainly corticolous or subcorticolous species that live either under loose bark on the trunks of a number of eucalypt trees, or within deep cracks in the bark of a variety of trees of various families (eucalypts, acacias and others) that possess a thick, rough bark structure (Baehr, 1992, 1997, 2002, 2005). It has been estimated that in Australia more than a quarter of the whole carabid fauna may be adapted to such a bark-inhabiting lifestyle (Baehr, 2004).

The thick bark of acacias like brigalow and gidgee is composed of a thick layer of multiple dead flakes 5–8cm deep (Fig. 5) and provides numerous, very narrow spaces for a multitude of subcorticolous animals of various groups. A distinctive flattened spider, *Platylampona mazeppa* Platnick (Lamponidae), has recently been described from this situation (Platnick, 2004). Other flattened taxa from the same habitat, yet to be described, include a new subfamily taxon of pentatomid Hemiptera and a new genus of large coccinellid beetles (G. Monteith, pers. com.), as well as a another new genus of markedly depressed lebiine

carabids related to the genus *Anomotarus*, under study by the author. *Brigalowia* is clearly another element of this unusual Australian fauna adapted to this specialised habitat.

Many corticolous or subcorticolous carabids exhibit markedly depressed body shape and usually possess quite elongate tactile setae, but *Brigalowia* seems to reach the utmost status in both characters. This extremely adaptive body structure, however, rather impedes its classification into one of the many lebiine tribes and subtribes. Mostly by exclusion, *Brigalowia* seems best placed at present within Dromiini, because few structural characters argue against this arrangement and some characters, like the denticulate tarsi, shape of the palpi, and the structure of the male aedeagus, support it. However, I do not know of any dromiine species with comparative body shape, and the structure of the female stylomeres of *Brigalowia*, at least, accords better with Anomotarini (=Callidini) than with Dromiini. Hence, the actual systematic position of *Brigalowia* is still doubtful and its putative status within Dromiini is completely uncertain.

Additional sampling by use of pyrethrum bark fogging in other parts of Australia may show whether the species, or at least the genus, has a wider range through inland Australia.

ACKNOWLEDGEMENTS

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Queensland Museum, prepared the habitus illustration (Fig. 1).

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