

## New species and new records of the amblyteline genera *Amblytelus* Erichson and *Dystrichothorax* Blackburn from eastern Australia

(Insecta, Coleoptera, Carabidae, Psydrinae)

Martin Baehr

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*Dystrichothorax odegardi*, spec. nov. from Lamington Plateau, south-eastern Queensland, and *D. similis*, spec. nov. from Gibraltar Range, north-eastern New South Wales, both Australia, are described and inserted in the respective key in the revision of the psydrine tribe Amblytelini of Australia (Baehr 2005). The first species belongs to the *australis*-group of the revision and is closely related to *D. sloanei* Blackburn, 1892, but differs mainly by lesser body size and by presence of a colour pattern on the elytra. The second species belongs to the *lividus*-group of the revision and is very similar to *D. lamingtonensis* Baehr, 2005; within the *lividus*-group it is characterized by the pattern of denticulate sclerites in the internal sac of the male aedeagus.

The hitherto unknown male of *D. lamingtonensis* Baehr is described and the male genitalia are figured. According to the genital structures, this species must be removed from the *australis*-group sensu Baehr (2005) to which it was tentatively alluded, to the *lividus*-group.

Additional records of several rare or little documented species sampled during recent surveys or identified recently from certain museum collections are dealt with.

Key words: Insecta, Coleoptera, Carabidae, Psydrinae, *Amblytelus*, *Dystrichothorax*, new species, new records, Australia

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### Introduction

Recent identifications of great numbers of specimens of the Australian psydrine tribe Amblytelini from a variety of projects and collections yielded two additional new species of the genus *Dystrichothorax* Blackburn, the hitherto unknown male of the recently described species *Dystrichothorax lamingtonensis* Baehr, and a variety of additional records of a number of rare species of the genera *Amblytelus* Erichson and *Dystrichothorax* which are recorded in the present paper. Material is from the

following projects or collections: The IBISCA project (see References) carried out on Lamington Plateau and National Park at the Queensland/New South Wales border, by G. B. Monteith and co-workers at Queensland Museum (C. Burwell, K. Staunton, G. Thompson, S. Wright), and by F. Odegard, J. Schmidl, and T. Bittner; the light trapping survey of R. Kitching and co-workers of Griffith University, Brisbane, on Lamington Plateau and Paluma Range in northern Queensland; material borrowed recently from University of Queensland Insect Collection, Brisbane, Queensland Department of Primary In-

dustries, Brisbane, Australian Museum, Sydney, Carnegie Museum of Natural History, Pittsburgh, and Zoological Institute of the Russian Academy of Sciences, St. Petersburg; material collected years ago by K. Arnold (Geyer) in northern Queensland and recently identified by me; and material collected recently by me in south-eastern New South Wales and southern Queensland.

The present paper is rendered another supplement to the monograph of the Australian *Amblytelini* (Baehr 2005, 2006, 2007), and style and format of the descriptions exactly correspond to those in the revision (Baehr 2005) which also can be used to gain additional information about the Australian *Amblytelini*, their morphology, distribution, and habits.

The genus *Amblytelus* at present includes 47 taxa which are distributed through southern Australia including the Southwest and along the east coast up to North Queensland. The genus *Dystrichothorax* so far includes likewise 47 taxa which are distributed along the east coast of Australia from Tasmania and southern Victoria to North Queensland, where several species occur on Atherton, Mossman, and Windsor Tablelands, respectively, but not further north.

The species of both genera live on tree trunks, either under bark of bark shedding eucalypts in open sclerophyll forests and woodland, or on (moss covered) tree trunks in wet sclerophyll forest and rain forest. In particular the rain forest inhabiting species apparently possess quite restricted ranges on single or few mountain tops or tablelands, and most of these species so far are rare in collections and knowledge of their ranges probably is yet quite fragmentary. This may be either due to their actual restricted ranges, either to inadequate sampling efforts, because rain forest dwelling species are best collected by pyrethrum fogging of tree trunks which has been done satisfactorily in a few areas only, in others at a rather limited extent. Actually many species so far are recorded from few or even single specimens only (see Baehr 2005) and thus, any additional records are useful for more exact definition of their range and better knowledge of their habitats and ecological requirements, but even for additional information on variability and taxonomical status. Additional records of the common and widely distributed eastern species *Amblytelus curtus* (Fabricius, 1801) and *A. brevis* Blackburn, 1892, and of the common south-western species *A. leai* Sloane, 1898 are not noted.

## Methods

Dissecting methods, measurements, and style of the descriptions exactly match those used in the revision (Baehr 2005).

## Abbreviations

for chetotaxy:

ab: ambulatory setae on male and female terminal abdominal sternite  
el: fixed setae on 3<sup>rd</sup>, 5<sup>th</sup>, and 7<sup>th</sup> elytral intervals  
pr: anterior and posterior marginal setae on pronotum

for collections:

AMS Australian Museum, Sydney, Australia  
CBM working collection M. Baehr in Zoologische Staatssammlung, Munich, Germany  
CMP Carnegie Museum of Natural History, Pittsburgh, U.S.A.  
QDPIB Queensland Department of Primary Industries, Brisbane, Australia  
QMB Queensland Museum, Brisbane, Australia  
UQIC University of Queensland Insect Collection, Brisbane, Australia  
ZISP Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia

for states:

NSW New South Wales  
QLD Queensland  
VIC Victoria

## New records

The species are arranged according to their sequence in the revision (Baehr 2005).

### *Amblytelus bellorum* Baehr

Baehr, 2005: 52.

**Distribution.** A restricted area in Australian Capital Territory and adjacent New South Wales.

**New records.** NSW: 1 ex., Werrikimbe NP, 31°12' 00"S 152°09'00"E, 1060 m, 1-7.12.1997, E. Tasker (AMS).

**Collecting circumstances.** The single freshly hatched specimen was caught in sticky trap on *E. viminalis* at high altitude.

### *Amblytelus weiri* Baehr

Baehr, 2005: 77, 281.

**Distribution.** Barrington Tops and New England Tableland in north-eastern New South Wales. The single specimen recorded from the latter area origi-

nally was tentatively alluded to *A. weiri*. Two rather recently collected specimens now confirm the occurrence of this species on New England Tableland.

**New records.** NSW: 1 ex., Barrington Tops, 5,000 ft. 13.1.1947, L. L. Hopson (AMS); 1 ex., New England NatP. 30.30S 152.23E, Thungutti Camp, 16-18.11.1990, A. Kirejtshuk (CBM, ZISP).

**Collecting circumstances.** Both specimens from New England National Park were sampled at night, probably at light, at high altitude.

#### *Amblytelus bathurstensis* Baehr

Baehr, 2005: 81.

**Distribution.** Known so far only from the holotype from south-western Tasmania.

**New record.** TAS: 1 ♀, Huonville, SE Tas Jan 30, 1998 M. Bouffard (CMP).

**Collecting circumstances.** Unknown. The new record extends the range of this extremely rare species to south-east Tasmania.

#### *Amblytelus marginicollis* Sloane

Sloane, 1911: 827; Baehr, 2005: 82, 282.

**Distribution.** South-east Australia from eastern Victoria to New England Tableland in north-eastern New South Wales.

**New records.** NSW: Clarence, 15.6.1985, R. Beysak (AMS); Tuross, 17-22.1.1936, K. C. McKeown (AMS).

**Collecting circumstances.** Not recorded.

#### *Amblytelus castaneus* Baehr

Baehr, 2005: 85, 282.

**Distribution.** South-east Australia from eastern Victoria to south-eastern Queensland.

**New records.** NSW: Scheyville, W of Sydney, 8.5.1987, H. Recher (AMS).

**Collecting circumstances.** The series was sampled by pyrethrum knockdown.

#### *Amblytelus pseudepelyx* Baehr

Baehr, 2005: 90, 282.

**Distribution.** Victoria to south-eastern New South Wales.

**New records.** VIC: Fern Tree Gully, R. Blackwood (AMS). – NSW: Leura, Blue Mts. 1.33, K. K. Spence (AMS); Medlow (AMS).

**Collecting circumstances.** Not recorded.

#### *Amblytelus lawrencei* Baehr

Baehr, 2005: 98.

**Distribution.** Australian Capital Territory and adjacent south-eastern New South Wales, north to Blue Mountains.

**New records.** NSW: Jenolan S.F. 21.4.1973, D. A. Doolan (AMS); Mooney Mooney Ck near Gosford, 18.1.1980, B. J. Day & D. K. McAlpine (AMS).

**Collecting circumstances.** Not recorded.

#### *Amblytelus barringtonensis* Baehr

Baehr, 2005: 99, 282.

**Distribution.** Barrington Tops and New England Tableland in north-eastern New South Wales.

**New records.** NSW: 1 ex., Walcha Survey, Giro, 31°35' 59" 151°49'47", Transsect 20, Jan. 1993, I. Oliver (AMS).

**Collecting circumstances.** The single specimen was sampled in pitfall in grassy forest, moist hardwood.

#### *Amblytelus balli* Baehr

Baehr, 2005: 103, 283.

**Distribution.** Eastern New South Wales to adjacent south-eastern Queensland.

**New records.** NSW: Lilyvale, 26.6.1971 (AMS); Lilyvale, 14.4.1973, D. A. Doolan (AMS); Hastings Riv. 1934, H. J. Davidson (AMS). – QLD: Eprapah Ck., Victoria Pt., 28.35S, 153.13E, 12-20.iv.1986, 27.ix.-10.x.1986 (QDPIB).

**Collecting circumstances.** Two specimens sampled in Malaise trap.

#### *Amblytelus minutus* Macleay

Macleay, 1871: 106; Baehr 2005: 107, 283.

**Distribution.** North-eastern New South Wales, adjacent south-eastern Queensland. Apparently rather common on Lamington Plateau.

**New records.** NSW: 30.22S 152.44E, Dorrigo Nat. P. Dorrigo Camp, 13-15.11.1990, A. Kirejtshuk (CBM, ZISP). – QLD: Mt. Glorious NP, Mt. Tenison Woods, 757 m, 27°17'37"S, 152°45'02"E, M. Baehr (CBM); Mt. Glorious, A. Hillers Site, 27°19'45"S, 152°45'34"E, M. Baehr (CBM); Lamington NP, 28°13'S, 153°07'E, 22.12.2000, R. Kitching (CBM, QMB); Lamington NP, 900 m, 10.2006, J. Schmid (CBM); National Pk., 10.12.1933, H. Hacker (QDPIB).

**Collecting circumstances.** The newly recorded specimens from Queensland either were sampled by fogging bark of rain forest trees or at MV light. At Lamington Plateau the species occurs from 300-900 m but apparently not at the highest tops at 1100 m.

*Amblytelus doyeri* Baehr

Baehr, 2005: 112.

**Distribution.** North-eastern Queensland from Paluma-Mt. Spec area in the south to Windsor Tableland in the north.

**New records. QLD:** 15 km SE. Atherton, 17°25'S; 145°30'E, 1.-20.2.1996, K. Arnold (CBM); Paluma, 18°59.30S, 146°11.00E, 16.3.2001, R. Kitching (CBM, QMB).

**Collecting circumstances.** All specimens collected at light in rain forest, those at Paluma probably at rather high altitude.

*Amblytelus observatorum* Baehr

Baehr, 2005: 114.

**Distribution.** Bellenden Ker Range at the eastern margin of Atherton Tableland, north-eastern Queensland. The species apparently is restricted to the uppermost summits of this range.

**New records. QLD:** Peak Mt. Bellenden-Ker, 10-18.I. 1977, R. I. Storey (CBM, QDPIB).

**Collecting circumstances.** The newly recorded specimens were collected at light at the uppermost top of Bellenden Ker, probably at about 1.600 m.

*Amblytelus montorum* Baehr

Baehr, 2005: 123.

**Distribution.** Bellenden Ker and Bartle Frere Ranges at the eastern margin of Atherton Tableland, north-eastern Queensland. The species apparently is restricted to the uppermost summits of this range.

**New records. QLD:** Peak Mt. Bellenden-Ker, 10-18.I. 1977, R. I. Storey (CBM, QDPIB).

**Collecting circumstances.** The newly recorded specimens were collected at light at the uppermost top of Bellenden Ker, probably at about 1.600 m.

*Dystrichothorax vicinus vicinus* Blackburn

Blackburn, 1892: 90, 91; Baehr 2005: 135.

**Distribution.** Eastern Victoria.

**New records. VIC:** Lake Schanck (AMS); Mornington Pen. nr. Red Hill, 38.21S, 145.01E (CMP).

**Collecting circumstances.** Not recorded.

*Dystrichothorax vicinus pervicinus* Baehr

Baehr 2005: 138.

**Distribution.** North-eastern New South Wales from Barrington Tops to New England Tableland.

**New record. NSW:** 30.30S 152.23E, New England NP. Thungutti Camp, 16-18.11.1990, A. Kirejtshuk (ZISP).

**Collecting circumstances.** Largely unknown. The single specimen probably collected at high altitude.

*Dystrichothorax gibbosus* Baehr

Baehr 2005: 139.

**Distribution.** Blue Mountains, south-east New South Wales.

**New records. NSW:** Hampton, 28.12.1968 (AMS); Mt. Irvine, Jan. 1985, K. K. Spence (AMS); Jenolan S.F. 29.12.1968, 23.12.1972, D. A. Doolan (AMS); Mt. Wilson, 27.9.1980, D. A. Doolan (AMS); Mt. Wilson, 920 m, 24.10.2007, M. Baehr (CBM); Tinderry Mts. 1300 m, 12 km E. Michelago, 27.10.1990, A. Kirejtshuk (ZISP).

**Collecting circumstances.** Most specimens probably sampled at rather high altitude, the specimens sampled recently by me at Mt. Wilson were collected from under bark of gum-type, tall eucalypts at the margin of Wet Sclerophyll Forest at high altitude.

*Dystrichothorax vittipennis* Sloane

Sloane, 1911: 828; Baehr 2005: 141, 283.

**Distribution.** North-eastern New South Wales from Barrington Tops to south-eastern Queensland.

**New records. NSW:** Carrai SF, 30°54'19"S, 152°17'56"E, 1055 m, 11.I.-16.V.1998, E. Tasker (AMS); Mt. Hyland Nat. Res. 30.09S 130.27E, 1080 m, Feb-Mar 1993, M. Gray, G. Cassis (AMS); Barrington Tops, 4.800 ft., 12.I. 1947, L. Hopsom, A. Musgrave (AMS). – **QLD:** Mt. Glorious, 27.20S 152.48E, 19.-21.12.1990, A. Kirejtshuk (ZISP).

**Collecting circumstances.** Mostly unrecorded, but one specimen from sticky traps on *E. obliqua*; all records are from high altitude.

*Dystrichothorax amplipennis* (Macleay)

Macleay, 1871: 106 (*Amblytelus*); Baehr 2005: 147, 283.

**Distribution.** North-eastern New South Wales from Comboyne Plateau to south-eastern Queensland north to about Gayndah.

**New records. NSW:** National Park, 27.11.1965, D. K. McAlpine (AMS); Antarctic Beech Lookout, Waingaree S. F., R. Beysak (AMS); Dorrigo NP, The Glade/Wonga Track, 30.22S 152.43E, 13-15.11.1090, A. Kirejtshuk (ZISP). – **QLD:** Lamington NP, 28.151°S, 153.138°E, 260 m, 23-24.3.2007, K. Barton (QMB); Bunya MT., 1919 (QDPIB); Stanthorpe; 17.5.1925 (QDPIB); Ravensbourne, 25.iii.1977, K. Houston (QDPIB); Bunya Mts. 4.1.1989, A. Sundholm, J. Bugeja (AMS).

**Collecting circumstances.** Most recorded specimens so far refer to old records, but from Dorrigo and Lamington Plateau some recent records are available. The specimens from the Lamington partly were fogged from tree trunks, partly were captured in light trap. At Lamington the species occurs from about 250-500 m, but does not seem to be common. Records are now also available from Bunya Mts. further inland.

*Dystrichothorax laeivennis* Baehr

Baehr, 2005: 149, 284.

**Distribution.** A rather common species on rain forest capped mountains of north-eastern Queensland from Paluma-Mt. Spec in the south to Windsor Tableland in the north.

**New records. QLD:** 15 km SE. Atherton, 17°25'S; 145°30'E, 1.-20.2.1996, K. Arnold (CBM); Paluma, 18°59.30S, 146°11.00E, 16.3.2001, R. Kitching (CBM, QMB); Tinaroo S.F. 24.2.1975 (AMS).

**Collecting circumstances.** Most specimens collected at light in rain forest, all probably at high altitude.

*Dystrichothorax bipunctatus* Blackburn

Blackburn 1892: 89, 91; Baehr 2005: 157.

**Distribution.** South-eastern New South Wales.

**New records. NSW:** Lilyvale, 26.6.1971 (AMS); Otford, 4.3.1972, D. A. Doolan (AMS); 33 km NE Singleton, 17.11.1985, D. J. Bickel (AMS).

**Collecting circumstances.** Not recorded.

*Dystrichothorax reidi* Baehr

Baehr, 2005: 159, 284.

**Distribution.** A rare species recorded only from south-eastern New South Wales.

**New records. NSW:** Lilyvale, 19.6.1971, 20.6.1971 (AMS, CBM).

**Collecting circumstances.** Not recorded.

*Dystrichothorax sloanei* Blackburn

Blackburn 1892: 89; Baehr 2005: 163, 284; 2007: 2.

**Distribution.** Apparently a common and rather widespread species that occurs from central eastern New South Wales to Bunya Mts. in south-eastern Queensland.

**New records. NSW:** Carrai SF, 30°54'19"S, 152°17'36"E, 1055 m, 3-8.12.1997, E. Tasker (AMS); Big Scrub, Nightcap NP, Gibbergunya Ra Rd, 28.36S 153.19E, 180 m,

1.3.2002, C. Reid (AMS); Woronora R, Engadine, 12. 1985. G.- A. Holloway (AMS). – **QLD:** Lamington NP, 28.216°S, 153.142°E, 560 m, 1-2.4.2007, D. Wright, I. & S. Flinders (QMB); Lamington NP, 28.240°S, 153.149°E, 29-30.3.2007, 944 m, K. Barton, D. Wright. (QMB); Mt. Glorious, Hiller, 10-31.1.1982 (QDPIB); Brisbane, 13.10. 1936 (QDPIB); Toowoomba, 10.8.1926 (QDPIB); Marrochy Hort Res. Stn, Nambour, 22-29.iii.1985 (QDPIB).

**Collecting circumstances.** At Lamington specimens were sampled by fogging trunks of rain forest trees and in light traps from 300-900 m. However, the species also occurs in more open sclerophyll forest. The specimens from Mt. Glorious and Nambour were sampled in Malaise trap, the one from Carrai SF in sticky trap on *E. campanulata*, the one from Nightcap NP at low altitude by beating rainforest trees/scrubs.

*Dystrichothorax pictus* Baehr

Baehr, 2005: 166; 2007: 2.

**Distribution.** A rare species at Lamington Plateau in south-eastern Queensland. Apparently restricted to this area.

**New records. QLD:** Lamington NP, 1100 m, 3.2007, T. Bittner (CBM).

**Collecting circumstances.** Collected by fogging trunks of rain forest trees at the uppermost top of Lamington Plateau.

*Dystrichothorax hawkeswoodi* Baehr

Baehr, 2005: 167.

**Distribution.** New England Tableland in north-eastern New South Wales. The species so far was known only from the holotype.

**New records. NSW:** 30.30S 152.23E, New England Nat. P. Wright Lookout Track, 16-18.11.1990, A. Kirejtshuk (CBM); 30.30S 152.23E, New England Nat. P. Thungutti Camp, 16-18.11.1990, A. Kirejtshuk (ZISP).

**Collecting circumstances.** The two additional specimens probably were collected at high altitude.

*Dystrichothorax storeyi* Baehr

Baehr, 2005: 169.

**Distribution.** Atherton Tableland including Bellenden Ker Range at the eastern margin of that tableland, north-eastern Queensland.

**New records. QLD:** Peak Mt. Bellenden-Ker, 10-18.I. 1977, R. I. Storey (QDPIB).

**Collecting circumstances.** The single specimen was collected at light at the uppermost top of Bellenden Ker, probably at about 1.600 m.

### *Dystrichothorax difficilis* Baehr

Baehr 2005: 171, 284.

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

**New records. QLD:** Lamington NP, 28°13'S, 153°07'E, 22.12.2000, R. Kitching (CBM, QMB).

**Collecting circumstances.** Collected at light, probably at rather high altitude.

### *Dystrichothorax bernhardti* Baehr

Baehr, 2005: 173; 2007: 2.

**Distribution.** Main Range at the Queensland/New South Wales border. So far apparently a rare species.

**New records. QLD:** Lamington NP, 28°21'S, 153°14'E, 560 m, S. Wright (CBM); Lamington NP, 28.262°S, 153.170°E, 1140 m, 7-17.10.2006, C. Lambkin, N. Starick (QMB).

**Collecting circumstances.** Specimens at Lamington were sampled either by fogging tree trunks or by light trapping in rain forest at c. 550 m and high up at the uppermost top.

### *Dystrichothorax lamingtonensis* Baehr

Fig. 1

Baehr, 2005: 177.

This species was so far known from two female specimens caught on Lamington Plateau slightly north of the Queensland/New South Wales border. While males were so far unknown but group affiliation in the genus *Dystrichothorax* largely depends on shape and structure of the male aedeagus, this species was tentatively alluded to the *australis*-group, in the sense of the revision (Baehr 2005). However, the structure of the aedeagus clearly demonstrates that this species actually belongs in the *lividus*-group of the revision, and it is herewith transferred to this group.

#### Partial redescription

Measurements. Length: 8.2-8.7 mm; width: 3.2-3.5 mm. Ratios. Length eye/orbit: 2.4-2.7; width/length of pronotum: 1.23-1.25; width base/apex of pronotum: 1.50-1.52; width pronotum/head: 1.24-1.28; length/width of elytra: 1.65-1.71; width elytra/pronotum: 1.82-1.88.

Chetotaxy. pr: 0, 1; el: 2, 0, 0; ab: 4, 8.

Male genitalia (Fig. 1). Genital ring wide, asymmetric, with asymmetric, moderately elongate apex, moderately convex base, and angulate, produced lateral angles. Aedeagus narrow and elongate, gently curved on lower surface, apex almost straight, though curved to the left side. Apex moderately elongate (in group), barely narrowed, obtusely rounded at tip. Tip sclerotized. Internal sac with a sclerotized spine in basal part, with one elongate, denticulate plate in middle at bottom, and another elongate, strongly denticulate plate at roof near apex. Both parameres very elongate, with narrow and elongate apex. Right paramere with 2 moderately elongate apical setae, a few short setae on lower surface near apex, and two fairly elongate setae in middle of lower surface. Left paramere larger and at base much wider than right one, apex gently curved, with 2-3 moderately elongate apical setae and a shorter seta each on upper and lower surface near apex.

**Distribution.** Lamington Plateau in south-eastern Queensland. Apparently restricted to this area.

**New records. QLD:** Lamington NP, 28°19'S, 153°12'E, 775m, 27.7.2007, G. Monteith, G. Thompson (CBM, QMB); Lamington NP, 28°22'S, 153°13'E, 920 m, 22.10.2006, C. Burwell (QMB); Lamington NP, 700 m, 10.2006, T. Bittner (CBM).

**Collecting circumstances.** At Lamington specimens were sampled by fogging trunks of rain forest trees including *Araucaria* between 700-920 m.

**Relationships.** According to shape of the aedeagus and structure of the spinose sclerites of the internal sac, within the *lividus*-group *D. lamingtonensis* is related to *D. parallelocollis* Baehr and *D. catrionae* Baehr, both recorded from Lamington Plateau, but it is even more closely related to *D. similis*, spec. nov. from Gibraltar Range (this paper, below) which has a very similar shaped and structured aedeagus.

### *Dystrichothorax lividus* Blackburn

Blackburn, 1892: 90, 91; Baehr 2005: 179, 284; 2007: 2.

**Distribution.** Main Range at the Queensland/New South Wales border. So far apparently a rare species.

**New records. QLD:** Lamington NP, 28°19'S, 153°12'E, 775 m, 27.7.2007, G. Monteith, G. Thompson (QMB).

**Collecting circumstances.** At Lamington this species was sampled by fogging trunks of rain forest trees at about 800 m.

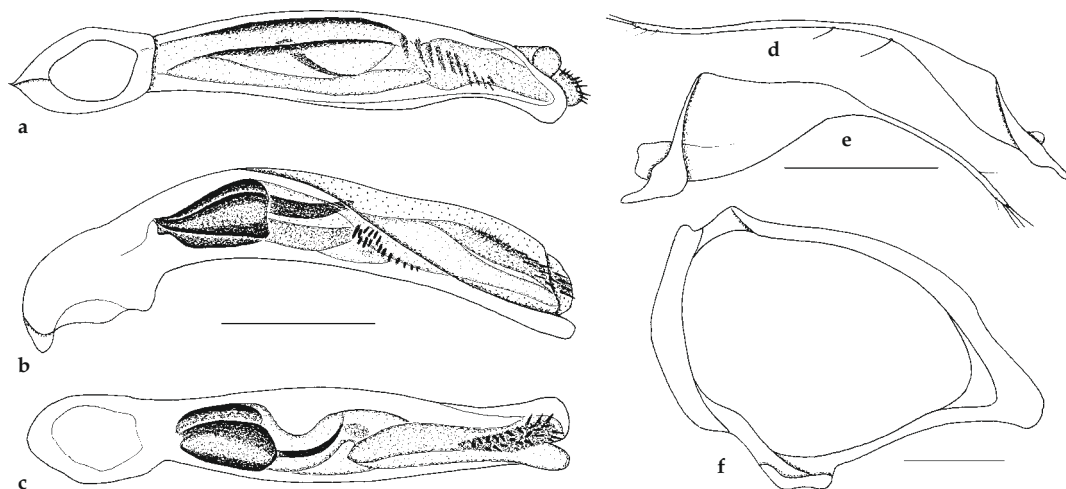


Fig. 1. *Dystrichothorax lamingtonensis* Baehr. Male genitalia. a. Aedeagus, ventral view. b. Aedeagus, lateral view, from left. c. Aedeagus, dorsal view. d. Right paramere. e. Left paramere. f. Genital ring. Scales: 0.5 mm.

#### *Dystrichothorax parallelocolis* Baehr

Baehr, 2005: 180; 2007: 2.

**Distribution.** So far a rare species, but, according to the recent captures, apparently moderately common in south-eastern Queensland including Bunya Mountains.

**New records. QLD:** Mt. Glorious NP, Mt. Tenison Woods, 757 m, 27°17'37"S, 152°45'02"E, M. Baehr (CBM); Mt. Glorious, A. Hillers Site, 27°19'45"S, 152°45'34"E, M. Baehr (CBM); Lamington NP, 28°19'25"S, 153°12'45"E, 775 m, 20.10.2006, C. Burwell (CBM, QMB); Lamington NP, 28°15'15"S, 153°13'38"E, 250 m, 8.3.2007, G. Thompson, 27.7.2007, S. Wright (CBM, QMB); Lamington NP, 28°20'7"S, 153°13'7"E, 471 m, 27.7.2007, G. Thompson (QMB); Lamington NP, 28.227°S, 153.131°E, 920 m, 10-11.3.2007, Wright, Barton, Pulland (QMB).

**Collecting circumstances.** All specimens were collected by either fogging tree trunks or by light trapping in rain forest, at Lamington from about 250-920 m.

#### *Dystrichothorax catrionae* Baehr

Baehr, 2005: 183, 285

**Distribution.** This very rare species was so far recorded only from Acacia Creek in north-eastern New South Wales close to the Queensland border. New records are now available from Lamington Plateau.

**New records. QLD:** Lamington NP, 500 m, 3.2007, T. Bittner (CBM); Lamington NP, 300 m, 10.2006, J. Schmidl (CBM).

**Collecting circumstances.** At Lamington specimens were sampled by fogging trunks of rain forest trees at median altitude (300-500 m).

#### *Dystrichothorax piceus* Baehr

Baehr, 2005: 185.

**Distribution.** So far recorded only from Richmond Range, north-eastern New South Wales close to the Queensland border, and only from the female holotype.

**New records. QLD:** 1♀, Lamington NP, Duck Creek Rd., 28°08', 153°10', 868 m, 7.8.2007, M. Baehr (CBM).

**Collecting circumstances.** The single additional female specimen was captured by fogging the moss-covered bark of a rainforest tree at rather high altitude.

#### *Dystrichothorax heatherae* Baehr

Baehr, 2005: 187.

**Distribution.** North-eastern Queensland from Paluma Range in the south to Atherton Tableland.

**New records. QLD:** 15 km SE. Atherton, 17°25'S; 145°30'E, 1.-20.2.1996, K. Arnold (CBM).

**Collecting circumstances.** Collected at light in rain forest at unknown but probably rather high altitude.

*Dystrichothorax demarzi* Baehr

Baehr, 2005: 191, 285; 2007: 3.

**Distribution.** North-eastern Queensland from Paluma Range in the south to western parts of Atherton Tableland.

**New records.** 15 km SE. Atherton, 17°25'S; 145°30'E, 1.-20.2.1996, K. Arnold (CBM); Paluma, 18°59.30S, 146°11.00E, 16.3.2001, R. Kitching (CBM, QMB).

**Collecting circumstances.** All specimens collected at light and probably at rather high altitude.

*Dystrichothorax bicolor* Blackburn

Blackburn, 1888, 91; Baehr, 2005: 197.

**Distribution.** Eastern Victoria and southern half of New South Wales.

**New records.** NSW: Blackheath, Jan. 1984, K. K. Spence (AMS); Jamberoo, Jan. 1949, N. W. Rodd (AMS); Jenolan S.F., 24.4.1973, D. A. Doolan (AMS); Clarence, 15.6.1985, R. Beysak (AMS).

**Collecting circumstances.** Not recorded.

*Dystrichothorax nothofagi* Baehr

Baehr, 2005: 207.

**Distribution.** Main Range at the Queensland/New South Wales border. It was so far considered a rare species, but obviously it is fairly common when appropriate sampling methods are employed.

**New records.** QLD: Lamington NP, 28.260°S, 153.167°E, 1106 m, 19-20.3.2007, C. Chavana, D. Wright (CBM, QMB); Lamington NP, 28.262°S, 153.170°E, 1140 m, 17-20.3.2007, C. Chavana, D. Pulland, K. Barton, D. Wright (QMB); Lamington NP, 28.259°S, 153.162°E, 1142 m, 18-19.3.2007, D. Wright, C. Chavana (QMB); Lamington NP, 28.260°S, 153.167°E, 1106 m, 18-19.3.2007, K. Barton (CBM); Lamington NP, 28.262°S, 153.170°E, 1140 m, 19-20.3.2007, D. Wright (QMB).

**Collecting circumstances.** At Lamington this species was sampled either by fogging tree trunks or by light trapping on ground and in canopy in rain forest at the uppermost top in cool temperate *Nothofagus* rain forest.

*Dystrichothorax laevior* Baehr

Baehr, 2005: 211.

**Distribution.** A rare species so far recorded only from New England Tableland in north-eastern New South Wales.

**New records.** NSW: New England NatP. 30.30S 152.23E Thungutti Camp, 16-18.11.1990, A. Kirejtshuk (CBM,

ZISP); The Glade/Wonga track, Dorrigo Nat. Park, 30.22S 152.43E, 13-15.11.1990, A. Kirejtshuk (ZISP).

**Collecting circumstances.** Not recorded, but all specimens probably sampled at high altitude.

*Dystrichothorax plagifer* Baehr

Baehr, 2005: 214, 285.

**Distribution.** Blue Mountains, south-eastern New South Wales. So far apparently a rare species.

**New records.** NSW: Mt. Wilson, 7.8.1972, D. A. Doolan (AMS); Jamberoo, Jan. 1949, N. W. Rodd (AMS); Mt. Tomah, 10.5.1980, N. W. Rodd (AMS); Brown Mtn. nr. Nimmitabel, 13-19.2.1987, 1200 m, D. Bickel (AMS); Mt. Wilson, 920 m, 24.10.2007, M. Baehr (CBM).

**Collecting circumstances.** The specimens sampled recently at Mt. Wilson were collected from under bark of gum-type, tall eucalypts at the margin of Wet Sclerophyll Forest at high altitude, the specimen from Brown Mountain was sampled in warm temperate rainforest, likewise at high altitude.

*Dystrichothorax odegaardii*, spec. nov.

Figs 2, 4

**Types.** Holotype: ♂, AUSTRALIA, Qld Lamington Nat. Park 28°26'S 153°16'E 1140 m asl, 12 March 2007 IQ-Plot 1100A, Beating Leg. F. Ødegaard / 21865 / Cara 004 (QMT156030) (QMB). – Paratypes: 1♀, AUSTRALIA, Qld Lamington Nat. Park 28°26'S 153°16'E 1140 m asl, 11 March 2007 IQ-Plot 1100D, Beating Leg. F. Ødegaard / 21852 / Cara 004 (QMB); 1♀, AUSTRALIA, Qld Lamington Nat. Park 28°26'S 153°17'E 1110 m asl, 15 Oct. 2006 IQ-Plot 1100C, Beating Leg. F. Ødegaard / 21865 / Cara 004 (CBM); 1♀, QLD: 28.262°S × 153.170°E Lamington NP.IBISCA Qld Plot# IQ-1100-D. rainforest 16 Mar 2007. 22119 S. Wright. 1140 m bark spray – NE side. (QMB); 1♂, QLD: 28.260°S × 153.167°E Lamington NP.IBISCA Qld Plot# IQ-1100-C. 1106 m 27 Jan 2008. rainforest C. Burwell. 32046 bark spray SW side. (QMB).

**Diagnosis.** Rather small species of the *australis*-group in the sense of Baehr (2005) with comparatively large eyes; in dark specimens centre of pronotum piceous; elytra with an ill defined, about diamond-shaped dark cloud in apical part, in dark specimens the whole disk dark but even so the cloud just visible; distinguished from most closely related *D. sloanei* Blackburn, *D. pictus* Baehr, and *D. hawkeswoodi* Baehr by lesser size and basally narrower pronotum, further from *D. sloanei* by presence of an elytral colour pattern and a much smaller denticulate plate in the aedeagus; and from both, *D. pictus* and *D. hawkeswoodi* by much more ill defined elytral pattern and

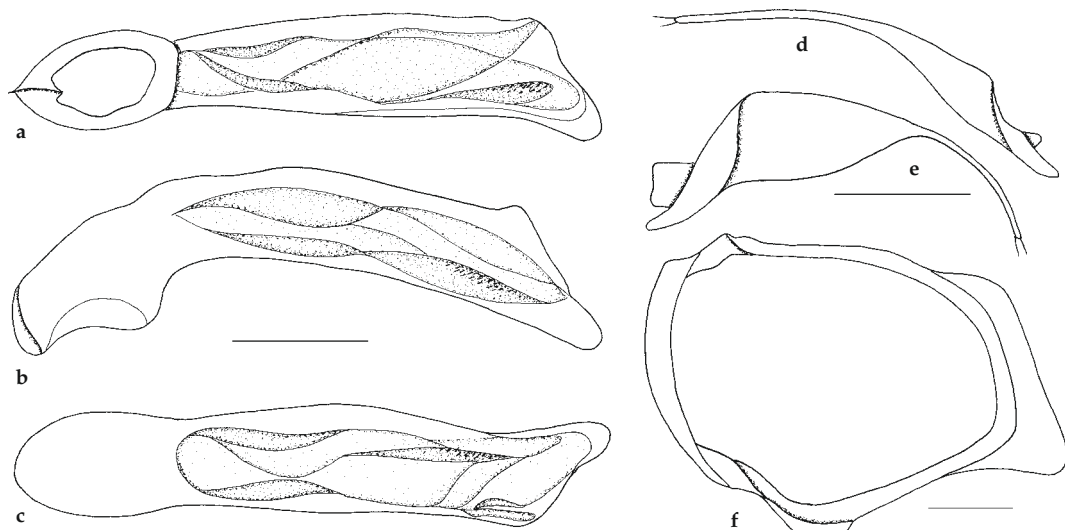


Fig. 2. *Dystrichothorax odegaardi*, spec. nov. Male genitalia. a. Aedeagus, ventral view. b. Aedeagus, lateral view, from left. c. Aedeagus, dorsal view. d. Right paramere. e. Left paramere. f. Genital ring. Scales: 0.5 mm.

the narrower, less compact aedeagus which has a less concave lower surface.

### Description

Measurements. Length: 5.8-6.45 mm; width: 2.15-2.4 mm. Ratios. Length eye/orbit: 4.3-4.5; width/length of pronotum: 1.18-1.24; width base/apex of pronotum: 1.56-1.63; width pronotum/head: 1.23-1.28; length/width of elytra: 1.78-1.82; width elytra/pronotum: 1.64-1.66.

Colour (Fig. 4). Surface, including mouth parts, antennae, and legs more or less reddish. In dark specimens disk of pronotum except the margins piceous. Elytra with ill defined, about diamond-shaped piceous cloud in apical part, also disk more or less dark, but even in the darkest specimens disk slightly lighter than the apical cloud.

Chetotaxy. pr: 0, 1; el: 2, 0, 0; ab: 4, 8.

Head. Fairly wide, though about a quarter narrower than pronotum, frons in middle convex. Eyes large, laterally well protruded. Orbits short, less than a fourth as long as eyes, oblique, straight to slightly convex, evenly merging into curvature of eye, forming a distinct angle with neck. Orbits barely enclosing eye. Labrum at anterior margin straight. Mandibles short and wide. Submentum laterally bisetose on either side. Tooth of mentum large, wide, rather acute. Glossa straight at apex, bisetose, paraglossae hyaline, slightly surpassing glossa. Lacinia with few strong spines. Both palpi rather short, obliquely cut at apex, apparently impilose. Antenna

elongate, surpassing base of pronotum by 2-3 antennomeres. Median antennomeres slightly  $< 3 \times$  as long as wide. Posterior supraorbital seta removed from eye, situated slightly behind posterior margin of eye. Frontal furrows rather short, fairly deep, rather wide, slightly sinuate. Frons near frontal sulci with an irregular, shallow groove and with or without some fine, transverse wrinkles, in middle with an indistinct longitudinal groove. Surface extremely finely and sparsely punctate, with extremely superficial, in some parts virtually lacking, isodiametric microreticulation, glossy.

Pronotum. Moderately wide, with fairly wide base, somewhat trapezoidal, disk depressed, widest at or slightly in front of base. Apex almost straight, apical angles widely rounded, barely protruded. Lateral margin evenly convex, anteriorly oblique, near basal angles almost straight. Basal angles about rectangular, laterally not produced though slightly produced backwards. Base in middle convex, bisinuate on either side, laterally rather excised. Apex in middle weakly margined, base coarsely margined throughout. Marginal channel rather narrow, lateral margins narrow especially at apex, slightly and evenly widened towards base, upturned, faintly explanate. Median line distinct, but rather shallow, almost reaching apex, basally slightly deepened, reaching base. Anterior transversal sulcus shallow, posterior transverse sulcus deep, linear. Basal grooves linear, slightly oblique, deep, separated from marginal channel. Posterior lateral seta arising at lateral margin on basal angle. Surface with extremely

fine and sparse punctures, without microreticulation, though covered with dense, fairly coarse, irregularly transverse striae, glossy.

Elytra. Elongate, laterally very faintly convex or almost parallel, barely widened in posterior half, widest slightly behind middle, disk moderately convex. Humerus angulate, slightly protruding, basal margin gently angulate. Lateral margin at apex markedly convex. Lateral apical fold very strong. All striae complete, though lateral striae very indistinct. Five inner striae faintly impressed, irregularly punctate, lateral striae very fine, not at all impressed, intervals almost depressed. Interval 3 with 2 setiferous punctures about in middle and at apical fourth, adjoining stria 3 (s. chetotaxy), marginal channel with 13 setiferous punctures, series slightly interrupted behind middle, punctures easy to detect. Two additional setiferous punctures located near apex at the ends of striae 2 and 3. Intervals impunctate, with fairly distinct, though superficial, very fine microreticulation consisting of moderately transverse meshes. Surface rather glossy.

Posterior wings. Fully developed.

Lower surface. Metepisternum moderately elongate, almost 2.5 × as long as wide at apex. Abdominal setae s. chetotaxy.

Legs. Of average size.

Male genitalia (Fig. 2). Genital ring wide, asymmetric, with asymmetric, moderately elongate apex, convex base, and angulate, produced lateral angles. Aedeagus narrow and elongate, very gently curved on lower surface, apex almost straight, though considerably curved to the left side. Apex fairly elongate (in group), barely narrowed, obtusely rounded at tip. Tip sclerotized. Internal sac with a weakly denticulate, barely sclerotized, narrow plate at bottom of in basal part, without any other sclerotized parts. Both parameres very elongate, with narrow and elongate apex. Right paramere with 2 short apical setae, without any setae on the lower surface. Left paramere larger and at base much wider than right one, apex markedly curved, with 2 short apical setae, without any additional setae.

Female genitalia. Stylomeres and lateral plate very similar to those of *D. lividus* Blackburn.

Variation. Some variation noted in relative width of pronotum and in degree of dark colouration on pronotum and elytra.

**Distribution.** Lamington Plateau, south-eastern Queensland, Australia. Known only from this area.

**Collecting circumstances.** Sampled by pyrethrum fogging of tree trunks or by beating in rain forest at the uppermost top in cool temperate *Nothofagus* rain forest.

**Etymology.** The name is a patronym in honour of the collector of most specimens of this new species, Frode Ødegaard.

**Relationships.** According to external morphology and to shape and structure of the male aedeagus, this species is most closely related to *D. sloanei* Blackburn, *D. pictus* Baehr and *D. hawkeswoodi* Baehr from south-eastern Queensland and New South Wales.

*Dystrichothorax similis*, spec. nov.

Figs 3, 5

**Types.** Holotype: ♂, Gibraltar Range, 3,000' via Glen Innes, N.S.W. 27-29.xii.1972 G. B. Monteith Rain forest (UQIC Reg #90490) (QMT 156029).

**Diagnosis.** Medium-sized, unicolourous reddish species of the *lividus*-group in the sense of Baehr (2005) with comparatively large eyes; distinguished from most closely related *D. lamingtonensis* Baehr by lighter colour, almost impunctate elytral striae, less curved aedeagus on lower surface and presence of two rather than one denticulate plates at apex of internal sac.

**Description**

Measurements. Length: 8.2 mm; width: 3.1 mm. Ratios. Length eye/orbit: 2.7; width/length of pronotum: 1.26; width base/apex of pronotum: 1.52; width pronotum/head: 1.23; length/width of elytra: 1.74; width elytra/pronotum: 1.83.

Colour (Fig. 5). Surface, including mouth parts, antennae, and legs pale reddish. Lateral margins of pronotum and elytra slightly lighter.

Chetotaxy. pr: 0, 1; el: 2, 0, 0; ab: 4, ?.

Head. Moderately wide, about a quarter narrower than pronotum, frons in middle convex. Eyes moderately large, laterally moderately protruded. Orbits moderate, slightly more than a third as long as eye, fairly oblique, convex, evenly merging into curvature of eye, forming a fairly distinct angle with neck. Orbits slightly enclosing eye. Labrum at anterior margin straight. Mandibles short and wide. Submentum laterally bisetose on either side. Tooth of mentum large, wide, rather acute. Glossa straight at apex, bisetose, paraglossae hyaline, slightly surpassing glossa. Lacinia with few strong spines. Both palpi rather short, obliquely cut at apex, impilose. Antenna elongate, surpassing base of pronotum by almost 3 antennomeres. Median antennomeres c. 3 × as long as wide. Posterior supraorbital seta removed from eye, situated slightly behind posterior margin of eye. Frontal furrows rather elongate, fairly deep, fairly wide, sinuate, ending in an irregular groove. Frons in middle with a very shallow, about

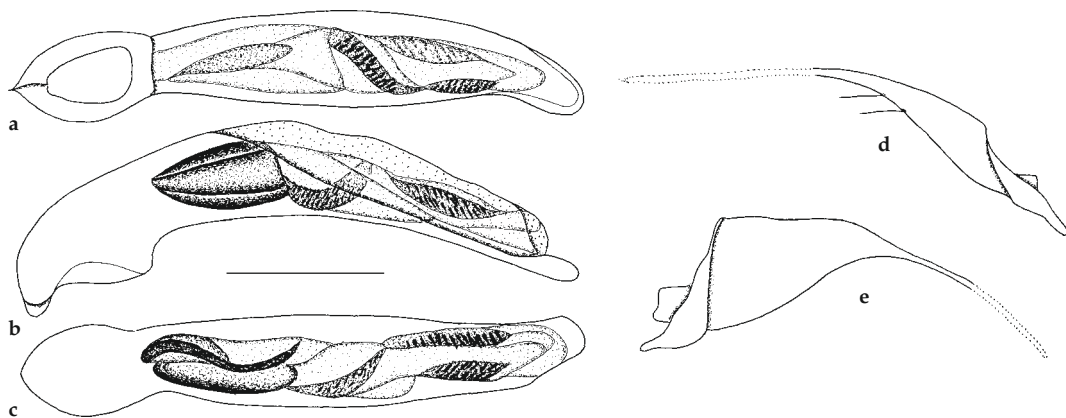


Fig. 3. *Dystrichothorax similis*, spec. nov. Male genitalia. a. Aedeagus, ventral view. b. Aedeagus, lateral view, from left. c. Aedeagus, dorsal view. d. Basal part of right paramere. e. Basal part of left paramere. Scale: 0.5 mm.

transverse impression. Surface impunctate, without microreticulation, very glossy.

**Pronotum.** Rather narrow, rather quadrate, laterally little convex, with fairly wide base, disk moderately convex, widest slightly behind middle, very little narrowed towards base. Apex with very shallow, almost straight excision, apical angles widely rounded, barely protruded. Lateral margin slightly convex throughout. Basal angles rectangular, very slightly produced laterad and posteriad. Base in middle convex, laterally rather excised. Apex in middle not margined, base coarsely margined throughout. Marginal channel rather narrow, lateral margins moderate, slightly widened towards base, rather upturned, faintly explanate. Median line distinct, not reaching apex but almost reaching base, not deepened basally. Anterior transversal sulcus shallow, posterior transverse sulcus rather deep. Basal grooves linear, deep, slightly oblique, well separated from marginal channel. Posterior lateral seta arising at lateral margin on basal angle. Surface impunctate, without microreticulation, though covered with fine, irregularly transverse striae, very glossy.

**Elytra.** Rather elongate, in middle almost parallel, not widened in posterior half, widest in middle, disk moderately convex. Humeri angulate, slightly protruding, basal margin gently angulate. Lateral margin at apex markedly convex. Lateral apical fold very strong. Inner six striae complete, though rather shallow, lateral striae very indistinct, stria 7 barely recognizable in basal half. Striae slightly impressed on disk, finely crenulate, lateral striae very fine, virtually not impressed, inner 5 intervals slightly convex. Interval 3 with 2 setiferous punctures in front of middle and in apical third, adjoining stria 3 (s. chetotaxy), marginal channel with 13-14 setiferous punctures, series interrupted behind middle,

punctures easy to detect. Two additional setiferous punctures located near apex at the ends of striae 2 and 3. Intervals impunctate, with fine, somewhat superficial microreticulation consisting of slightly transverse meshes. Surface very glossy.

**Posterior wings.** Fully developed.

**Lower surface.** Metepisternum rather elongate, slightly less than  $2.5\times$  as long as wide at apex. Abdominal setae s. chetotaxy.

**Legs.** Of average size.

**Male genitalia (Fig. 3).** Genital ring unknown, destroyed. Aedeagus narrow and elongate, very gently curved on lower surface, apex almost straight, though slightly curved to the left side. Apex moderately elongate (in group), barely narrowed, obtusely rounded at tip. Tip sclerotized. Internal sac with a sclerotized spine in basal part, with one elongate, denticulate plate in middle at bottom, and two elongate, strongly denticulate plates at roof near apex. Both parameres broken in middle, but probably very elongate, with narrow and elongate apex. Right paramere with 2 elongate setae in basal half of lower surface. Left paramere larger and at base much wider than right one, without any setae in basal half.

**Female genitalia.** Unknown.

**Variation.** Unknown.

**Distribution.** Gibraltar Range, northern New South Wales, Australia. Known only from type locality.

**Collecting circumstances.** Sampled in rain forest at almost 1.000 m. Collecting method unknown.

**Etymology.** The name refers to the high grade of similarity of body shape and structure of the aedeagus as compared with the next related *D. lamingtonensis* Baehr.



4



5

**Figs 4,5.** Habitus. 4. *Dystrichothorax oodegardi*, spec. nov. 5. *D. similis*, spec. nov. Body lengths: 6.3 mm; 8.2 mm.

**Relationships.** According to external morphology and to shape and structure of the male aedeagus, this species is most closely related to *D. lamingtonensis* Baehr from Lamington Plateau in south-eastern Queensland.

**Recognition**

*Dystrichothorax oodegardi*, spec. nov. can be inserted in the recent key (Baehr 2005) under couplet 24 which has to be modified as follows (figures of the revision included as B05 fig):

- 24. Elytra with indistinct dark, diamond-shaped or posteriorly arrow-shaped pattern (Fig. 4; B05 figs 216, 217) ..... 25.
- Elytra without such pattern ..... 26.
- 25a. Smaller species, body length <6.5 mm; pronotum with narrower base, ratio base/apex <1.64; elytra with ill-delimited, about diamond-shaped dark cloud in posterior half; aedeagus see fig. 2. Lamington Plateau, se. QLD ..... *oodegardi*, spec. nov.

- Larger species, body length >6.7 mm; pronotum with wider base, ratio base/apex >1.72; elytra with better delimited, posteriorly arrow-shaped pattern (B05 figs 216, 217); aedeagus (BA05 figs 85, 86). ..... 25b.
- 25b. Elytra with dark sutural stripe in anterior half extended over at least three inner intervals (Ba05 fig. 216); eyes larger, more protruded, ratio eye/orbit >4.0; pronotum narrower in relation to head, ratio pr/h <1.31; elytra shorter and wider in relation to pronotum, ratio el/pr >1.76; aedeagus (Ba05 fig. 85). Lamington Plateau, se. QLD ..... *pictus* Baehr
- Elytra only with narrow arrow-shaped pattern in posterior half (Ba05 fig. 217); eyes smaller, less protruded, ratio eye/orbit c. 2.6; pronotum wider in relation to head, ratio pr/h c. 1.35; elytra longer and narrower in relation to pronotum, ratio el/pr c. 1.68; aedeagus (Ba05 fig. 86). New England Tableland, ne. NSW ..... *hawkeswoodi* Baehr
- 26. As in Baehr (2005).

*Dystrichothorax lamingtonensis* Baehr and *D. similis*, spec. nov. can be inserted in the recent key (Baehr 2005) under couplet 34 which has to be modified as follows (figures of the revision included as B05 fig):

34. Lateral margins of pronotum moderately convex; aedeagus elongate, internal sac with a curved spine at base, an oblique, denticulate plate in middle at bottom, and one or two denticulate plates at apex (Figs 1, 3) ..... 34a.
- Lateral margins of pronotum rather parallel; shape and/or distribution of denticulate plates different (B05 figs 87, 88, 90-96) ..... 35.
- 34a. Aedeagus with a single denticulate plate at apex of internal sac (Fig. 1). Lamington Plateau, se. QLD ..... *lamingtonensis* Baehr
- Aedeagus with two denticulate plates at apex of internal sac (Fig. 3). Gibraltar Range, ne. NSW ..... *similis*, spec. nov.
35. As in Baehr (2005)

### Remarks

Almost all of the recently sampled specimens noted in present paper were either obtained by light trapping either by fogging tree trunks in rain forest. The results corroborate the latter sampling method as the most promising one for collecting rain forest inhabiting amblyteline species. If fogging is done systematically at a multitude of (montane) localities, evidently it is possible to close apparent distribution gaps and to give a better impression of frequency and habits of species. But the results of increasing systematical sampling also confirm the high species diversity of both, *Amblytelus* and *Dystrichothorax*, in eastern Australia and the short-range endemism of many species. Apart from several examples noted in the revision (Baehr 2005), this can be well observed, for example, in the great number of mostly closely related species recorded on Lamington Plateau during the IBISCA survey.

As explained in the revision (Baehr 2005), Psydrinae basically is a plesiotypic and rather basal group of carabid beetles that has a long history in Australia. Although the tribe Amblytelini probably is most apotypic within Psydrinae (if the grade of general apotypy is the measure of the distance of a taxon from the base of the group-specific cladogram expressed in the number of dichotomies from the base of the cladogram) (Moore 1963, Baehr 1999), and the genus *Dystrichothorax* again is most apotypic within Amblytelini (Baehr 2005), both genera are likewise ancient Australian faunal elements that

probably have evolved in temperate rain forest. Even when the changing from life on bark of rain forest trees to life on bark of eucalypts in many species of the genera *Dystrichothorax* and *Amblytelus* cannot be dated so far, the high species diversity of the rain forest inhabiting species in both genera with high certainty is a result of very recent rapid speciation events caused by repeated climatic changes which most probably date back not later than to (late) Glacial Period. Along Great Dividing Range of eastern Australia these climatic changes caused repeated periods of dispersion and retreat, respectively, of rain forest at mountain tops and tablelands, but likewise of the surrounding sclerophyll forest, in a reciprocal manner. As a result of these oscillations of vegetation, ranges of species on mountain tops and tablelands repeatedly were enlarged and again restricted when rain forest spread down the slopes and again retreated to the uppermost tops, which caused continuous speciation events and repeated colonization of many mountain tops and tablelands by closely related species.

It has been explained in the revision that for both genera *Amblytelus* and *Dystrichothorax* rain forest capped Lamington Plateau in south Queensland and Atherton Tableland in north Queensland, respectively, are hotspots of species diversity with a surprisingly great number of related species occurring in both areas. The presently existing rain forest patches between, and also a number of more southerly ones, on the contrary, are home of only single or no species at all. This may be evidence of an uninterrupted history of rain forest on both tablelands, whereas the rain forests between presumably were lost during Glacial Period, probably not only once but several times. On Lamington Plateau and Atherton Tableland rain forest probably also became intersected and again reunited during Glacial Period, but a certain amount of rain forest certainly was always preserved. This presence of rain forest which, however, probably was several times intersected, may refer not only to the presence of several related species on both tablelands, but also generally for the high number of species.

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