

SPIXIANA	33	1	59–63	München, Juli 2010	ISSN 0341–8391
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A new species of the genus *Diabaticus* Bates from eastern Australia

(Coleoptera, Carabidae, Lebiini)

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Baehr, M. 2010. A new species of the genus *Diabaticus* Bates from eastern Australia (Coleoptera, Carabidae, Lebiini). *Spixiana* 33(1): 59–63.

Diabaticus rufescens, spec. nov. is described from south-eastern Queensland and north-eastern New South Wales, eastern Australia. It is distinguished from both described species of the genus *Diabaticus* Bates by light reddish colouration, large, massive head bearing small, laterally little projected eyes, short and robust legs, and differently shaped female gonocoxites. A key for the species of the genus *Diabaticus* is included.

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Introduction

The lebiine genus *Diabaticus* Bates, 1878 so far includes two quite differently shaped species occurring in south-eastern Australia, namely *D. australis* (Erichson, 1842) and *D. pauper* Blackburn, 1901. The genus belongs to the lebiine subtribe Calleidina and within the subtribe to the *Trigonothops* complex. Ball & Hilchie (1983) united as subgenera in the genus *Trigonothops* Macleay, 1864 a couple of genera which formerly were treated as separate genera, namely *Phloeocarabus* Macleay, 1871, *Diabaticus* Bates, 1878, *Speotarus* Moore, 1964, and the newly erected subgenus *Abaditicus* Ball & Hilchie, 1983 which includes *Diabaticus collaris* Blackburn, 1901, alongside with *Abaditicus meyeri* Ball & Hilchie, 1983, described in the same paper. All these groups in their external structures are quite different, and it was mainly the generally similar structure of the male aedeagus and the female gonocoxites which caused the mentioned authors to combine them to a single genus. Certainly all groups are related, but it is a matter of opinion which nomenclatorial status should be given to them. Consequently, both authors already stated (Ball & Hilchie 1983: 186) that their uniting “makes it difficult to define the genus *Trigonothops* in terms of external features”. Indeed, the “subgenera” dif-

fer considerably in many characters of body shape, pilosity of surface, shape of pronotum, structure of tarsi, but also in structure of the setosity of the female gonocoxite 2. For these reasons I herein treat the mentioned subgenera as genera. This opinion is also supported by the quite different ecology of the mentioned groups: While the species of *Trigonothops*, *Phloeocarabus*, and *Abaditicus* are arbouricolous and live on or under the bark of trees, those of *Speotarus* occur in caves, and the two described species of *Diabaticus* apparently are ground-living beetles.

Even both species presently included in *Diabaticus* differ considerably in shape and structure: *D. pauper* Blackburn, 1901 has pilose surfaces of body and tarsi, the eyes are much projected, but the orbits are elongate and very oblique, and the metepisternum is quadrate which means that the species has short wings. *D. australis* (Erichson, 1842) is impilose on body and tarsi, has a normal shaped head with fairly large eyes, and is fully winged, bearing an elongate metepisternum.

The new species again is quite different from both mentioned ones in body shape and structure, but also in certain characters of the female gonocoxites, and therefore is but preliminarily included in the genus *Diabaticus*.



Fig. 1. *Diabaticus rufescens*, spec. nov. Habitus. Body length: 6.6 mm.

Methods

The male and female genitalia were removed from specimens, soaked for a night in a jar under wet atmosphere and then cleaned for a short while in hot KOH. The habitus photograph was obtained by a digital camera using SPOT Advanced for Windows 3.5 and subsequently were edited using Corel Photo Paint 11.

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those taken by other authors. Length of pronotum was measured along mid-line.

Abbreviations of collections

ANIC Australian National Insect Collection, Canberra
CBM Working Collection M. Baehr, in Zoologische Staatssammlung, München
QMB Queensland Museum, Brisbane

Taxonomy

Genus *Diabaticus* Bates

Bates, 1878: 324. – Ball & Hilchie 1983: 188; Moore et al. 1987: 303; Lorenz 1998: 471.

Type species: *Plochionus australis* Erichson, 1842, by monotypy.

Diagnosis. Genus of the lebiine subtribe Calleidina, close to the *Trigonothops* lineage. Dorsal surface and surface of tarsi setulose or not; 4th tarsomeres not bilobate, at most slightly excised, lower surface of 4th tarsomeres without dense vestiture; tarsal claws denticulate; elytra without distinct colour pattern; head variously shaped, with more or less distinct neck; pronotum subcordate with angulate basal angles; elytra with transverse microreticulation; aedeagus (when known) with a characteristically curved sclerite in internal sac (see Fig. 2); female gonocoxites elongate, gonocoxite 2 straight and narrow, with more or less elongate ensiform seta at or near apex and with additional short apical setae.

At present the genus (as a subgenus of *Trigonothops* Macleay) includes two species, *D. australis* (Erichson, 1842), recorded from Tasmania and eastern Victoria, and *D. pauper* Blackburn, 1901, only recorded from Tasmania. However, all three species not only differ in their external shape and structure, but also in the structure of their female gonocoxite 2.

Diabaticus rufescens, spec. nov.

Figs 1-3

Holotype: ♂, Copeland Tops, Forrest Rd. 19 km from Gloucester 4 Jan. 1982 E. Britton (ANIC).

Paratypes: 1♂, Mt. Develin via Maryvale S.E. Queensland 18 Feb. 1996 M. De Baar G. De Baar (QMB); 1♀, Australien, NSW90, Aspley Gorge, 17 km se. Walcha, 1.-2.12.1990, M. Baehr (CBM).

Etymology. The name refers to the light rufous colour of the surface.

Diagnosis. Unicolourous light reddish species; apart from the different colour, distinguished from both described species by combination of impilose surfaces of body and tarsi, small, little projected eyes and large orbits, and a remarkably elongate apical part of the female gonocoxite 2.

Description

Measurements. Length: 6.45-6.7 mm; width: 2.45-2.6 mm.

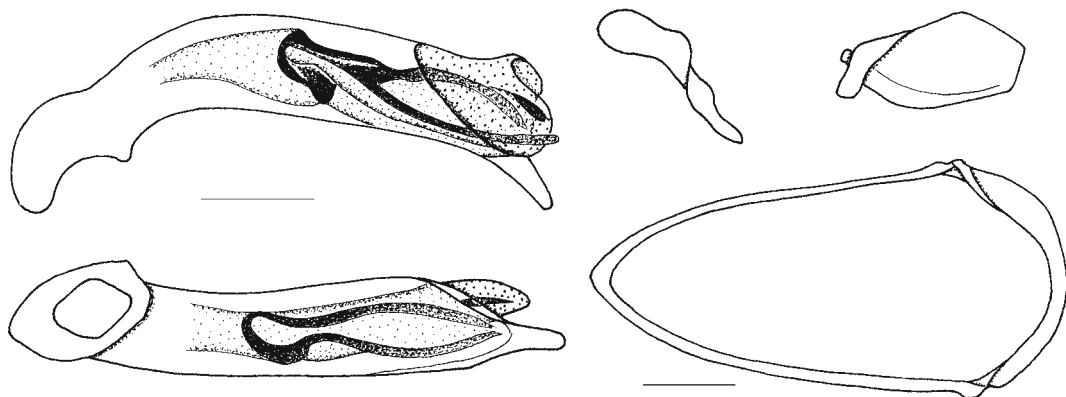


Fig. 2. *Diabaticus rufescens*, spec. nov., male genitalia: aedeagus, left side and lower surface, right and left parameres, genital ring. Scale bars: 0.25 mm.

Ratios. Width/length of pronotum: 1.27-1.31; width diameter/width base of pronotum: 1.16-1.18; width of head/width of pronotum: 0.87-0.89; length/width of elytra: 1.51-1.53.

Colour (Fig. 1). Upper and lower surfaces, including mouth parts, antenna, and legs, almost unicolourous light reddish, only antenna very slightly darker towards apex, and knees dark.

Head (Fig. 1). Compact and voluminous, with remarkably wide neck. Eyes comparatively small, laterally but little projected, orbits about as long as eyes, moderately oblique and slightly convex. Labrum wide, anterior border almost straight. Mandibles short, apically much incurved. Both palpi short, sparsely pilose, maxillary palpus filiform, labial palpus in both sexes but slightly widened towards apex. Mentum with an elongate, unidentate tooth. Glossa narrow, apparently bisetose at apex, paraglossae not surpassing glossa, at apex transverse. Antenna short, surpassing base of pronotum by one antennomere, median antennomeres about $1.5\times$ as long as wide. Posterior supraorbital seta far removed posteriad from posterior margin of eye. Frontal furrows very short and shallow, indicated only immediately behind clypeal suture. Surface without any wrinkles, glabrous, impilose, with rather superficial, isodiametric microreticulation, glossy.

Pronotum (Fig. 1). Rather wide, very gently cordiform, with wide base, widest at apical third. Dorsal surface moderately convex. Apex almost straight, apical angles very slightly produced, obtuse. Lateral margin gently convex, in basal half almost straight or but very slightly concave. Base slightly produced in middle, laterally slightly convex, basal angles almost rectangular but obtuse at tip. Apex not margined, base margined. Lateral margin narrow, widened and explanate towards base. Median line

distinct, complete, anterior transverse sulcus barely indicated, posterior transverse sulcus moderately impressed. Basal grooves barely impressed. Anterior marginal seta inserted at apical third at position of widest diameter, posterior marginal seta inserted just in front of base. Surface glabrous with transverse, extremely fine and superficial microreticulation, glossy.

Elytra (Fig. 1). Moderately elongate, slightly widened towards apical third, dorsal surface moderately convex but in middle depressed. Humeri evenly rounded, basal margin complete, attaining the scutellum. Lateral margin almost straight, slightly oblique, elytra widest at apical third. Apex widely and evenly rounded, not incurved towards the apical angle which is slightly obtuse. Striae finely impressed, impunctate, intervals very slightly convex. Scutellary stria elongate, situated in 1st interval, scutellary pore and seta present, at base of scutellary stria. 3rd interval bipunctate, the anterior puncture and seta located slightly in front of middle and near 3rd stria, the posterior puncture located far apicad, in apical sixth, near 2nd stria. Marginal series consisting of 14-15 punctures and setae, series uninterrupted in middle. At apex with one elongate seta situated at end of 3rd interval and a very short one mediad of it. Marginal setae of different length, some very elongate. Intervals with an irregularly spaced row of fine punctures and with very fine and superficial microreticulation that consists of very dense, markedly transverse striae. Surface glossy.

Posterior wings. Fully developed.

Lower surface. Glabrous and impilose. Metepisternum elongate, c. twice as long as wide at anterior margin. Terminal abdominal sternum bisetose in both sexes.

Legs. Comparatively short and stout. Mesotibia

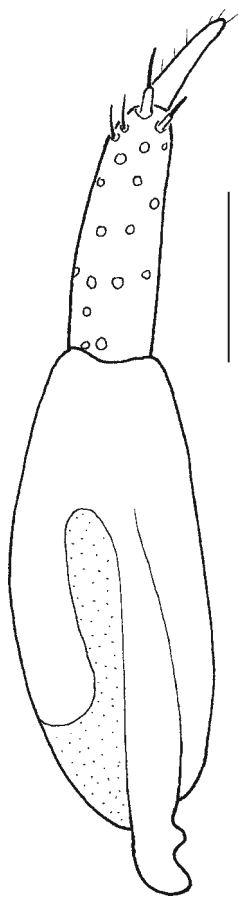


Fig. 3. *Diabaticus rufescens*, spec. nov., female gonocoxites 1 and 2. Scale bar: 0.1 mm.

and metatibia laterally carinate. Tarsi comparatively short, impilose at upper surface. 4th tarsomeres not lobate, not widened, little excised, without dense vestiture on lower surface. 5th tarsomeres with 2 fine setae in apical part of lower surface. Claws large, very finely 3-denticulate. In the male three basal tarsomeres of protarsus and two basal tarsomeres of mesotarsus biserially squamose at lower surface.

Male genitalia (Fig. 2). Genital ring rather narrow, triangular-convex, almost symmetric, with narrow apex. Aedeagus rather narrow and elongate, laterally slightly curved, lower surface straight, only near apex slightly bent down. Apex elongate, narrow, obtuse at tip. Orificium short, situated mainly on left side. Internal sac with a narrow, elongate, basally curved sclerite and with slightly sclerotized margins of some hyaline folds. Left paramere fairly elongate, with obliquely cut apex, right paramere moderately elongate.

Female genitalia (Fig. 3). Both gonocoxites narrow and elongate. Gonocoxite 1 asetose at apical margin. Gonocoxite 2 very slightly curved, at apex with a markedly elongate apical spine-shaped part which is indistinctly separated from the basal part of the gonocoxite. At apex of the basal part with two small ensiform setae that are situated on produced sockets, and with few very small nematiform setae. The apical spine-shaped part with three very small nematiform setae on median surface and a few very small setae at tip.

Variation. Very little variation noted.

Distribution. North-eastern New South Wales to south-eastern Queensland.

Collecting circumstances. Largely unknown. The female specimen collected by me was captured from leaf litter at the base of an Eucalypt tree.

Key to the species of the genus *Diabaticus* Bates

1. Surface of body and of tarsi punctate and setulose; metepisternum quadrate. Tasmania.
.....*pauper* Blackburn
- Surface of body and of tarsi impunctate and glabrous; metepisternum elongate. Tasmania, south-east Australia north to southern Queensland. 2.
2. Colour piceous; eyes large, laterally well protruded; aedeagus unrecorded; gonocoxite 2 without a spine-shaped apical part. Tasmania, eastern Victoria.*australis* (Erichson)
- Colour light reddish; eyes rather small, laterally little protruded (Fig. 1); aedeagus with an elongate, at base curved sclerite (Fig. 2); gonocoxite 2 with elongate spine-shaped apical part (Fig. 3). North-eastern New South Wales, south-eastern Queensland.*rufescens*, spec. nov.

Remarks

Diabaticus rufescens, spec. nov., the third species of the genus *Diabaticus*, is not very closely related to either of both described species, which likewise are rather remotely related one to another. Hence the genus, even in its restricted sense as proposed by Ball & Hilchie (1983), i.e. without *Abaditicus collaris* (Blackburn) which originally was described as a *Diabaticus*, does not form a homogenous unit but rather is a genus of convenience which perhaps in the future could be again subdivided into additional subunits, e.g. subgenera. Main differences between

the three species are in body shape; presence, or absence, of pilosity on body surface and on the tarsi; size and shape of the eyes; and, in particular, shape and structure of the female gonocoxite 2. When comparing the gonocoxite 2 of *Diabaticus rufescens* with the figures of the gonocoxites of both other species given by Ball & Hilchie (1983: figs 99, 100), it is evident, that the structures are very different, even in both described species. However, with respect to the large spine-shaped apical part and the socket-based ensiform setae *D. rufescens* is even more aberrant in this structure. These differences even raise the question whether it is possible to retain the three species within a single genus. Unfortunately, the male genitalia of both described species have been never examined, so additional evidence from this structure at present is not available, and a complete revision of the genus or the complex is outside of the aim of the present paper. Moreover, apparently both described species seem to be very rare in collections and even Ball & Hilchie (1983) for their comprehensive study had only a single female of both species, the types of which also are females.

In the Australian Calleidine complex *Diabaticus* most probably is a basal genus in many respects, which is suggested by the not markedly depressed body; absence of a distinct colour pattern on the elytra; relatively stout legs; not lobate 4th tarsomeres and absence of a special vestiture at their lower surface. All these character states probably are due to – and likewise suggest – non-arbouricolous habits. Unfortunately, almost nothing is reported about the ecology and ethology of any of the species of *Diabaticus*, hence the above suggestion presently cannot be verified.

Acknowledgements

I am indebted to Geoff Monteith (Brisbane) and Tom Weir (Canberra) for the kind loan of specimens.

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Buchbesprechungen

3. Bergbauer, M. & Humberg B. 2009. Was lebt im Mittelmeer? 2. Auflage – Kosmos Naturführer, Franckh-Kosmos Verlags-GmbH & Co. KG, Stuttgart, 352 Seiten, Umschlag mit Plastikversteifung, ISBN 978-3-440-11736-1.

Es handelt sich hierbei um die Neuauflage eines 1999 erstmals erschienenen Buches zur Bestimmung von Pflanzen und Tieren des Mittelmeeres. Es enthält unter Anderem eine Übersichtskarte mit meeresbiologisch wichtigen Orten, eine relativ ausführliche Beschreibung der unterschiedlichen Lebensräume und am Ende ein ausführliches Register sowie ein Glossar. Der mit großem Abstand ausführlichste Teil widmet sich, systematisch gegliedert, einzelnen Arten, die über eine Textbeschreibung mit zusätzlicher wissenschaftlicher Information und zumindest einer Lebendphotographie im Originallebensraum dargestellt werden. Es sind diese – insgesamt 512 – großteils ausgezeichneten Photos, die den eigentlichen Wert des Buches ausmachen. Diese ermöglichen eine relativ schnelle und einfache Bestimmung bzw. systematische Zuordnung in Organismengruppen. Die Neuauflage unterscheidet sich durch deutlich erweitertes Bildmaterial und der damit verbundenen erhöhten Formenanzahl. Bemerkenswert sind Namensänderungen (Beispiel "Leopardenschnecke": *Peltadoris* vs. *Discodoris*), wobei neueste taxonomische Erkenntnisse offenbar sorgfältig berücksichtigt wurden.

Eine exakte Artbestimmung ist mit dem Konzept des Buches aber nur in manchen Fällen – bei Fischen sicher wesentlich eher als bei Wirbellosen – möglich. Taxono-

misch relevante, also häufig mikroskopische Merkmale, können hier nicht ausreichend dargestellt werden. Klar ist auch, dass nur ein Querschnitt des tatsächlichen Formenreichtums dargestellt werden kann. Hier ist Kritik anzubringen: Dieser Umstand wird vollkommen verschwiegen. Wünschenswert wäre eine Einleitung mit einer Übersicht der gesamten Formenvielfalt, um die Reichweite des im Buch gebotenen für jedermann darzulegen. Nicht leicht nachzuvollziehen ist außerdem der relative Umfang der einzelnen Taxa. So wird zum Beispiel der artenarmen Gruppe der bunten polycladen Plattwürmer (Polycladida) mehr Raum als den allgegenwärtigen und höchst umfangreichen Borstenwürmern (Polychaeta) gewidmet. Zweierlei Hintergrund ist hier zu vermuten: (1) Ästhetische Attraktivität sowie (2) Verfügbarkeit von (bestimmbaren) photographischem Bildmaterial haben wohl zu solchen Unausgewogenheiten geführt.

Dennoch ist das vorliegende Buch – wie etliche ähnliche mit Schwerpunkt auf Unterwasserphotographie – als (Feld-)Führer nicht nur der primären Zielklientel, nämlich interessierten Laien und Tauchsportlern wärmstens zu empfehlen. Auch Fachbiologen, etwa im Rahmen von Studentenkursen, können durch die photographischen Darstellungen in Ergänzung zu einschlägiger Literatur erheblich profitieren. Es sei hier angeführt, dass die Artbestimmung bei vielen Übersichtswerken im althergebrachten Stil mit halbschematischen Zeichnungen, wie den klassischen Mittelmeerführern, nicht minder problematisch als beim vorliegenden Werk ist.

B. Ruthensteiner