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National Library of Australia card number
ISSN 0079-8835

A Guide to Authors is displayed at the Queensland Museum web site

A Queensland Government Project
Typeset at the Queensland Museum

PSYDRINE GROUND BEETLES (COLEOPTERA: CARABIDAE: PSYDRINAE), EXCLUDING AMBLYTELINI, OF EASTERN QUEENSLAND RAINFORESTS

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Baehr, M. 2003 06 30: Psydrine ground beetles (Coleoptera: Carabidae: Psydrinae), excluding Amblytelini, of eastern Queensland rainforests. *Memoirs of the Queensland Museum* **49**(1): 65-109. Brisbane. ISSN 0079-8835.

The psydrine ground beetles of eastern Queensland, excluding the tribe Amblytelini, are reviewed. Species of *Laccocenus* Sloane, *Teraphis* Castelnau, *Trephisa* Moore, and *Meonis* Castelnau are enumerated, the Queensland species of *Mecyclothorax* Sharp revised, and *Sitaphe* Moore and *Raphetis* Moore fully revised. The following new taxa are described: *Mecyclothorax inflatus* from southern parts of Atherton Tableland, *M. inflatus spinifer* from the Walter Hill Range, *M. impressipennis* from Isley Hills north of Bellenden Ker Range, *M. storeyi frerei* from Bartle Frere, *M. lewisensis uncinatus* from Mt Hemmant and Mt Halcyon north of Thornton Peak, *Sitaphe trapezicollis* from Bellenden Ker/Bartle Frere Ranges, *S. parvicollis* from Bartle Frere Range, *S. minuta* from Lambs Head, Mt Williams, and Isley Hills north of Bellenden Ker Range, *S. hamifera* from Cardwell Range, *S. incurvicollis* from the Walter Hill Range, *S. parallelipennis* from Carbine and Windsor Tablelands, *S. ovipennis* from Thornton Peak, *Raphetis curta* from Springbrook Plateau in southeastern Queensland, and four subspecies of *R. gracilis* Moore, all from northeastern Queensland: *R. g. frerei* from Bellenden Ker/Bartle Frere Ranges and vicinity, *R. g. spinosa* from the surroundings of Mt Lewis, *R. g. spurgeoni* from north of Mt Spurgeon, and *R. g. subarmata* from Mt Spurgeon and Plane Crash Site, the last three subspecies being from different parts of Carbine Tableland.

Within the three revised genera similar patterns of distribution are recognised: all species are montane, and the many extremely similar taxa each occupy single or closely adjacent mountain tops or tablelands. This distribution pattern reflects similar patterns in various invertebrate groups of low vagility occurring in the Wet Tropics of North Queensland. The high level similarity is strong evidence of a rather recent — probably even Pleistocene — allopatric speciation caused by vicariance events due to repeated spreading and retreat of the montane rain forests during the glacial and inter-glacial periods.

Within the strictly northern *Sitaphe*, and also in the *storeyi*-group of *Mecyclothorax*, relationships are still obscure. In *Raphetis* a fairly distinct gradient exists between the plesiotypic southern *R. curta*, the intermediate *R. darlingtoni* from mid-eastern Queensland, and the apotypic *R. gracilis*-complex in north Queensland. ❐ *Coleoptera, Carabidae, Psydrinae, Mecyclothorax, Sitaphe, Raphetis, new species, Australia, Queensland, distribution.*

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By courtesy of Geoff Monteith of Queensland Museum, Brisbane, I received specimens of the psydrine genera *Mecyclothorax* Sharp, *Sitaphe* Moore and *Raphetis* Moore collected during the extensive rain forest sampling program carried out by him and his co-workers on various mountain tops along the east coast of Queensland during the last 20 years. When I requested some voucher specimens of *Raphetis* for comparison during the course of a forthcoming revision of the psydrine tribe Amblytelini, Geoff Monteith asked me to review all specimens because there appeared to be several different — probably undescribed — forms. We agreed, then, that it would be best to combine descriptions of new forms of all genera in a single comprehensive paper to give an overview of the geophile psydrines of the rain forests of eastern Queensland.

This paper, therefore, includes a revision of Queensland *Mecyclothorax*, and complete revisions of *Sitaphe* and *Raphetis*. Other psydrine species that occur near the Queensland/New South Wales border (mostly on Lamington Plateau) are mentioned for completeness. Queensland species of *Meonis* Castelnau, a genus that urgently merits a thorough revision, are mentioned without further commentary.

The tribe Amblytelini is very speciose in eastern Queensland (c. 40 taxa at the present state of knowledge) but is omitted from this paper

because a general revision of that tribe will be printed elsewhere (Baehr, in press a).

More general information about extent, distribution, and phylogeny of the Psydrinae is or will be available from Baehr (1999, in press a). Here I will direct the readers' attention to the use of taxonomic categories higher than genus. I use the term subfamily for the whole psydrine complex, and tribe for such units as Amblytelini, Mecyclothoracini, etc. Other authors rank the tribes as subtribes and the subfamily as a tribe. This is, however, a matter of opinion and is of no serious relevance to the present treatment.

Raphetis and *Sitaphe* were described in Moore's generic revision of the Australian Psydrinae (Moore, 1963) which is still the basis of all work on this group in Australia. In it, Moore described a single species of *Sitaphe* and two species of *Raphetis*, the types of which I have examined. Moore (1984) later described two outstanding species of *Mecyclothorax* from rain forests of North Queensland, and these are reviewed in the present paper.

In tropical Queensland, apart from the tribe Amblytelini, only the three genera that are herein revised occur. Curiously enough, the many mountain tops and tablelands south of Atherton Tableland except for Lamington Plateau and adjacent ranges on the Queensland/New South Wales border, although having been sampled with comparable intensity during the last decade, apparently lack a similarly diverse psydrine fauna. It seems, thus, that except for *Raphetis darlingtoni* Moore at Eungella, west of Mackay, the Psydrinae are almost absent from the many rainforest patches south of the Wet Tropics, and that this absence indicates a real distribution gap.

MATERIAL AND METHODS

Almost all material for this study was collected by Geoff Monteith and his co-workers of the Queensland Museum, Brisbane (QM), and the bulk of the material is in that collection, except for duplicates lodged in the working collection of the author (CBM) in Zoologische Staatssammlung, München. Altogether 542 specimens of *Mecyclothorax* of the *storeyi*-group, 290 specimens of *Sitaphe* and 38 specimens of *Raphetis* were available for this study. In addition, about 80 specimens of southern Queensland species of *Laccocenus*, *Mecyclothorax*, *Trephisa*, *Teraphis* and *Meonis* were noted.

The types of B.P. Moore's species were kindly loaned from the Australian National Insect Collection, Canberra (ANIC). Further abbreviations of collections are: CMC, Collection B.P. Moore, Canberra, in ANIC; DPI, Department of Primary Industries, Mareeba.

Specimens for male genitalia dissection were soaked in a moist jar overnight, then the genitalia were cleaned briefly in hot 4% KOH. The photographs were made using SPOT Advanced for Windows 3.5 and subsequently were worked with Corel Photo Paint 10.

Holotype label data are given in full but for other specimens collectors' names and other terms are abbreviated as follows: DC, D.J. Cook; DY, D.K. Yeates; GM, G.B. Monteith; GT, G.I. Thompson; HJ, H.A. Janetzki; LR, L. Roberts; PB, P. Bouchard; RS, R. Sheridan; SM, S.R. Monteith; Pyr., pyrethrum knockdown; QM Berl., Queensland Museum Berlesate No.; Rf, rainforest; Tbld, Tableland.

Descriptions. Because of similarity in external and genitalic characters within most taxa of *Mecyclothorax*, *Sitaphe*, and *Raphetis*, generally one species of each genus is fully described, then for the other taxa only characters that differ are noted. This is done so as to reduce repetition, but was not applied to species that differ more substantially.

Measurements. 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 of other authors, especially Moore (1963, 1984). Length of pronotum was measured along midline, width of pronotum at widest part, width of base of pronotum at the extreme tips of the basal angles, though in those species of *Sitaphe* that have the lateral margin incurved to the basal angle, width of base was measured immediately in front of the basal angle. In the measurements of *Raphetis* species length of eye includes a small dark coloured ring of ocellae behind the light area. Ratios are somewhat variable in most species, but generally offer good indication of relative shape.

Taxonomic Principles. Interpretation of the taxonomic status of the many highly similar populations is difficult in all genera that occur in the Wet Tropics. For the time being, at least until additional distribution information is available, I have decided to treat those populations that show slight though apparently constant differences as subspecies, when they are allopatric, and as species, when they are obviously sympatric (e.g. in *Sitaphe*). In a couple of taxa the morphological

differences, in either the male genitalia or external structure, are very weak and do not justify description as species. Because several other carabid genera (and also some non-carabid groups) on mountain tops in the Wet Tropics of northeastern Queensland are likewise segregated into many closely related but apparently well distinguished units (be they species or subspecies!) on adjacent mountain ranges (e.g., Darlington, 1961a, 1961b; Baehr, 1995b; Monteith, 1997; Bouchard, 2002), this treatment seems to accommodate the complex situation best. Other non-morphological methods may be useful to interpret the taxonomic status of the different populations. For further comments see 'Discussion'.

Although ranges are included in the keys, range should not be used as a distinguishing character *per se*, even when the ranges of most taxa are apparently restricted and well separated.

Laccocenus Sloane, 1890

Laccocenus Sloane, 1890: 644; Csiki 1929: 484; Moore 1963: 286, Moore et al. 1987: 153.

TYPE SPECIES. *Laccocenus ambiguus* Sloane, 1890.

REMARKS. This is the sole Australian genus of the tribe Nomiini s.str. Until recently monotypic, an additional species has been found in a cave in southeastern New South Wales and is being described at present (Moore, in press).

Laccocenus ambiguus Sloane, 1890

Laccocenus ambiguus Sloane, 1890: 646; Csiki 1929: 484; Moore 1963: 286; Moore et al. 1987: 153

REMARKS. A rather common species living in and under rotten wood or under bark of fallen logs in subtropical to temperate rain forest.

DISTRIBUTION. Northeastern New South Wales (type locality: Dunoon, near Lismore) and at the following high elevation localities (QM specimens) along the Macpherson Range, Queensland: (east to west) Tomewin Range; Repeater Station, Springbrook; Mt Bithongabel and Westcliff Track, Lamington Plateau; Mt Chinghee; Mt Superbus; Bald Mountain, via Emu Vale.

Mecyclothorax Sharp, 1903

Mecyclothorax Sharp, 1903: 243; Csiki 1929: 487; Moore 1963: 286; Moore 1984: 161; Moore et al. 1987: 147.

TYPE SPECIES. *Cyclothorax montivagus* Blackburn, 1878.

REMARKS. A genus of the tribe Mecyclothoracini that also includes *Neonomius* Moore in Australia. *Mecyclothorax* is widely distributed throughout eastern, southern and southwestern Australia, and altogether 16 species were described from Australia. Moore (1984), who published a partial revision of the genus (the *ambiguus*-group) and described two new species from North Queensland, stated that the genus urgently needs revision.

Outside Australia, *Mecyclothorax* is widely distributed in New Guinea, New Caledonia, Borneo, Java, Hawaii, Tahiti, New Zealand, Norfolk Island, Lord Howe Island and several subantarctic islands, e.g. Amsterdam and St. Paul (Baehr 1992, 1995a, 1998, 1999, 2000, in press b, Baehr & Lorenz 1999, Britton 1948, Darlington 1962, 1971, Deuve 1987, Jeannel 1944, Louwerens 1949, Mandl 1969, Moore 1984, 1985, 1992, Moore et al. 1987, Perrault 1978, 1992). In Australia a distinct, probably apotypic, group of tropical species is well separated from the range of the main body of the genus in Australia which is essentially southern.

KEY TO THE QUEENSLAND TAXA OF *MECYCLOTHORAX* SHARP

1. Pronotum almost orbicular, lateral margin shortly excised in front of basal angles, elytra longer, striae deeply punctate. Size >5mm. Central and southeastern Queensland . . . . . *punctipennis* (Macleay)

   Pronotum more or less cordate, lateral margin not excised in front of basal angles, elytra shorter and wider, striae mostly barely punctate. Size <3.5mm 2

2. Clypeus bisetose; base of pronotum coarsely punctate, basal angles without seta, anterior transverse impression deep; aedeagus abnormal, side-inverted and turned to the right side. 3

   Clypeus quadrisetose; base of pronotum not or barely punctate, basal angles usually with setae, anterior transverse impression barely indicated; aedeagus normal, turned to the left side. 4

3. Pronotum not sinuate in front of base; aedeagus larger, apex shorter and wider, internal sac with two small spinose areas in front (Fig. 1A). Bellenden Ker Range, Massey Range . . . . . *storeyi storeyi* Moore

   Pronotum slightly sinuate in front of base; aedeagus smaller, apex longer and narrower, internal sac without spinose areas in front (Fig. 1B). Bartle Frere Range . . . . . *storeyi frerei* subsp. nov.

4. Lateral margins of pronotum not perceptibly sinuate posteriorly; genital ring with very elongate apex (Fig. 1E). 5

   Lateral margins of pronotum perceptibly sinuate posteriorly; genital ring, when known, with shorter apex (Figs 1C-D). 6

5. Spinose fields within apex of orificium of aedeagus smaller, situated at left and right sides (Fig. 1E). Southwestern Part of Atherton Tbld: Mt Fisher, Mt Hugh Nelson, Mt Father Clancy, Malaan Rd nr Palmerston Hwy.. . . . . *inflatus inflatus* sp. nov.

   Spinose fields within apex of orificium of aedeagus very large, situated only at the right side (Fig. 1F). Upper

Boulder Creek at Walter Hill Range . . . . . *inflatus spinifer* subsp. nov.

6. Four inner striae of elytra impressed and coarsely punctate. Isley Hills, ne. Atherton Tbld . . . . . *impressipennis* sp. nov.

Inner striae of elytra at most lightly impressed and finely punctate. 7

7. Apex of aedeagus rounded off, genital ring with longer apex (Fig. 1C); pronotum with comparatively wider base, ratio base/apex >1.20. Carbine Tbld, Thornton Peak, Mt Pieter Botte, north of Thornton Peak . . . . . *lewisensis lewisensis* Moore

Apex of aedeagus sharply spined, genital ring with considerably shorter apex (Fig. 1D); pronotum with comparatively narrower base, ratio base/apex <1.17. Mt Hemmant, Mt Halcyon, Roaring Meg Ck, mountain tops near Cape Tribulation, all north of Thornton Peak . . . . . *lewisensis uncinatus* subsp. nov.

Mecyclothorax punctipennis (Macleay, 1871)

Cyclothorax punctipennis Macleay, 1871: 105.
Mecyclothorax punctipennis, Csiki, 1929: 487; Moore, 1984: 162; Moore et al., 1987: 149.
Cyclothorax obsoletus Blackburn, 1889: 1389.

REMARKS. A common species in southeastern Queensland, where it is found in subtropical rain forest on Lamington Plateau, Main Range, Bunya Mountains, and further north to about Gayndah (the type locality) where it has been recollected recently (QM). One rather recent record is available from Blackdown Tableland further north (QM). There, and at scattered localities in low country, the species also occurs in more open habitats. It lives on the ground, but also on and sometimes even under bark of logs and standing trees. Moore (1984) demonstrated the differences between *M. punctipennis* and the rather similar *M. ambiguus* Erichson, under which name *M. punctipennis* was still noted by Csiki (1929).

DISTRIBUTION. Whole southern Australia from southern half of Western Australia to southern Queensland as far north as Tropic of Capricorn (Moore et al., 1987). Recently recorded also from Tasmania (Baehr, 2000).

Mecyclothorax storeyi Moore, 1984

Mecyclothorax storeyi Moore, 1984: 164; Moore et al., 1987: 149.

Small, conspicuously coloured species living at high altitude in rain forest litter. So far known from Bellenden Ker, Bartle Frere, and Massey Ranges at the eastern margin of Atherton Tableland. As the population living on Mt Bartle Frere shows significant differences in shape and structure of the male aedeagus, it is described as a distinct subspecies.

M. storeyi is peculiar in possessing strikingly abnormal male genitalia, because aedeagus and parameres are side-inverted and moreover, are turned to the right side of the beetle, which is opposite to all other species of *Mecyclothorax* and to Psydrinae in general. During ample dissections of almost 100 species and several hundred specimens of the amblytelines *Amblytelus*, *Dystrichothorax*, and *Epelyx*, I found a similar inversion only twice in single specimens of two species that normally possess normal shaped aedeagi turned to the left side of the body. Moore (1984, fig. 15) recognised this inversion, but confused the parameres, describing the left one as 'small, styloid, setose laterally' and the right one as 'larger, conchoid, setose apically'. Nevertheless the parameres are normal, but the whole male genitalia are inverted which means that the left paramere in situ is the right one morphologically, and *vice versa*.

To clarify the situation, and because the species includes two subspecies that differ in certain characters of the aedeagus, and finally, because the setosity of the parameres is incorrectly figured in the description, the genitalia of both subspecies are (re)described and figured herein.

DIAGNOSIS. Small species, distinguished by the side-inverted aedeagus with straight instead of downcurved apex, bisetose clypeus (as usual for the genus), absence of the posterior pronotal seta, deeply impressed anterior transverse sulcus of pronotum, and rather narrow base of the basally coarsely punctate pronotum.

REMARKS. With respect to several differences between this and the following small, flightless species from North Queensland, *M. storeyi* is a rather isolated species within this group, whereas all following species form a distinct group of very closely related taxa.

Mecyclothorax storeyi storeyi Moore, 1984 (Figs 1A, 2A, 5)

Mecyclothorax storeyi Moore, 1984: 164; Moore et al., 1987: 149.

MATERIAL. HOLOTYPE: ♂, N Qld, Mt Bellenden Ker (summit), from leaf litter, 19.i.1977, B.P. Moore (ANIC). PARATYPES: 35 ex. from same locality (in ANIC, CMC, DPI, and QM).

NEW RECORDS: 6 ♂, 24 ♀, Bellenden Ker, Centre Peak Summit, 10.iv.1979, GM, QM Berl. No. 9 17.16S 145.51E Rf, 1500m Sieved litter (CBM, QM); 1 ♀, same loc., 10.iv.1979 GM, QM Berl. 12 Rf, Stick brushings (QM); 9 ♂, 7 ♀, same loc., 11.iv.1979 GM, QM Berl. Rf, Sieved litter (QM); 15 ♂, 5 ♀, same loc., 11.iv.1979 GM /QM Berl. 14 ,Rf, Sieved litter (QM); 1 ♂, same loc., 11.iv.1979 GM, QM Berl. 15, Rf, Stick brushings (QM); 2 ♀, same

loc., 11.iv.1979 GM, QM Berl. 16, Rf, Stick brushings (QM); 4 ♂, 1 ♀, same loc., 11.iv.1979 GM, QM Berl. 17, Rf, Sieved litter (QM); 1 ♂, 4 ♀, same loc., 28.viii.1991 GM & HJ, QM Berl. No. 852, Rf, 1560m , Sieved litter (QM); 1 ♀, Bellenden Ker, Cable Tower No. 3, 12.iv.1979 GM, QM Berl. 21 17.16S 145.52E Rf, 1000m Sieved litter (QM); 4 ♂, 5 ♀, Bellenden Ker Summit 10.vi.1980 GM, QM Berl. No. 220 17°16'S 145°52'E Rf, 1561m Sieved Litter (QM); 8 ♂#, 4 ♀ , Bellenden Ker Range, NQ Summit TV Stn., 1560m, 17.16S 145.51E, Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 334, Rf Sieved litter (QM); 5 ♂#, 2 ♀ , same loc., Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 335, Rf Sieved litter (QM); 8 ♂#, 5 ♀, same loc., Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 336, Rf Sieved litter (CBM, QM); 8 ♂#, 6 ♀ ,same loc., Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 337 Rf Sieved litter (QM); 7 ♂#, 2 ♀ , same loc., Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 338, Rf Sieved litter (QM); 1 ♀ , same loc. Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 343, Rf Stick & Moss brushings (QM); 11 ♂, 8 ♀ , same loc. Oct 25-31, 1981 Earthwatch/QM, QM Berl. 371, Rf Sieved litter (CBM, QM); 5 ♂m, 3 ♀ , same loc. Oct 25-31, 1981 Earthwatch/QM, QM Berl. 372, Rf Sieved litter (QM); 5 ♂, 3 ♀ , same loc. Oct 25-31, 1981 Earthwatch/QM, QM Berl. 374, Rf *Dracophyllum* litter (QM); 9 ♂, 5 ♀ , same loc. Oct 25-31, 1981Earthwatch/QM, QM Berl. 375, Rf Sieved litter (QM); 2 ♂, 3 ♀ , same loc.Oct 20-23, 1981 Earthwatch/QM, QM Berl. 376, Rf Sieved litter (QM); 8 ♂, 6 ♀, same loc. 28.x.1983 GM, DY & GT, QM Berl. No. 601, Rf, Sieved litter (QM); 11 ♂, 9 ♀, same loc. 28.x.1983 GM, DY & GT, QM Berl. No. 602, Rf, Sieved litter (CBM, QM); 2 ♂, same loc.,16 April 1999 GM & SM, QM Berl. 993, Rf, Moss ex trees & logs (QM); 1 ♂, same loc., 17 April 1997 GM & Russell, QM Berlesate 930 17°16'S 145°52'E Rf, Sieved leaf litter (QM); 6 ♂, 3 ♀, same loc. 1.xii.1998 GM, QM Berl. 977, Sieved litter (QM); 5 ♂, 1 ♀, AUST: Qld: NE: Bellenden Ker, 1994 Crash. 1.xii.1998 GM, QM Berl. 978 17°16'S 145°51'E Rf, 1325m Sieved litter (QM);2 ♀, Mt Bellenden Ker Qld rain forest 12.xii.1976 Walford-Huggins / *Mecyclothorax storeyi* Moore (CBM); 1 ♂, Massey Range, NQ 12km S Gordonvale 2.v.1983 GM, DC, QM Berl. No. 573 17.16S 145.59E Rf, 1300m sieved litter (QM);6 ♂, 3 ♀, NE Qld. Thornton Peak, via Daintree, 20-22.ix.1981 GM & DC, QM Berl. 301 Rf, 1000-1300m Sieved litter & moss (QM) (probably wrong label! See further discussion under *M. lewisensis)*.

DIAGNOSIS. As the species was described from individuals from Bellenden Ker Range, this population is the nominate subspecies. It is distinguished from the southern population living on Mt Bartle Frere, *M. s. frerei* subsp. nov., by considerably larger aedeagus bearing a shorter and wider apex and two small spinose fields at the opening of the internal sac, and by wider base of pronotum the lateral margins of which, on average, are less sinuate near base.

DESCRIPTION. *Measurements.* Length: 2.8-3.25mm; width: 1.35-1.5mm; Ratios. Length/width of 9th antennomere: 1.8-2.0; width/length of pronotum: 1.24-1.30; width base/apex of pronotum: 1.10-1.15; width pronotum/head: 1.51-1.60; length/width of elytra: 1.24-1.27; width elytra/pronotum: 1.36-1.38.

Colour. As in the southern subspecies, colouration of the nominate subspecies is very diverse. Although head and pronotum are always black, colour of the elytra can vary from almost completely black, to completely reddish, to blackish or dark reddish with light margin, or with light humeral area only, or quadrimaculate with light humerus and light apex.

Male genitalia (Fig. 1A). Genital ring short and wide, highly asymmetrically triangular, with characteristic angle laterally, apex narrow and rather elongate. Aedeagus side-inverted, turned to the right side (in beetle), narrow and elongate (in genus), lower surface evenly concave. Apex fairly elongate, wide, straight, evenly rounded off. Internal sac rather complexly folded, with several narrow, sclerotized plates within. On left side of apical end of (inverted) internal sac with two strongly spinose fields. Both parameres comparatively elongate, triangularly convex, with narrow, elongate apex. Left (in situ right!) paramere larger than right (in situ left!), with 1-2 short apical setae. Right (in situ left!) paramere with 2 apical and 5-8 moderately elongate setae along the apical half of lower margin.

Female genitalia (Fig. 2A). Stylomere 1 with one, rarely two elongate ensiform seta(e) at lateral part of ventro-apical margin. Stylomere 2 rather short, with short apex and two large dentiform ventro-lateral ensiform setae of about similar size below middle of lateral margin. Near apex with a large, oblong pit and a short nematiform seta originating from that pit. In middle of dorso-median surface with a large, dentiform, dorso-median ensiform seta. Lateral plate with a densely setose area at median apical margin.

Variation. A rather variable subspecies with respect to relative shape and, in particular, to colour and distinctness of pattern of elytra. Also puncturation of base of pronotum, and degree of puncturation and depth of elytral striae vary to some extent.

DISTRIBUTION (Fig. 5). Bellenden Ker and Massey Ranges at the eastern margin of Atherton Tableland.

COLLECTING CIRCUMSTANCES. Generally collected by Berlese extraction or by sieving of

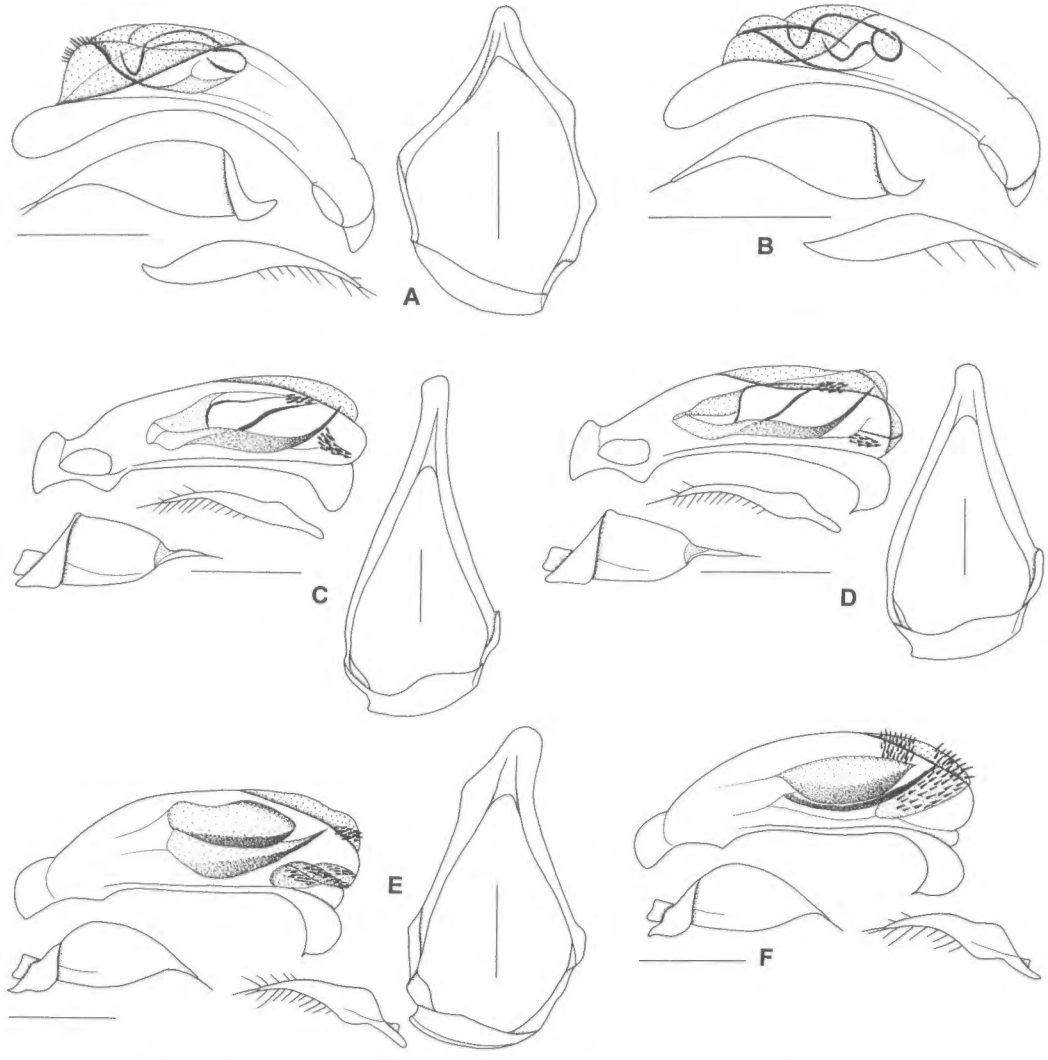

FIG. 1. Male genitalia of *Mecyclothorax* spp. A, *M. storeyi storeyi* Moore, aedeagus, parameres, and genital ring; B, *M. storeyi frerei* subsp. nov., aedeagus and parameres; C, *M. lewisensis lewisensis* Moore, aedeagus, parameres, and genital ring; D, *M. lewisensis uncinatus* subsp. nov., aedeagus, parameres, and genital ring; E, *M. inflatus inflatus* sp. nov., aedeagus, parameres and genital ring; F, *M. inflatus spinifer* subsp. nov., aedeagus and parameres. Scales: 0.25mm.

ground litter from upland rain forest. A few were collected by 'stick brushings' and in pitfall traps. Most specimens are from the absolute summits of the respective ranges.

Mecyclothorax storeyi frerei subsp. nov.
(Figs 1B, 3A-B, 4A, 5)

ETYMOLOGY. The name refers to the type locality, Mt Bartle Frere, Queensland's highest peak.

MATERIAL. HOLOTYPE: ♂, QMT21216, NE Qld, Mt Bartle-Frere, summit creek, 24.ix.1981 G. Monteith & D. Cook, QM Berl. 304 Rf, 1500m Sieved litter (QM). PARATYPES: 2 ♂, 3 ♀, same data (CBM, QM); 9 ♂, 14 ♀, Mt Bartle Frere, N Qld. 0.5km N of Sth Peak 6-8 Nov. 1981 Earthwatch/QM, QM Berl. 357 17.24S 145.49E Rf Sieved litter (CBM, QM); 10 ♂, 6 ♀, Mt Bartle Frere, N Qld. NW/Centre Peak ridge 7-8.x.1981, 1400-1500m Earthwatch/QM, QM Berl. 358 17.23S 145.48E Rf Sieved litter (CBM, QM); 6 ♂, 10 ♀, Mt Bartle Frere, N Qld. Sth Peak Summit, 1620m 6-8 Nov. 1981 Earthwatch/QM, QM

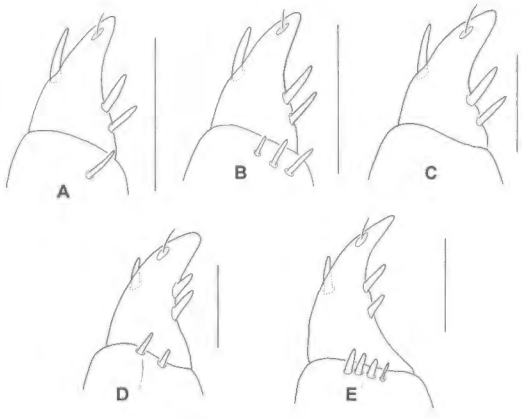

FIG. 2. Stylomere 2 and apex of stylomere 1. A, *Mecyclothorax storeyi storeyi*; B, *M. lewisensis lewisensis*; C, *Sitaphe rotundata* Moore; D, *Raphetis curta* sp. nov.; E, *R. gracilis gracilis* Moore. Scales: 0.1mm.

Berl. 354 17.24S 145.49E Sieved litter (CBM, QM); 3 ♂, same loc. 6-8 Nov. 1981 Earthwatch/QM, QM Berl. 359, Sieved litter (QM).

DIAGNOSIS. This subspecies is distinguished from the nominate subspecies by considerably smaller aedeagus bearing a longer and narrower apex and lacking the spinose fields at the opening of the internal sac, and by narrower base of pronotum, the lateral margins of which are more distinctly sinuate towards base.

DESCRIPTION. *Measurements.* Length: 2.65-3.15mm; width: 1.2-1.45mm; Ratios. Length/width of 9th antennomere: 1.9-2.1; width/length of pronotum: 1.29-1.32; width base/apex of pronotum: 1.07-1.10; width pronotum/head: 1.43-1.50; length/width of elytra: 1.25-1.29; width elytra/pronotum: 1.33-1.34.

Colour (Fig. 4A). Black, though colouration of elytra as variable as in nominate subspecies: uniformly black, or reddish, of with light lateral margin, or more or less conspicuously quadrimaculate.

Head. As in nominate subspecies with clypeus in middle remarkably convex, frontal furrows deep, curved, prolonged onto clypeus, eyes convex, laterally produced, with large orbits of c. 1/3 of length of eye, with eyes separated from frons and vertex by very deep sulcus. Surface absolutely smooth.

Pronotum (Fig. 3A). As in nominate subspecies, though anteriorly even wider and remarkably convex, base relatively narrower and perceptibly sinuate in front of the obtuse basal angles. Base coarsely punctate and basal angle without basal lateral seta, as in nominate subspecies.

Elytra (Fig. 3B). As in nominate subspecies. Scutellar stria always lacking, sutural stria deeply impressed and distinctly punctate, outer striae far less impressed, commonly only punctate.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 1B). As in nominate subspecies, though aedeagus smaller, with longer apex, on lower surface slightly less curved, and without the spinose fields at apex of the (inverted) internal sac. Right (in situ left!) paramere with only 4-5 setae on lower margin.

Female genitalia. As in nominate subspecies.

Variation. Little variation noted, except for colouration of elytra, and depth of outer elytral striae.

DISTRIBUTION (Fig. 5). Mt Bartle Frere, on the eastern fringe of Atherton Tableland.

COLLECTING CIRCUMSTANCES. Most specimens sampled by 'sieving litter' in montane rainforest. This subspecies was collected only on the summit plateau, above 1500m.

Mecyclothorax lewisensis Moore, 1984

Mecyclothorax lewisensis Moore, 1984: 165; Moore et al. 1987: 148.

REMARKS. Small, conspicuously coloured species living at high altitude in rain forest litter. So far known from Mt Lewis and certain localities at the southern fringe of Carbine Tableland, also from Thornton Peak and Mt Pieter Botte north of Daintree River. As the northernmost population living on Mt Hemmant, Mt Halcyon, and Mt Sorrow near Cape Tribulation shows significant differences in shape of the male aedeagus, this population is described as a distinct subspecies.

In contrast to *M.* storeyi, *M. lewisensis* has normally shaped and directed male genitalia, that, however, show rather apomorphic features in the apex of the aedeagus and the left paramere.

There is some confusion as to presence or absence of the basal prothoracic seta. Moore (1984: 165-166) stated that 10 specimens he examined from Thornton Peak lack this seta, which is unusual and opposite to all other specimens that I have examined. Through courtesy of G. Monteith I had the opportunity to see all QM material including the 10 mentioned

specimens from Thornton Peak. Thereby it appeared that only one specimen belongs to *M. lewisensis* which lacks the basal prothoracic seta though not the puncture, whereas the nine other specimens belong to *M. storeyi*. Apparently, some confusion of labelling has occurred, because it is extremely improbable that *M. storeyi* should occur on Thornton Peak. As a conclusion, Moore's (1984) statement that *M. lewisensis* is highly variable in this character does not apply.

Because *M. lewisensis* includes two subspecies that differ in certain characters of the aedeagus, and moreover, because structures of the internal sac are omitted and the setosity of the parameres is incorrectly figured in the description (Moore, 1984, fig. 16), the genitalia of both subspecies are (re)described and figured herein.

DIAGNOSIS. Small, with cordate prothorax that bears sharply angulate basal angles; clypeus quadrisetose (as in all following species): distinguished by the apically very elongate male genital ring. Further distinguished from *M. storeyi* Moore by not side-inverted aedeagus and the basal pronotal seta; from *M. impressipennis* sp. nov. by narrower, less quadrate elytra with far less deeply punctate inner striae and by narrower base of pronotum; and from *M. inflatus* sp. nov. by narrower base of pronotum bearing angulate basal angles, and by less spinose apex of internal sac of aedeagus, longer right paramere, and presence of a membranous area near apex of left paramere.

Mecyclothorax lewisensis lewisensis Moore (Figs 1C, 2B, 6)

Mecyclothorax lewisensis Moore, 1984: 165; Moore et al., 1987: 148.

MATERIAL. HOLOTYPE: ♂, N Qld, Mt Lewis, 16.i.1975, B.P. Moore (ANIC). PARATYPES: 23 ex. from same locality (in ANIC, CMC, and QM).

NEW RECORDS. 1 ♂, 2 ♀, Australien, Qld. Mt Lewis, 1000m 6.1.1982 M. Baehr/*Mecyclothorax lewisensis* Moore (CBM); 7 ♂, 4 ♀, Mt Lewis, road end 18.xi.1997 GM, QM Berl. 950, 16°30'S 145°15'E, Rf, 1120m Sieved litter (CBM, QM); 1 ♂, 2 ♀, Mt Lewis Rd 29km from Hwy 29.xi.1997 DC, QM Berl. 964 16°31'S 145°16'E, Rf, 1210m Leaf litter (QM); 3 ♀, 2.5km N Mt Lewis via Julatten 3.xi.1983 DY & GT, QM Berl. No. 610 16.34S 145.16E Rf, 1040m Sieved litter (QM); 2 ♂, 1 ♀, same loc., 3.xi.1983 DY & GT, QM Berl. No. 611, Rf, 1040m Sieved litter (QM); 2 ♂, same loc., 3.xi.1983 DY GT, QM Berl. No. 612, Rf, 1040m Sieved litter (QM); 2 ♂, 7.5km N Mt Lewis, via Julatten, 8.ix.1981 GM & DC, QM Berl. 279 Rf, 1200m Sieved litter (QM); 1 ♂, 2 ♀ 5.5km N Mt Lewis, via Julatten, 8.ix.1981 GM & DC, QM Berl. 276 Rf, 1100m Sieved litter (QM); 1 ♂, same loc., 8.ix.1981 GM & DC, QM Berl. 275 Rf, Sieved litter (QM); 3 ♂, 1 ♀, Mt Lewis, 18km N 23.xi.1998 GM, QM Berl. 975 16°30'S 145°16'E, Rf, 1300m Moss and litter (QM); 5 ♂, 5 ♀, Mt Demi, 7km SW Mossman 29.x.1983 DY GT, QM Berl. No. 604 16.30S 145.19E Rf 1100m Sieved litter (CBM, QM); 1 ♀, same loc., 29.x.1983 DY GT, QM Berl. No. 603, Rf, Sieved litter (QM); 9 ♂, 3 ♀, Hilltop, 5.5.km N Mt Lewis, 13.ix.1981 GM & DC, QM Berl. 297 Rf, 1200m Sieved litter (CBM, QM); 13 ♂, 5 ♀, same loc.,13.ix.1981 GM & DC, QM Berl. 297 Rf, 1200m Sieved litter (CBM, QM); 2 ♀, The Bluff, 11km W of Mossman 29 April 1983 GM, DY, QM Berl. No. 551 16.27S 145.16E Rf, 1050m litter (QM); 1 ♂, 2 ♀, same loc., 29 April 1983 GM, DY, QM Berl. No. 554, Rf, 900-1000m litter (QM); 1 ♀, same loc.29 April 1983 GM, DY, QM Berl. No. 555, Rf, 900-1000m litter (QM); 1 ♀, same loc., 29 April 1983

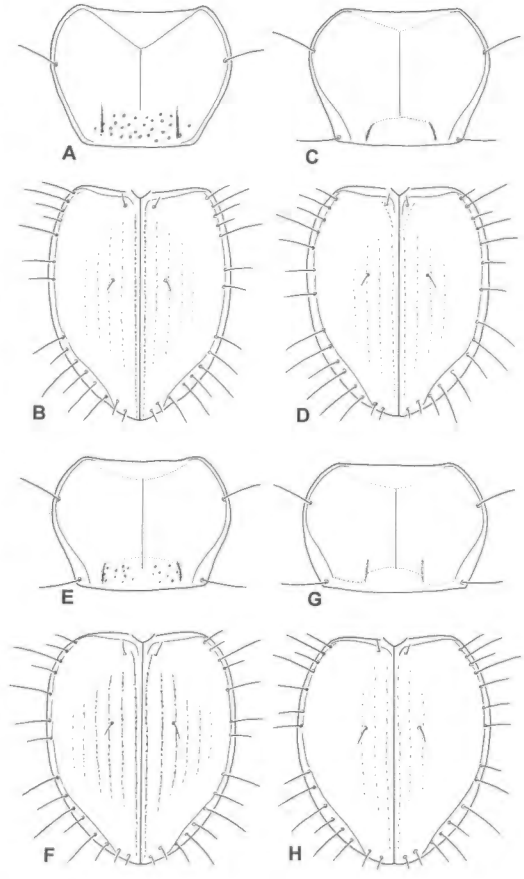

FIG. 3. Pronota and elytra of *Mecyclothorax* spp. A, B, *M. storeyi frerei* subsp. nov.; C, D, *M. lewisensis uncinatus* subsp. nov.; E, F, *M. impressipennis* sp. nov.; G, *M. inflatus spinifer* subsp. nov.; H, *M. inflatus inflatus* sp. nov.

GM, DY, QM Berl. No. 556, Rf, 900-1000m litter (QM); 2 ♂, 1 ♀, same loc., 2.xi.1983 GM, DY & GT, QM Berl. No. 609, Rf, 1000m litter (QM); 1 ♀, Carbine Tbld, N Qld Mossman Bluff Camp, 30.xi.1990, 1000m GM & HJ Pitfall Traps (QM); 6 ♂, 3 ♀, Devils Thumb area 10km NW Mossman 9.x.1982 GM, DY & GT, QM Berl. No. 456 16.34S 145.17E Rf 1000-1180m Sieved litter (QM); 2 ♂, 6 ♀, same loc. 9.x.1982 GM, DY & GT, QM Berl. No. 457, Rf 1150m Sieved litter (QM); 2 ♂, 5 ♀, same loc., 9.x.1982 GM, DY & GT, QM Berl. No. 461, Rf, Sieved litter (QM); 1 ♂, 1 ♀, same loc., 10.x.1982 GM, DY & GT, QM Berl. No. 459, Rf 1180m Sieved litter (QM); 7 ♂, 7 ♀, same loc., 9-10.x.1982 GM, DY & GT, QM Berl. No. 455, Rf 1000-1180m Sieved litter (CBM, QM); 2 ♂, same loc., 9.x.1982 GM, DY & GT, QM Berl. No. 455, Rf, 1000-1180m Sieved litter/ *Mecyclothorax lewisensis* Moore Det. GM 1989 (CBM); 1 ♀, Devil's Thumb - Pauls Luck, 12km WNW Mossman, NQ 27.xii.1989 - 15.i.1990 ANZSES Expedition Site 12, 1300m, pitfall (QM); 9 ♂, 9 ♀, Upper Whyanbeel Creek 5.ix.1992 GM, QM Berl. No. 859 16°23' 145°17', 1150m Rf, litter (QM); 1 ♂, 7km N Mt Spurgeon (Camp 2) 17-19.x.1991. 1200-1250m 16°22'S 145°13'E GM, DC & LR Pitfall Traps (QM); 6 ♂, 2 ♀, same loc., GM & HJ, QM Berl. No. 857 Rf. 1250m Sieved litter (CBM, QM); 4 ♂, 1 ♀ , 4km NNE Mt Spurgeon 15.x.1991 GM & HJ, QM Berl. No. 854 16°24'S 145°13'E Rf. 1250m Sieved litter (QM); 1 ♀, 3.5km NNE Mt Spurgeon 15-20.x.1991, 1350m 16°24'S 145°13'E GM, HJ, DC & LR. PITFALLS (QM); 1 ♂, Stewart Ck, 4km NNE Mt Spurgeon (Camp 1), 1250-1300m 16°24'S 145°13'E 15-20.x.1991. PITFALLS GM, DC & LR (QM); 1 ♂, 2km SE Mt Spurgeon via Mt Carbine, N Qld. 20.xii.88-4.i.1989 GM, GT & ANZSES 1100m, RF, pitfall (QM); 1 ♂, Thornton Peak, via Daintree, 20-22.ix.1981 GM & DC, QM Berl. 301 Rf, 1000-1300m Sieved litter & moss (QM); 3 ♂, 5 ♀ , Thornton Peak summit, via Daintree 24-27.ix.1984 GM & SM, QM Berl. 662 Rf, 1100-1300m Sieved litter & moss (CBM, QM); 3 ♂, Granite Outcrops 0.5km E. Mt Pieter Botte 5.x.1982 GM, DY & GT, QM Berlesate No. 450 16.05S 145.23E Rf, 780m Sieved litter (CBM, QM).

DIAGNOSIS. As the species was described from individuals from Mt Lewis, the population showing similar genitalic morphology is the nominate subspecies. It is distinguished from the northern subspecies *M. l. uncinatus* subsp. nov. by evenly rounded apex of aedeagus, generally narrower pronotum with wider base, and, on average, longer elytra.

DESCRIPTION. *Measurements.* Length: 2.8-3.25mm; width: 1.35-1.5mm; Ratios. Length/width of 9th antennomere: 1.65-1.8; width/length of pronotum: 1.32-1.36; width base/apex of pronotum: 1.21-1.25; width pronotum/head: 1.48-1.54; length/width of elytra: 1.22-1.27; width elytra/pronotum: 1.37-1.42.

Colour. Rather variable, blackish to more or less dark piceous, elytra commonly lighter, reddish-piceous to reddish, more or less inconspicuously quadrimaculate, though apical spots always present and rather distinct, invariably somewhat oblique.

Pronotum. Contrary to the description (Moore 1984, p. 165) all examined specimens bear the posterior lateral seta, including all specimens from Thornton Peak. Most probably Moore included in this species by error a wrongly labelled sample of *M. storeyi* that, unfortunately, also included a single specimen of *M. lewisensis* with setae broken on both sides (series examined by me).

Male genitalia (Fig. 1C). Genital ring elongate, triangular, slightly asymmetric, apex narrow and very elongate. Aedeagus normal, turned to the left side (in beetle), rather short and compact (in genus), lower surface almost straight, but suddenly curved down in front of apex. Apex short and wide, obtusely triangular, suddenly turned down. Internal sac rather complexly folded, with two narrow elongate spine-shaped sclerotized plates within. On left side and at roof of (inverted) internal sac with a strongly spinose field each. Parameres very dissimilar, left comparatively stout, with spine-like, thin apex and small membranous area between basal part and apex, with a single short apical seta. Right paramere narrow and elongate, with tapering apex, with 1 apical seta, c. 10 rather elongate setae on lower margin, and 2-3 shorter setae on apical third of upper margin.

Female genitalia (Fig. 2B). Stylomere 1 with 2-3 elongate ensiform setae at lateral part of ventro-apical margin. Stylomere 2 rather short, with short apex and 2 large dentiform ventro-lateral ensiform setae of about similar size below middle of lateral margin. Near apex with a large, oblong pit and a short nematiform seta originating from that pit. In middle of dorso-median surface with a large, dentiform, dorso-median ensiform seta. Lateral plate with a densely setose area at median apical margin.

Variation. A rather variable subspecies with respect to relative shape of pronotum and elytra, colour and distinctness of colour pattern, and depth and degree of puncturation of elytra. Especially the specimens from Mt Spurgeon in western part of Carbine Tableland tend to have rather well impressed and coarsely punctate elytra, though this is not regarded as more than a local variation. All examined specimens from Mt Spurgeon and Thornton Peak possess the

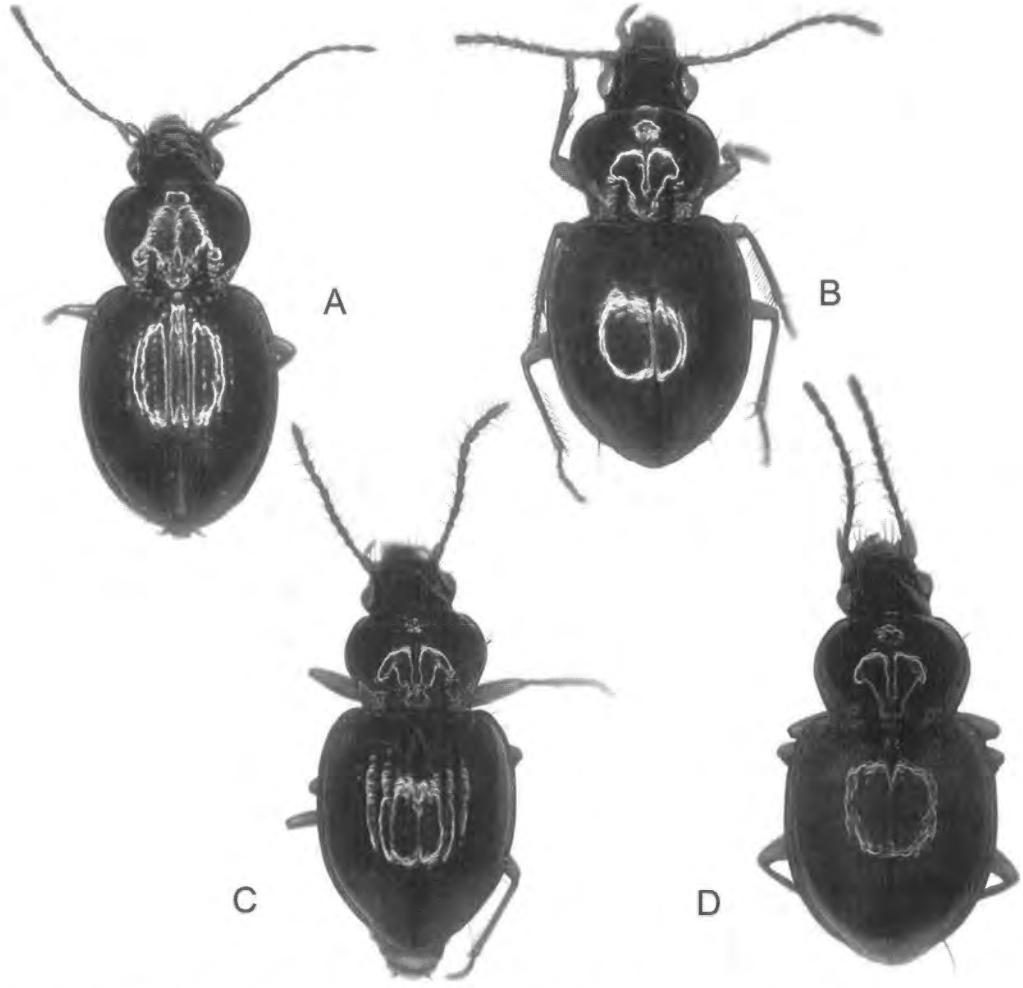

FIG. 4. Habitus of *Mecyclothorax*. A, *M. storeyi frerei* subsp. nov.; B, *M. lewisensis uncinatus* subsp. nov.; C, *M. impressipennis* sp. nov.; D, *M. inflatus inflatus* sp. nov. Lengths: 3.0mm; 2.95mm; 3.2mm; 3.05mm.

scutellar pore and seta, whereas these are apparently absent in all other populations.

DISTRIBUTION (Fig. 6). Carbine Tableland north of Mossman (Mt Lewis, Mt Demi, Mossman Bluff, Devils Thumb, Mt Spurgeon), and Thornton Peak and Mt Pieter Botte, both north of Daintree River, North Queensland.

COLLECTING CIRCUMSTANCES. Most were collected from rain forest leaf litter by Berlese extraction, with a few from ground pitfall traps. These are clearly ground dwellers invariably occurring on the highest peaks of mountains and tablelands and not descending below about 750m.

Mecyclothorax lewisensis uncinatus subsp. nov.
(Figs 1D, 3C-D, 4B, 6)

ETYMOLOGY. The name refers to the sharply hooked apex of aedeagus.

MATERIAL. HOLOTYPE: ♂, QMT21587, AUST: NE Qld, Mt Halcyon 24 Nov 1993 G. Monteith & H. Janetzki, QM BERLESATE No. 864 16°03'S 145°25'E Rf, 870m Leaf litter (QM). PARATYPES: 2 ♂, 2 ♀, same data (CBM, QM); 3 ♂, 4 ♀, Mt Hemmant 27.xi.1993 GM & HJ, QM Berl. No. 865 16°07'S 145°25'E Rf, 1050m Sieved leaf litter & moss (CBM, QM); 1 ♂, Roaring Meg Ck 6km W Cape Tribulation 5.x.1982 GM, DY & GT, QM Berl. No. 453 16.05S 145.24E Rf, 710m Sieved litter (QM); 1 ♂, 4.5-5km W of Cape Tribulation (Top Camp)

1.x.1982 GM, DY & GT, QM Berl. No. 442 16.05S 145.26E Rf, 760-780m Sieved litter (QM).

DIAGNOSIS. Distinguished from the nominate subspecies by the hook-shaped apical part of aedeagus bearing a sharply spined apex, considerably shorter apex of male genital ring, generally wider pronotum with narrower base, and, on average, shorter elytra.

DESCRIPTION. *Measurements.* Length: 2.9-3.1mm; width: 1.35-1.45mm; Ratios. Length/width of 9th antennomere: 1.6-1.8; width/length of pronotum: 1.34-1.41; width base/apex of pronotum: 1.14-1.17; width pronotum/head: 1.45-1.54; length/width of elytra: 1.19-1.24; width elytra/pronotum: 1.33-1.37.

Colour (Fig. 4B). As in nominate subspecies, maculate pattern in all examined specimens distinct.

Head. As in nominate subspecies with remarkably protruding eyes and small orbits.

Pronotum (Fig. 3C). As in nominate subspecies, though at the average slightly wider in anterior half and with relatively narrower base. Posterior lateral setae always present.

Elytra (Fig. 3D). As in nominate subspecies, though at the average slightly shorter. In all examined specimens all striae, including sutural stria, barely impressed and rather finely punctate. Contrary to most populations of the nominate subspecies, except for those occurring on Mt Spurgeon and Thornton Peak, sutural pore and seta always present.

Lower surface and legs. As in nominate subspecies.

Male genitalia (Fig. 1D). Generally similar to those of nominate subspecies, though apical part of genital ring considerably shorter and apex of aedeagus more curved downwards and with acute spine at end.

Female genitalia. As in nominate subspecies.

Variation. Little variation noted, except for slight differences in depth of puncturation of elytral striae.

DISTRIBUTION (Fig. 6). Mt Hemmant, Mt Halcyon and Roaring Meg Creek, north of Thornton Peak, North Queensland.

COLLECTING CIRCUMSTANCES. All specimens collected by sieving leaf litter and moss in montane rainforest. Therefore, this subspecies apparently lives in litter at the ground and in moss near the bases of trees. Collections were made between 710m and 1050m, mostly at the tops of the respective mountains.

Mecyclothorax impressipennis sp. nov.
(Figs 3E-F, 4C, 5)

ETYMOLOGY. The name refers to the deeply impressed four inner striae.

MATERIAL. HOLOTYPE: ♀, QMT21421, AUST: NE Qld, Isley Hills 1 Dec 1993 G. Monteith & H. Janetzki, QM Berlesate No 866 17°03'S 145°42'E Rainforest, 1050m Sieved litter & moss (QM). PARATYPE: 1 ♀, same data (CBM).

DIAGNOSIS. Small species with cordate prothorax that bears sharply angulate basal angles, clypeus quadrisetose; distinguished from all other species of this group by the very coarsely punctate, well impressed four to five inner elytral striae. Further distinguished from *M. storeyi* Moore by much wider pronotum with wider base that bears the posterior marginal setae; from *M. lewisensis* Moore by wider, more quadrate elytra with deeply punctate four inner striae and by wider base of pronotum; and from *M. inflatus* sp. nov. by narrower base of pronotum bearing angulate basal angles.

DESCRIPTION. *Measurements.* Length: 3.2mm; width: 1.52-1.55mm; Ratios. Length/width of 9th antennomere: 1.5; width/length of pronotum: 1.35-1.38; width base/apex of pronotum: 1.24-1.27; width pronotum/head: 1.49-1.56; length/width of elytra: 1.19-1.21; width elytra/pronotum: 1.40-1.41.

Colour (Fig. 4C). Very dark piceous to almost black, lateral margins of pronotum and four inconspicuous spots on the elytra reddish. Antennae, palpi and legs light reddish to dark yellowish. Lower surface dark piceous, lateral and terminal margins of abdomen reddish.

Head. Distinctly narrower than pronotum. Eyes but moderately projecting, orbits rather large, c. 1/3 of length of eye. Eyes separated from frons by a narrow furrow. Frontal furrows elongate, deep, evenly curved, almost attaining position of posterior supraorbital seta. Clypeal suture deep, clypeus quadrisetose, punctures large and deep. Labrum anteriorly straight, six-setose. Mandibles of moderate size, seta in outer scrobe elongate. Mentum with wide, obtuse, triangular tooth. Two mental setae and four gular setae very elongate. Glossa rather narrow, bisetose, paraglossae membranous, by far surpassing glossa. Lacinia elongate, sparsely spinose at inner margin. Terminal palpomeres asetose. Antenna

short, median antennomeres c. 1.5 × as long as wide. Posterior supraorbital setae situated shortly behind posterior margin of eye. Upper surface of head absolutely smooth, highly glossy.

Pronotum (Fig. 3E). Rather wide, gently cordate. Apex almost straight, apical angles barely produced. Lateral margins evenly curved, in front of base gently sinuate, base straight. Basal angles angulate, almost rectangular. Marginal sulcus anteriorly narrow, widened towards base. Both, apex and base not margined. Median line fine, not attaining apex nor base. Basal grooves deep, linear. Anterior transversal sulcus barely indicated, basal transverse sulcus shallow. Base with few scattered punctures. Both marginal setae present, the anterior one situated slightly in front of middle, the posterior one at basal angle. Surface absolutely smooth, highly glossy.

Elytra (Fig. 3F). Short and wide, convex, rather quadrate. Humeri wide, evenly rounded, lateral margin anteriorly gently convex. Base completely bordered. Scutellar stria interrupted, scutellar pore and seta present, situated in 1st interval. Four inner striae well impressed, coarsely punctate, striae shortened towards base and apex. Outer striae increasingly superficial, finely punctate. Inner intervals considerably convex. Dorsal puncture conspicuous, at inner margin of 3rd interval, situated slightly in front of middle. Marginal series consisting of 7-8 anterior and 6 posterior setae that are widely separated in middle. At end of 3rd and 5th intervals with a short seta each. Intervals absolutely smooth, highly glossy.

Lower surface. Metepisternum short, even wider than long. terminal abdominal sternite in male bisetose, in female quadrisetose.

Legs. Fairly elongate. Squamosity of male anterior tarsus unknown.

Male genitalia. Unknown.

Female genitalia. As in *M. l. lewisensis*.

Variation. Only some variation of depth of elytral striae noted.

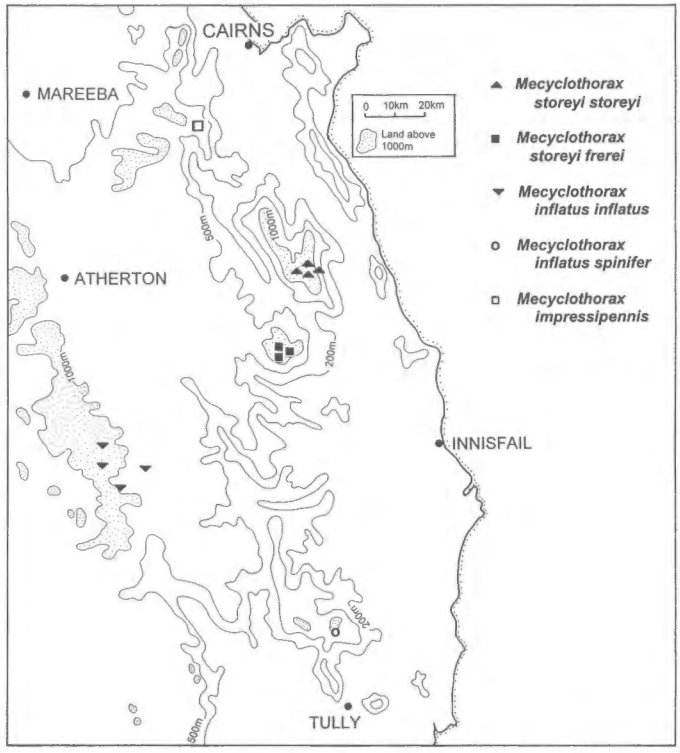

FIG. 5. Distribution of species of *Mecyclothorax* (part).

DISTRIBUTION (Fig. 5). Isley Hills, northwest of Bellenden Ker Range. Known only from type locality.

COLLECTING CIRCUMSTANCES. Collected by pyrethrum knockdown on trees and logs in upland rainforest.

Mecyclothorax inflatus sp. nov.

ETYMOLOGY. The name refers to the very wide elytra.

REMARKS. This new species is distributed through the southern and southwestern parts of Atherton Tableland. In the southernmost part of its range (Walter Hill Range) a population exists that differs by the armature of the internal sac of the male aedeagus and is described as separate subspecies. Some apparent geographic variation also occurs in the nominate subspecies with respect to external morphology (mainly in shape of pronotum). However, at the present this is not regarded as of major taxonomic value and the different populations have not been attributed

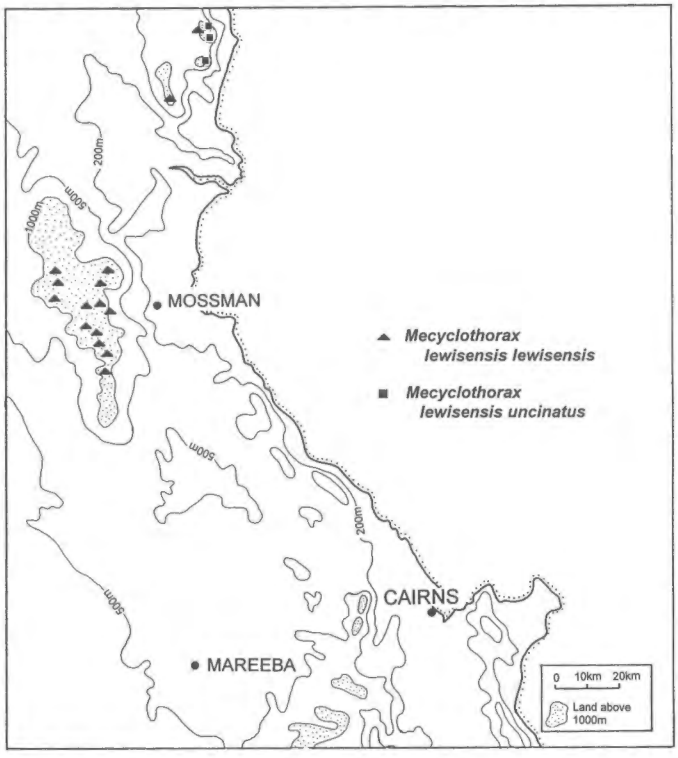

FIG. 6. Distribution of species of *Mecyclothorax* (part).

subspecific rank (see also chapter 'Variation' in the description of the nominate subspecies).

DIAGNOSIS. Small species with wide prothorax that is barely sinuate posteriorly and bears rather obtuse basal angles, clypeus quadrisetose. Further distinguished from *M. storeyi* Moore by much wider pronotum with wider base that bears the posterior marginal setae; from *M. lewisensis* Moore by wider pronotum with wider base, and by shorter genital ring; and from *M. impressipennis* sp. nov. by far less coarsely punctate elytral striae.

Mecyclothorax inflatus inflatus sp. nov.
(Figs 1E, 3H, 4D, 5)

MATERIAL. HOLOTYPE: ♂, QMT21595, Mt Father Clancy, 10km S Millaa Millaa NE Qld 4.v.1983 G. Monteith & D. K. Yeates, QM Berlesate No. 581 17.35S 145.38E Rainforest, 840m Sieved litter (QM). PARATYPES: 1 ♀, same data (QM); 2 ♂, 6 ♀, Mt Father Clancy, 9km S Millaa Millaa. 6.xii.1988 GM GT, QM Berl. 812 145.33'E 17.35'S Rf. 1000m Sieved litter. (CBM, QM); 2 ♂, 2 ♀, AUST: Qld: NE: Mt Hugh Nelson, summit 7.ii.1999 GM & DC, QM Berl. 990 17°31'S 145°33'E Rf 1200m Sieved litter (QM); 1 ♂, 3 ♀, AUST: Qld: NEQ Maalan Rd, 1.5km S Palmerston Hwy 26.xi.1994. GM, QM Berl. No. 879 17°36'S, 145.42'E Rf. 750m Sieved litter (CBM, QM); 1 ♂, 2 ♀, AUST: Qld: NE Mt Fisher, summit 8.ii.1999 GM & DC, QM Berl. 991 17°34'S 145°33'E Rf, 1360m Sieved litter (CBM, QM).

DIAGNOSIS. Distinguished from southern subspecies, *M. inflatus spinifer* subsp. nov., by slightly shorter and wider elytra and less spinose apex of internal sac of aedeagus.

DESCRIPTION. *Measurements.* Length: 2.8- 3.25mm; width: 1.35-1.65mm; Ratios. Length/width of 9th antennomere: 1.6-1.85; width/length of pronotum: 1.38-1.48; width base/apex of pronotum: 1.32-1.36; width pronotum/head: 1.49-1.65; length/width of elytra: 1.16-1.19; width elytra/pronotum: 1.34-1.40.

Colour (Fig. 4D). Head and pronotum dark piceous to almost black, elytra piceous to reddish-piceous. Lateral margins of pronotum and four very inconspicuous spots on the elytra reddish. Antennae, palpi and legs light reddish to dark yellowish. Lower surface dark piceous, lateral and terminal margins of abdomen reddish.

Head. Distinctly narrower than pronotum. Eyes but moderately projecting, orbits rather large, c. 1/3 of length of eye. Eyes separated from frons by a narrow furrow. Frontal furrows elongate, deep, evenly curved, almost attaining position of posterior supraorbital seta. Clypeal suture deep, clypeus quadrisetose, punctures large and deep. Labrum anteriorly straight, six-setose. Mandibles of moderate size, seta in outer scrobe elongate. Mentum with wide, obtuse, triangular tooth. Two mental setae and four gular setae present, very elongate. Glossa rather narrow, bisetose, paraglossae membranous, by far surpassing glossa. Lacinia elongate, sparsely spinose at inner margin. Terminal palpomeres asetose. Antenna short, median antennomeres slightly >1.5 × as long as wide. Posterior supraorbital setae situated shortly behind posterior margin of eye. Upper surface of head absolutely smooth, highly glossy.

Pronotum. Wide, barely or not cordate. Apex almost straight, apical angles barely produced. Lateral margins evenly curved, in front of base either convex or almost straight, not sinuate, base straight. Basal angles either angulate, though wide, or almost obtuse. Marginal sulcus anteriorly narrow, widened towards base. Both, apex and base not margined. Median line fine, not attaining apex nor base. Basal grooves deep, linear. Anterior transversal sulcus barely indicated, basal transverse sulcus shallow. Base with few scattered punctures. Both marginal setae present, the anterior one situated slightly in front of middle, the posterior one at basal angle. Surface absolutely smooth, highly glossy.

Elytra (Fig. 3H). Short and wide, convex, gently oviform. Humeri wide, evenly rounded, lateral margin convex throughout. Base completely bordered. Scutellar stria interrupted or almost wanting, if present, situated in 1st interval, scutellar pore and setae wanting. Inner striae including sutural stria indicated as rows of fine punctures, or even wanting, not at all impressed, outer striae not perceptible. Intervals absolutely depressed. Dorsal puncture inconspicuous, situated slightly in front of middle, at inner margin of 3rd interval when this is present. Marginal series consisting of 7-8 anterior and 6 posterior setae that are widely separated in middle. At end of 3rd and 5th intervals with a short seta each. Intervals absolutely smooth, highly glossy.

Legs. Fairly elongate. Male anterior tarsus slightly widened, asymmetrically squamose on 1st - 3rd tarsomeres.

Male genitalia (Fig. 1E). Genital ring moderately elongate, asymmetrically triangular, apex moderately wide, fairly elongate. Aedeagus normal, turned to the left side (in beetle), rather short and compact (in genus), lower surface almost straight, but suddenly curved down in front of apex. Apex short and wide, suddenly curved down and to the rear, with acute spine at end. Internal sac rather complexly folded, with a narrow elongate spine-shaped sclerotized plate within. On left side of bottom and on right side at roof of (inverted) internal sac with a rather small spinose field each. Parameres fairly dissimilar, left comparatively stout, with rather short, tapering, spine-like apex, with a single short apical seta. Right paramere narrow and elongate, with tapering apex, with 2 apical setae, 8-10 rather elongate setae along lower margin, and 2-5 shorter setae on apical third of upper margin.

Female genitalia. As in *M. l. lewisensis*.

Variation. Some geographical variation of relative shape of pronotum can be noted between the populations recorded from Mt Fisher and Mt Hugh Nelson (both near Millaa Millaa) and those from Mt Father Clancy and Malaan Rd near Palmerston Hwy, further southeast. The examined specimens from Mt Fisher and Mt Hugh Nelson possess large pronota with the lateral margins evenly curved towards the obtuse basal angles, whereas in the available specimens from Mt Father Clancy and Malaan Road the pronotum is less voluminous and has the lateral margin little convex to almost straight near the more angulate basal angles. Further collecting in the area between may clarify the taxonomic situation. As male genitalia do not show any striking differences, for the present these populations are regarded as infrasubspecific units of no taxonomic value. Probably, they are members of a morphological cline. However, for better comparison and possible future distinction, the measurements and ratios of both populations are added below:

Mt Fisher/Mt Hugh Nelson (N = 5): Length: 3.0-3.25mm; width: 1.52-1.65mm; Ratios. Length/width of 9th antennomere: 1.7-1.85; width/length of pronotum: 1.45-1.48; width base/apex of pronotum: 1.29-1.34; width pronotum/head: 1.59-1.65; length/width of elytra: 1.16-1.17; width elytra/pronotum: 1.34-1.36.

Mt Father Clancy/Malaan Rd (N = 5): Length: 2.8-3.1mm; width: 1.35-1.52mm; Ratios. Length/width of 9th antennomere: 1.6-1.7; width/length of pronotum: 1.37-1.44; width base/apex of pronotum: 1.32-1.36; width pronotum/head: 1.49-1.58; length/width of elytra: 1.18-1.19; width elytra/pronotum: 1.35-1.40.

DISTRIBUTION (Fig. 6). Southwestern part of Atherton Tableland: Mt Fisher, Mt Hugh Nelson, Mt Father Clancy, and Malaan Road south of Palmerston Hwy., North Queensland.

COLLECTING CIRCUMSTANCES. Collected by berlese extraction from rainforest leaf litter.

Mecyclothorax inflatus spinifer sp. nov.
(Figs 1F, 3G, 5)

ETYMOLOGY. The name refers to the remarkably large spinose fields at the entrance of the internal sac of the male aedeagus.

MATERIAL. HOLOTYPE: ♂, QMT21599, NE Qld, Upper Boulder Ck via Tully 27.x.1983 Monteith, Yeates & Thompson, QM Berlesate No. 600, 17.50S 145.54E Rf,

TABLE 1. *Mecyclothorax* spp. measurements.

Species	N	body length (mm)	ratio length/ width 9th antennomere	ratio width/ length pronotum	ratio width base/apex pronotum	ratio width pronotum/ head	ratio length/ width elytra	ratio width elytra/ pronotum
M. storeyi storeyi	10	2.8-3.25	1.8-2.0	1.24-1.30	1.10-1.15	1.51-1.60	1.24-1.27	1.36-1.38
M. storeyi frerei	10	2.65-3.15	1.9-2.1	1.29-1.32	1.07-1.10	1.43-1.50	1.25-1.29	1.33-1.34
M. lewisensis lewisensis	10	2.8-3.25	1.65-1.8	1.32-1.36	1.21-1.25	1.48-1.54	1.22-1.27	1.37-1.42
M. lewisensis uncinatus	10	2.9-3.1	1.65-1.8	1.34-1.41	1.14-1.17	1.45-1.54	1.19-1.24	1.33-1.37
M. impressipennis	2	3.2	1.5	1.35-1.38	1.24-1.27	1.49-1.56	1.19-1.21	1.40-1.41
M. inflatus inflatus	10	2.8-3.25	1.6-1.85	1.38-1.48	1.32-1.36	1.49-1.65	1.16-1.19	1.34-1.40
M. inflatus spinifer	10	2.8-3.05	1.7-1.8	1.36-1.40	1.30-1.37	1.53-1.59	1.20-1.23	1.31-1.36

900m Sieved litter (QM). PARATYPES: 3 ♂, 5 ♀, same data (CBM, QM); 1 ♀, same loc., 26.x.1983 GM, DY & GT Pyr. in RF. (QM).

DIAGNOSIS. Distinguished from the northern nominate subspecies by slightly longer and narrower elytra, narrower pronotum at the average, and remarkably spinose apex of internal sac of aedeagus.

DESCRIPTION. *Measurements.* Length: 2.8-3.05mm; width: 1.35-1.48mm; Ratios. Length/ width of 9th antennomere: 1.7-1.8; width/length of pronotum: 1.36-1.40; width base/apex of pronotum: 1.30-1.37; width pronotum/head: 1.53-1.59; length/width of elytra: 1.20-1.23; width elytra/pronotum: 1.31-1.36.

Colour. As in nominate subspecies, though all examined specimens with rather light coloured elytra and extremely faded pattern.

Head. As in nominate subspecies.

Pronotum (Fig. 3G). As in nominate subspecies, though pronotum generally even narrower and lateral margins posteriorly even less convex than in the Mt Father Clancy/Malaan Rd population. Therefore, basal angles angulate and distinct.

Elytra. As in nominate subspecies, though slightly longer and narrower. Scutellar pore and seta lacking. Striation extremely inconspicuous, in some specimens barely recognisable.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 1F). Very similar to those of nominate subspecies, though internal sac at end with two large, remarkably spinose fields, both situated at the right side.

Female genitalia. As in nominate subspecies.

Variation. Very little variation noted.

DISTRIBUTION (Fig. 6). Southernmost Atherton Tableland: Upper Boulder Creek area in Walter Hill Range. Known only from type locality.

COLLECTING CIRCUMSTANCES. Collected by sieving litter and by pyrethrum knockdown in upland rainforest on trees and logs. Probably this subspecies generally lives on the ground, but also in moss at the bases of rainforest trees. So far collected at 900m.

MEASUREMENTS AND RATIOS IN *MECYCLOTHORAX* SHARP

For better comparison of the species the measurements and ratios of all species and subspecies are compiled in Table 1.

REMARKS. The diversity of *Mecyclothorax* in the Wet Tropics of North Queensland is shown to be greater than previously indicated. Certainly, the various taxa of the *storeyi*-group are thoroughly distinct from those species occurring in the southern half of Australia (the *ambiguus*-group), and in part, they are very closely related *inter se*. In view of shape of aedeagus and complex armature of the internal sac in all northern taxa, these probably form a rather apotypic group within the Australian *Mecyclothorax*, but at the same time in external and genitalic morphology they show a certain grade of similarity with the species occurring in New Guinea (Baehr, 1995a, 1998, 2002c) and New Caledonia (Deuve, 1987, Baehr, pers. obs.). So, it would be conceivable that the New Guinean and New Caledonian *Mecyclothorax* (and perhaps also those occurring further north in Java and Borneo) should have been derived from ancestors that were related to the *storeyi*-stock and were coming originally from northern Queensland.

Apart from *M. storeyi* which is unique for its strange, side-inverted aedeagus and generally lack of posterior marginal prothoracic seta, the other three species are still very closely related.

This is demonstrated by the morphology of the aedeagus, the duplication of the clypeal seta, and the shape and structure of pronotum. Even the most distant taxa, *M. lewisensis* and *M. inflatus*, separated by about 100km, are still very closely related.

As with the situation in New Guinea, where in those areas that have been more extensively sampled for litter inhabiting *Mecyclothorax*, many species with rather restricted ranges exist (Baehr, 1995a, 2002c), the Wet Tropics of northern Queensland also harbours a number of taxa — most still closely related — in a restricted region. In several instances, the ranges of different taxa are spatially close. Certainly this rapid turnover of ranges is due to the low vagility of these tiny, flightless, litter inhabiting, montane beetles. Since none have been taken below 650m in North Queensland, and most are from above 1,000m, even rather unimportant creek valleys may act as significant distribution barriers.

A striking example for this range fragmentation is the distribution of populations of *M. lewisensis* in the Thornton Peak area. The more northern form (*M. lewisensis uncinatus*) occurs on a mountain block that is no more than 5km distant from Thornton Peak where the nominate form occurs, and that is only separated by the valleys of two creeks that do not descend below 500m. However, these unimportant valleys apparently are sufficient to act as significant barriers for montane, rain forest living beetles. In the same region, this barrier is corroborated by the occurrence of two different species of blind, litter-inhabiting water beetles of the genus *Terradessus* (Dytiscidae), one on each side of the valley (Brancucci & Monteith, 1996). In *Mecyclothorax* the situation is even more complex. Within the range of the northern population (*M. lewisensis uncinatus*), namely near Mt Pieter Botte, the southern nominate population apparently appears again as demonstrated by the rounded apex of the aedeagus and the very elongate genital ring in males collected on Mt Pieter Botte. This population again occurs in the immediate neighbourhood of the uncinate form on mountains near Cape Tribulation, also separated by only a minor stream valley.

So far, in the North Queensland *Mecyclothorax*, no overlapping of ranges has been detected, contrary to other genera (e.g. in *Sitaphe*). This may be evidence of a rather recent diversification of this group following recent immigration into the northern montane rain forests. The high level of phylogenetic diversification of the species, on the other hand, would suggest a longer history of *Mecyclothorax* in this area. Additional knowledge about distribution may bring more light to this question.

Teraphis Castelnau, 1867

Teraphis Castelnau, 1867: 41; Castelnau, 1868: 127; Sloane, 1898: 470; Csiki, 1929: 485; Moore, 1963: 283; Moore et al., 1987: 151.

Phersita Sloane, 1903: 591; Sloane, 1920: 156; Csiki, 1929: 485; Moore, 1963: 283; Moore et al., 1987: 151.

REMARKS. A genus of Tropopterini. Most species occur in southeastern Australia from southern New South Wales to Tasmania with a single species reaching the Macpherson Range in southern Queensland. Sloane's replacement name *Phersita* was unjustified, as Moore (1987) stated.

Teraphis helmsi (Sloane)

Drimostoma helmsi Sloane, 1890: 647.

Teraphis helmsi, Sloane, 1898: 471; Csiki, 1929: 486; Moore, 1963: 284; Moore et al., 1987: 151.

DISTRIBUTION. The single northern species of this decidedly southern genus occurs in northeastern New South Wales (type locality: Dunoon, near Lismore) and at the following localities (QM specimens) along the Macpherson Range within Queensland (east to west): Upper Tallebudgera Valley; Numinbah Arch; Mt Asplenium; Mt Huntley. It is curious that it has never been taken on the well-collected Lamington Plateau, even though it occurs to the east and west of that area.

Trephisa Moore, 1963

Trephisa Moore, 1963: 282; Moore et al., 1987: 152.

REMARKS. A genus of Tropopterini, described by Moore for a unique, small-eyed, elongate species.

Trephisa parallela Moore

Trephisa parallela Moore, 1963: 282; Moore et al., 1987: 152.

REMARKS. At the time of Moore et al. (1987) the unique species of the genus was still known only from the type locality at Binna Burra on the Lamington Plateau. An additional specimen has been collected recently by G. Monteith at Springbrook Plateau about 10km SE of Binna Burra, which belongs to the same tableland system. The species is apparently endogeous, as all five recorded specimens were collected under deeply embedded rocks.

DISTRIBUTION: Lamington and Springbrook Plateaus, southeastern Queensland.

Sitaphe Moore, 1963

Sitaphe Moore, 1963: 284; Moore et al., 1987: 150.

TYPE SPECIES. *Sitaphe rotundata* Moore, 1963, by monotypy.

DIAGNOSIS. Easily distinguished from all other Australian Tropopterini by the short, oval-shaped form, rather trapezoidal pronotum that is widest at or near the basal angles, and oviform, scarcely striate elytra. Other diagnostic characters may be taken from Moore's (1963) description of the genus.

REMARKS. Highly apotypic, known only from the Wet Tropics. All taxa of this genus live in crevices of logs and dead trees in tropical upland rain forest (G.B.Monteith, pers.comm.), and extend to the summits of the highest peaks in the region.

KEY TO THE TAXA OF THE GENUS *SITAPHE* MOORE

1. Pronotum markedly trapezoidal, at basal angles not at all incurved (Figs 8D, 9B). Bellenden Ker/Bartle Frere Ranges. . . . . *trapezicollis* sp. nov.

   Pronotum less trapezoidal, at base at least slightly incurved (Figs 8A,B,E,G,H,J,K, 9A, 9C) 2

2. Basal angle of pronotum obtuse, without distinct denticle, lateral margin barely incurved, pronotum very wide (ratio width/length >1.60), with wide base (ratio width base/apex >2.0) (Figs 8A, 9A). Eastern and southern fringes of Atherton Tbld: Bellenden Ker/Bartle Frere/Massey Ranges, Malbon Thompson Range, Mt Hypipamee, Mt Fisher, Millaa Millaa Falls, Mt Kooroomool . . . . . *rotundata* Moore

   Basal angle of pronotum with small denticle and more or less deep incurvation in front (Figs 8E,G,H,J,K), **or** basal angle rectangular and lateral margin in front straight or even slightly sinuate (Figs 8B, 9C); pronotum less wide (ratio width/length <1.60), with narrower base (ratio width base/apex <2.0) 3

3. Basal angle of pronotum rectangular and lateral margin in front straight or even slightly sinuate (Figs 8B, 9C), surface of pronotum rather depressed, base in middle remarkably impressed. Bartle Frere Range . . . . . *parvicollis* sp. nov.

   Basal angle of pronotum with small denticle and more or less deep incurvation in front (Figs 8E,G,H,J,K), surface of pronotum rather convex, base in middle less deeply impressed. 4

4. Lateral margin of pronotum near base suddenly incurved, basal angle conspicuously dentiform (Figs 8E,J). . . . 5

   Lateral margin of pronotum near base but slightly incurved, basal angle faintly denticulate (Figs 8G,H,K). 6

5. Pronotum longer and narrower, anteriorly more regularly trapezoidal (Fig. 8J); right paramere less angulate near base, more curved in apical half (Fig. 7E). Cardwell Range . . . . . *hamifera* sp. nov.

   Pronotum shorter and wider, anteriorly less trapezoidal (Fig. 8E); right paramere angulate near base, rather straight in apical half (Fig. 7F). Upper Boulder Creek area in Walter Hill Range . . . . . *incurvicollis* sp. nov.

6. Smaller species, length 4.1-4.7mm **and** elytra short and wide (ratio length/width < 1.15) and aedeagus and parameres short (Fig. 3A). Northeastern part of Atherton Tbld: Lambs Head, Mt Williams, Isley Hills . . . . . *minuta* sp. nov.

   Either larger species, length 4.9-5.6mm and aedeagus and parameres elongate (Fig. 7G); **or** length 4.6-5.3mm and elytra elongate (ratio length/width > 1.18). 7

7. Elytra shorter, laterally more parallel, less oviform (Fig. 8I); aedeagus and parameres elongate (Fig. 7G). Carbine and Windsor Tblds. . . . . *parallelipennis* sp. nov.

   Elytra longer, laterally more convex, oviform (Fig. 8L); aedeagus and parameres much shorter (Fig. 7H). Thornton Peak . . . . . *ovipennis* sp. nov.

Sitaphe rotundata Moore
(Figs 2C, 7A, 8A, 9A,D, 11)

Sitaphe rotundata Moore, 1963: 284; Moore et al. 1987: 150.

MATERIAL. HOLOTYPE: ♂, Mt Bartle Frere W. slope, Q. 3-5000', Dec. 57' Darlingtons/ *Sitaphe* gen. nov. *rotundata* sp. nov. holotype ♂ Det. B.P. Moore '63 (ANIC). PARATYPE: 1 ♀, same data/ *Sitaphe* gen. nov. *rotundata* sp. nov. paratype ♀ Det. B.P. Moore '63 (ANIC).

NEW RECORDS. 1 ♀, Bellenden Ker, 1994 Crash Site. 17°16'S 145°51'E 1.xii.1998 GM. Pyr. trees. 1325m (QM);2 ♀, Bellenden Ker Range, NQ Summit TV Stn., 1560m Oct 25-31, 1981 Earthwatch/QM, QM Berl. 372 17.16S 145.51E Rf Sieved litter (QM); 1 ♂, 1 ♀, same loc., 29 Apr-3 May, 1983 GM, DY (QM); 1 ♀, Bellenden Ker, Centre Peak Summit, 10.iv.1979 GM, QM Berl. N 12 17.16A 145.51E Rf, 1500m Stick brushings (QM); 4 ♀, Bellenden Ker Range, Cable Tower 3, 1054m Oct 17-24, 1981 Earthwatch/QM (QM); 4 ♂, same loc.,17 Oct.-5 Nov. 1981 Earthwatch/QM (CBM, QM); 3 ♂, Mt Bartle Frere, NW/Centre Peak 16 Sept. 1982, 1500m GM & SM (QM); 3 ♂, same loc., 24.ix.1981 GM & DC (QM); 2 ♀, same loc., 7-8.xi.1981, 1400-1500m Earthwatch/Qld Museum (QM); 1 ♀, Mt Bartle Frere, 0.5km N of Sth. Peak, 6-8 Nov.1981, 1500m Earthwatch/QM Pyr. (QM); 3 ♂, 2 ♀, Mt Bartle Frere, N Qld. Sth. Peak Summit, 1620m 6-8 Nov., 1981 Earthwatch/QM (QM); 1 ♀, same loc., 6-8 Nov., 1981 Earthwatch/QM Pyr. (CBM); 4 ♂, 3 ♀ , same loc., 29.xi.1998. GM, DC, PB. (CBM, QM); 3 ♂, Mt Bartle Frere west face, 1000-1400m 7.x.1980 GB & SM (QM); 1 ♂, Mt Bartle Frere, N Qld. Central Ridge, 1500m 27.xii.1989 GM & SM (QM); 7 ♂, 3 ♀, NE. Q: 17°16'S 145°49'E Massey Range, 4km W of Centre Bellenden Ker 9-11.x.1991. 1250m GM, HJ & DC (CBM, QM); 3 ♀, NE. Q: 17°14'S 145°48'E Massey Range, 6km NW of Centre Bellenden Ker 11-12.x.1991. 1150m GM, HJ & DC (QM); 2 ♂, North Bell Peak, 1000m Malbon Thompson Ra., N Qld. 19-22.xi.1990, 800-900m GM & GT (QM);2 ♂, same loc., 900- 1000m, 15-16.ix.1981 GM & DC (QM);1 ♀, same loc., 13 Oct. 1982, 850-1000m GM, DY & GT (QM); 1 ♂, 1 ♀, South Bell Peak Malbon Thompson Ra., N Qld. 20-21.xi.1990, 900m GM & GT Pitfall Traps (QM); 2 ♂, 2

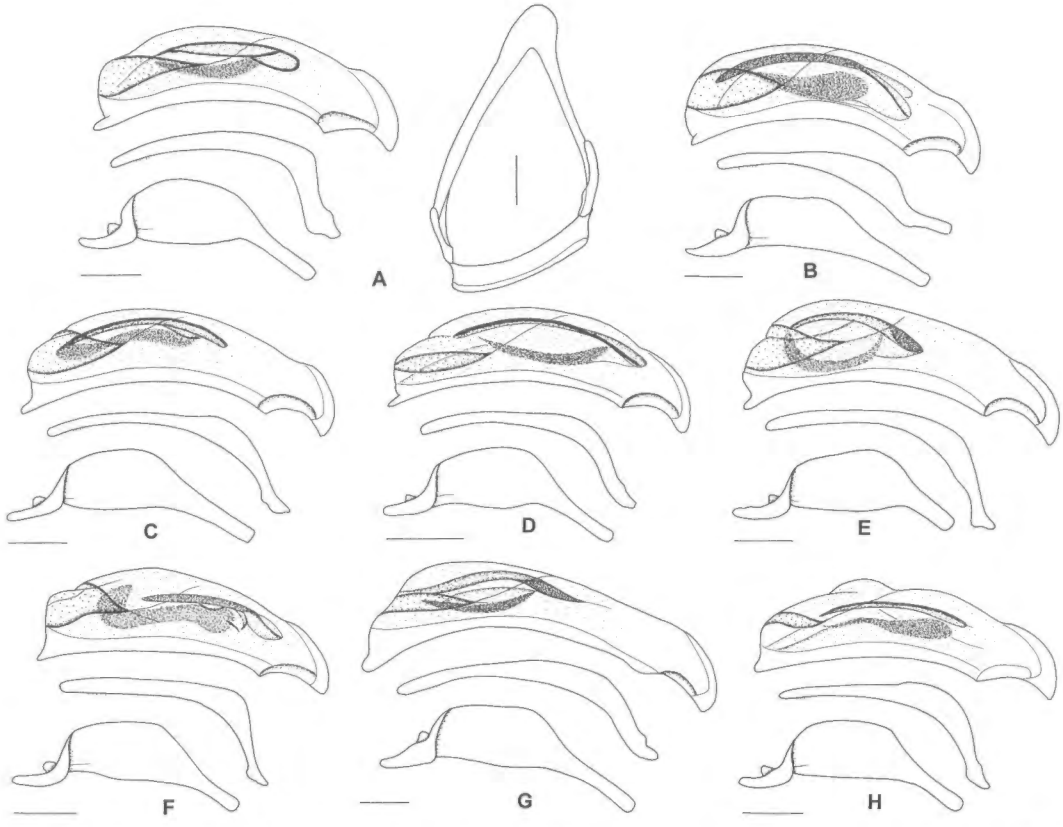

FIG. 7. Male genitalia of *Sitaphe* spp. A, *S. rotundata* Moore, aedeagus, parameres, and genital ring; B, *S. trapezicollis* sp. nov., aedeagus and parameres; C, *S. parvicollis* sp. nov., aedeagus and parameres; D, *S. minuta* sp. nov., aedeagus and parameres; E, *S. hamifera* sp. nov., aedeagus and parameres; F, *S. incurvicollis* sp. nov., aedeagus and parameres; G, *S. parallelipennis* sp. nov., aedeagus and parameres. H, *S. ovipennis* sp. nov., aedeagus and parameres. Scales: 0.5mm.

♀, Mt Hypipamee Nat. Park 5.x.1980 GM, QM Berl. 237 Rf, 950m Stick brushing (CBM, QM); 1 ♂, same loc., 960m 24 July 1982 S. & J. Peck, SBP86, Rf streamside litter (ANIC); 1 ♂, Tower S. of Crater N P 16.v.1995 GM, QM Berl. No. 886 17°27'S, 145°29'E Rf, 1230m Stick brushing (QM); 1 ♂, Millaa Millaa Falls, via Millaa Millaa, N Qld. 12 Aug. 1968. R. Cantrell / *Sitaphe rotundata* Mre Det. B.P. Moore'69 (QM); 1 ♂, 1 ♀, Mt Fisher, 7km SW Millaa Millaa NQ (Whiteing Road) 5.v.1983, 1200m GM, DY (QM); 3 ♂, 2 ♀, Mt Fisher, 1050-1100m 7km SW Millaa Millaa, NQ. 27-29 Apr., 1982 GM, DY & DC (CBM, QM); 1 ♂, Mt Fisher, 1/2km NW 17°33'S 145°33'E 8.ii.1999. GM 1280m. Pyr. -trees & logs, Rf. (QM); 1 ♂, Mt Fisher, summit. 1360m 17°33'S 145°33'E 8.ii.1999. Rf GM. Pyr.-trees & logs. (QM); 1 ♀, Mt Kooroomool, summit. 7km S. 17°54'S 145°41'E 3-4.xii.1998 GM DC PB 1050m, Rf. (QM).

DIAGNOSIS. Distinguished by the very wide pronotum with wide base. Further distinguished from syntopic *S. trapezicollis* sp. nov. by basally incurved lateral margins of pronotum and by the remarkably curved right paramere. Distinguished from species with similarly shaped pronota by having basal angles not sinuate and not at all angulate.

DESCRIPTION. *Measurements.* Length: 4.6-5.8mm; width: 2.40-3.25mm; Ratios. Length/width of 9th antennomere: 2.2-2.5; width/length of pronotum: 1.60-1.67; width base/apex of pronotum: 1.98-2.07; width pronotum/head: 2.02-2.12; length/width of elytra: 1.12-1.15; width elytra/pronotum: 1.25-1.30.

Colour. Overall black as in all other species.

Head. Very similar to that of other species.

Pronotum (Figs 8A, 9A). Very wide, generally trapezoidal, though lateral margins evenly

convex throughout, slightly incurved to basal angles, therefore, widest diameter at a short distance in front of basal angles. However, lateral margins not excised at basal angles which are obtuse, neither angulate, nor dentiform.

Elytra. Of average relative length, in middle rather parallel-sided though still gently convex, elytra not markedly egg-shaped. Usually two internal striae slightly depressed and rather finely punctate, both inner intervals in basal half gently convex. Outer striae decreasingly impressed or even almost absent, barely punctate.

Legs and lower surface. As in the other species.

Male genitalia (Fig. 7A). Genital ring moderately elongate, asymmetrically triangular, apex moderately wide, rather short. Aedeagus, comparatively short (in genus), lower surface gently curved. Apex very short, barely surpassing (inverted) internal sac. Orificium turned to right side. Internal sac moderately folded, with two narrow, sclerotized plates within, the upper one more spine-like, the lower one wider and near apex slightly spinose. Parameres elongate, fairly dissimilar, left comparatively stout, rather convex, with suddenly tapering, rather elongate apex, asetose. Right paramere very narrow and elongate, deeply sinuate on lower side, with tapering apex, asetose, though with a series of minute hairs at lower margin near apex.

Female genitalia (Fig. 2C). Stylomere 1 asetose at apical rim. Stylomere 2 rather short, with short apex and 2 large dentiform ventro-lateral ensiform setae of about similar size below middle of lateral margin. Near apex with a large, oblong pit and a nematiform seta originating from that pit. In middle of dorso-median surface with a large, dentiform, dorso-median ensiform seta. Lateral plate with a densely setose area at median apical margin.

DISTRIBUTION (Fig. 10). Almost the whole of Atherton Tableland and surroundings, North Queensland: Bellenden Ker and Bartle Frere Ranges, Massey Range, Malbon Thompson Range, Mt Hypipamee, Millaa Millaa Falls, Mt Fisher, Mt Kooroomool.

COLLECTING CIRCUMSTANCES. All specimens collected in montane rainforest, generally above 1050 m, with many specimens caught at the summits of the ranges. Mostly sampled by pyrethrum knockdown, but also by 'stick brushing', 'pitfall trapping' and 'on tree'. Although collecting circumstances as labelled give no clear information, this species probably lives rather on the bark or in moss of logs and trunks than in the forest litter.

Sitaphe trapezicollis sp. nov.
(Figs 7B, 8D, 9B,E, 12)

ETYMOLOGY. The name refers to the remarkably trapezoidal shape of pronotum.

MATERIAL. HOLOTYPE: ♂, QMT21669, Bellenden Ker Range, NQ Summit TV Stn., 1560m Oct. 25-31, 1981 Earthwatch/Qld Museum (QM). PARATYPES: 3 ♂, 4 ♀, same data (QM); 7 ♂, 6 ♀, same loc.,17 Oct.-Nov. 5, 1981 17.16S 145.51E Earthwatch/QM Pyr. (CBM, QM); 1 ♂, 1 ♀, same loc.Oct. 17-24, 1981 Earthwatch/QM (QM); 1 ♀, same loc., 30 Nov-2.xii.1998 HAND GM, PB& DC, 1500m 1991 (QM); 1 ♂, 1 ♀, same loc., Nov. 1-7, 1981 Earthwatch/QM, QM Berl. 342 Rf Stick brushings (QM); 1 ♂, same loc., 28.x.1983 GM, DY & GT Pyr. in RF (QM); 5 ♂, 4 ♀, same loc., 29 Apr.-3 May, 1983 GM, DY (CBM, QM); 1 ♀, same loc., 28.x.1983, GM, DY & GT (QM); 4 ♂, 2 ♀ , same loc., 28.x.1983 GM DY & GT Pyrethrum, Rf. (QM); 1 ♂, same loc., 8.x.1991. 1560m GM & HJ Pyrethrum, trees & logs (QM); 4 ♂, 2 ♀, same loc., 8.x.1991. 1560m GM, HJ & DC (QM);1 ♀, Mt Bellenden Ker, Centre Peak Summit NE Qld 10-12.iv.1979 1500m GM (QM); 2 ♂, NEQ: 17°16'S 145°51'E Bellenden Ker summit 30 Nov-2.xii.1998 HAND GM, PB & DC, 1500m 1991 (QM);7 ♂, 5 ♀, Mt Bartle Frere, N Qld. Sth. Peak Summit, 1620m 6-8 Nov., 1981 Earthwatch/QM Pyr. (CBM, QM);5 ♂, 4 ♀ , same loc., 29.xi.1998. GM. Pyrethrum, trees/logs, 1620m (CBM, QM).5 ♂, 3 ♀, same loc., 29.xi.1998, GM, DC &PB. (CBM, QM); 2 ♂, 2 ♀, Mt Bartle Frere, NW/Centre Peak ridge, 7-8 xi. 1981, 1400-1500m Earthwatch/Qld Mus. (QM); 4 ♂, 2 ♀, same loc.,16 Sept. 1982, 1500m GM & SM (QM); 2 ♂, Mt Bartle Frere, NQ 0.5km N of Sth. Peak, 6-8 Nov. 1981, 1500m Earthwatch/QM Pyr. (QM); 1 ♂, 1 ♀, 17°24'S 145°49'E Bartle Frere, Top camp 1500m, 29.xi.1998 GM, Pyr. trees, R.F.(QM).

DIAGNOSIS. Easily distinguished by the strongly trapezoid prothorax that is not at all incurved at basal angle.

DESCRIPTION. *Measurements*. Length: 4.9-6.2mm; width: 2.70-3.45mm; Ratios. Length/width of 9th antennomere: 2.25-2.5; width/length of pronotum: 1.49-1.53; width base/apex of pronotum: 2.02-2.07; width pronotum/head: 2.03-2.11; length/width of elytra: 1.12-1.13; width elytra/pronotum: 1.29-1.34.

Colour. Black, elytra in some specimens very dark piceous. Labrum and mandibles dark reddish, palpi and antennae reddish. Femora and tarsi reddish, tibiae reddish-piceous. Lower surface of anterior body dark piceous, abdomen reddish-piceous.

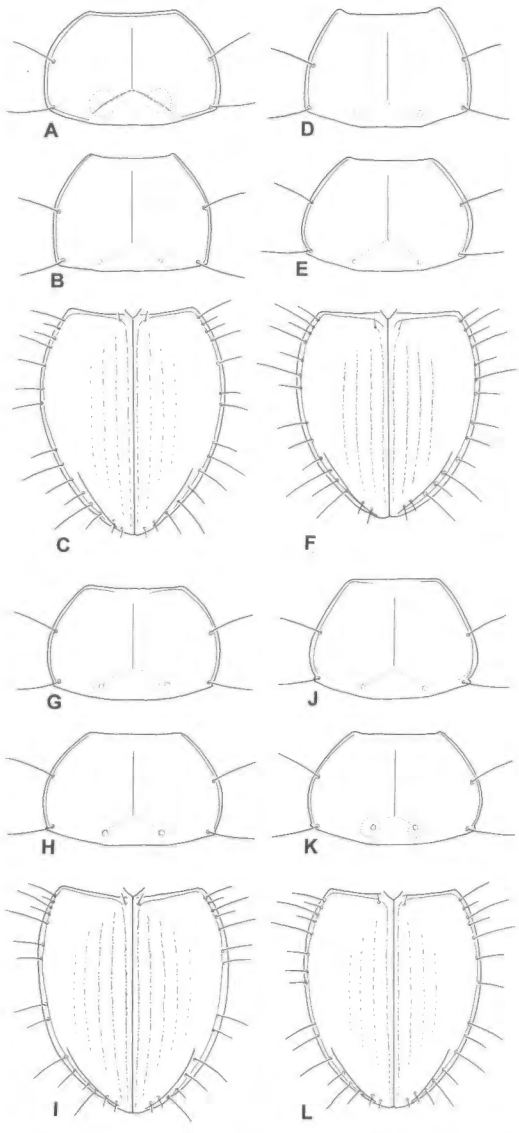

FIG. 8. Pronota and elytra of *Sitaphe* spp. A, *S. rotundata* Moore; B, C, *S. parvicollis* sp. nov.; D, *S. trapezicollis* sp. nov.; E, F, *S. incurvicollis* sp. nov.; G. *S. minuta* sp. nov.; H, I, *S. parallelipennis* sp. nov.; J, *S. hamifera* sp. nov.; K, L, *S. ovipennis* sp. nov.

Head. Half as wide as pronotum. Eyes of moderate size, little protruding, posteriorly enclosed by the orbits that are about 1/3 of length of eyes. Eyes separated from frons by a narrow, straight furrow. Frons with two elongate, curved furrows medially of eyes that are prolonged to clypeal suture. Neck separated from frons by a shallow transverse furrow. Anterior supraorbital seta situated close to eye slightly in front of middle of eye, posterior seta situated at or just behind posterior margin of eye and slightly moved on upper part of head. Clypeal suture deeply impressed. Labrum anteriorly slightly concave, 6-setose and with some shorter hairs around the anterior angles. Mandibles elongate, though of median size in genus, straight, inner margin straight for a long distance, then gently incurved, with acute apex, with elongate seta in scrobe. Right mandible with conspicuously large tooth in middle of inferior margin. Mentum with apically rounded triangular tooth. Submentum bisetose. Gula quadrisetose. Glossa short, narrow, bisetose, paraglossae hyaline, surpassing glossa. Lacinia elongate, inner margin with few strong spines, apex markedly incurved, very acute. Both palpi glabrous, maxillary palpus with elongate, fusiform terminal palpomere, labial palpus shorter and stouter, apex transverse. Antennae rather short and stout (in genus), just attaining base of pronotum, pilose from half of 4th antennomere, central antennomeres <2.5 × as long as wide. Surface of head absolutely smooth, without any indication of microsculpture or puncturation, remarkably glossy.

Pronotum (Figs 8D, 9B). Remarkably trapeziform. Wide, though comparatively narrow in genus. Apex slightly concave, anterior angles slightly produced, obtusely rounded, sides evenly though comparatively little curved, not incurved towards base, therefore widest immediately at basal angles. Base in lateral third remarkably oblique, exactly adapted to the oblique base of elytra. Basal angles angulate, not dentiform, angle c. 100°. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves very shallow, rather punctiform, situated close to middle. Both, anterior and posterior transverse sulci absent. Base in middle not impressed. Anterior lateral seta situated shortly behind middle, posterior lateral seta situated slightly inside of basal angle. Surface absolutely smooth, without any indication of microsculpture and puncturation, remarkably glossy.

Elytra. Wide, convex, considerably wider than pronotum, wide at humeri, reversely oviform. Humeri angulate, basal border deeply excised. Lateral margins convex throughout, elytra widest

at anterior fourth, than evenly narrowed. In anterior half lateral margin faintly convex, barely sinuate at position of crossing of epipleurae. Basal margin complete, lateral margin narrow throughout. Scutellar puncture and seta present, at base of outturned 1st stria. Sutural stria short, inside 1st stria. Two inner striae at least in anterior half impressed, finely punctate or even gently crenulate. External striae decreasingly less distinct, barely punctate, outer striae barely recognisable. 8th stria only in apical half present. Near apex 1st, 2nd, and in particular 7th striae well impressed, 7th stria forming an elongate, fairly deep furrow. At most 1st and 2nd intervals feebly convex in basal half, outer intervals depressed or not recognisable. Disk impunctate. Marginal series consisting of two groups of 7-8 and 6 setiferous punctures, respectively, which are rather widely separated in middle. Inside of deepened 7th stria with two additional punctures very near to apex. Some of the marginal setae very elongate. Intervals absolutely smooth, without any traces of microreticulation, highly glossy.

Lower surface. Elytral epipleurae anteriorly very wide. Metepisternum short and small, slightly longer than wide at apex. Lower surface impunctate. Terminal sternite in male bisetose, in female quadrisetose along margin, and with two shorter setae in middle somewhat removed from margin.

Legs. Fairly elongate. 5th tarsomere with one pair of very elongate setae beneath. Anterior tarsus in male barely wider than in female, 1st - 3rd tarsomeres very lightly squamose beneath. Claws large, smooth.

Male genitalia (Fig. 7B). Genital ring as in *S. rotundata*. Aedeagus as in *S. rotundata*, though even shorter and slightly more curved. Left paramere basally narrower than in *S. rotundata*, with evenly tapering apex. Right paramere less elongate than in *S. rotundata*, far less sinuate on lower side.

Female genitalia. Very similar to those of *S. rotundata*.

Variation. Some variation noted in size, relative shape of pronotum, and depth of elytral striae.

DISTRIBUTION (Fig. 11). Bellenden Ker and Bartle Frere Ranges at the eastern margin of Atherton Tableland.

COLLECTING CIRCUMSTANCES. Mostly collected by pyrethrum knockdown in upland rainforest, some also by hand collecting. Generally they have been captured not below 1500m, with most specimens collected on summit peaks and ridges. This species probably lives rather on the bark or in moss of logs and trunks than in the forest litter.

Sitaphe parvicollis sp. nov.
(Figs 7C, 8B-C, 9C,F, 12)

ETYMOLOGY. The name refers to the unusually narrow and small pronotum.

MATERIAL. HOLOTYPE: ♂, QMT21688, Mt Bartle Frere, N Qld. Sth. Peak Summit, 1620m 6-8 Nov., 1981 Earthwatch/Qld Museum Pyr. (QM). PARATYPE: 1 ♀, same loc., 29.xi.1998. GM, DC, PB (CBM).

DIAGNOSIS. Immediately distinguished by the narrower pronotum that is widest at basal third and bears almost straight lateral margins in basal third to two-fifth.

DESCRIPTION. *Measurements.* Length: 5.4-6.0mm; width: 2.75-2.95mm; Ratios. Length/width of 9th antennomere: 2.7-2.75; width/length of pronotum: 1.41; width base/apex of pronotum: 1.92; width pronotum/head: 1.93-1.95; length/width of elytra: 1.18-1.19; width elytra/pronotum: 1.35-1.37.

Colour. As in *S. trapezicollis*.

Head. As in *S. trapezicollis*, though mandibles remarkably elongate, and also antennae longer than in all other species.

Pronotum (Figs 8B, 9C). Not as trapeziform as in other species. Moderately wide, though comparatively narrow in genus. Apex slightly concave, anterior angles slightly produced, obtusely rounded, sides evenly rounded in anterior three thirds, then oblique, or even faintly concave, slightly narrowed to basal angles, not incurved at angles. Pronotum widest about at posterior two thirds. Base laterally barely oblique, slightly overlapping the gently oblique base of elytra. Basal angles angulate, very slightly produced laterally, gently dentiform. angle almost right. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves rather deep, oblique, situated close to middle. Both transverse sulci barely recognisable, though basal region in middle remarkably impressed. Anterior lateral seta situated shortly behind middle, posterior lateral seta situated slightly inside of basal angle. Surface absolutely smooth, without any

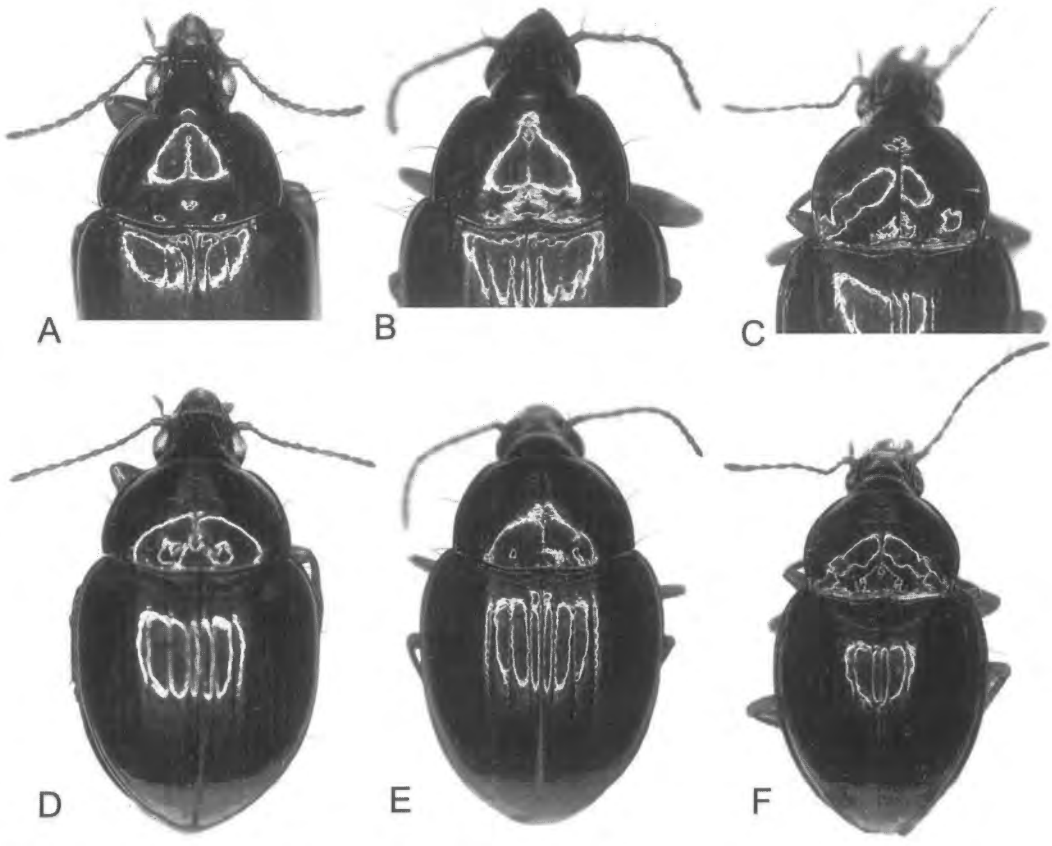

FIG. 9. Head and pronotum of *Sitaphe*. A, *S. rotundata* Moore; B, *S. trapezicollis* sp. nov.; C, *S. parvicollis* sp. nov.; habitus of *Sitaphe*: D, *S. rotundata* Moore; E, *S. trapezicollis* sp. nov.; F, *S. parvicollis* sp. nov. Lengths: 4.9mm; 5.4mm; 5.4mm.

indication of microsculpture and puncturation, remarkably glossy.

Elytra (Fig. 8C). As in *S. trapezicollis*, though longer and more regularly oviform. Base far less oblique than in other species, but otherwise rather similar. In the holotype inner striae barely impressed, outer striae barely recognisable, in the paratype at least four inner striae well impressed, intervals between clearly convex, outer striae finer but still recognisable.

Lower surface. As in *S. trapezicollis.*

Legs. As in *S. trapezicollis.*

Male genitalia (Fig. 7C). Genital ring as in *S. rotundata*. Aedeagus as in *S. rotundata*, though apex slightly longer. Left paramere very similar, but right paramere less deeply sinuate on lower surface than in *S. rotundata.*

Female genitalia. As in *S. rotundata.*

Variation. Due to scarce material little variation noted in shape, but striking variation in development and depth of elytral striae.

DISTRIBUTION (Fig. 11). South Peak of Bartle Frere Range at the eastern margin of Atherton Tableland, North Queensland.

COLLECTING CIRCUMSTANCES. Specimens were collected by hand and by pyrethrum from logs and tree trunks.

Sitaphe minuta sp. nov.
(Figs 7D, 8G, 11)

ETYMOLOGY. The name refers to the very small size of this species.

MATERIAL. HOLOTYPE: ♂, QMT21849, NEQ: 17°02'S 145°40'E Lambs Head (east end), 1180m 29.xi.1993. Monteith, Janetzki & Cook (QM). PARATYPES: 1 ♀, same data (QM); 1 ♀, Lambs Head,

10km W Edmonton, N Qld. 12-13.xii.1988, 1200m GM & GT (QM); 1 ♂, same loc., 8-9.i.1990, GM & SM (CBM); 1 ♀, same loc., 10-12.xii.1989, 1200m GM, GT & HJ (QM); 1 ♂, Isley Hills, 17°03'S 145°42'E 1050m 30.xi.1993; 1 ♀, Mt Williams, 900-1000m 16°55'S 145°40'E 2-3.xii.1993. DC, GM & HJ (QM).

DIAGNOSIS. Small, rather short species. Distinguished from the most similar species, *S. rotundata* Moore, by smaller size, narrower pronotum with relatively narrower base, distinctly incurved margin at base, and dentiform basal angles; and from likewise similar *S. ovipennis* sp. nov. by smaller size, narrower base of pronotum and considerably shorter elytra.

DESCRIPTION. *Measurements.* Length: 4.1-4.7mm; width: 2.2-2.5mm. Length/width of 9th antennomere: 1.9-2.0; width/length of pronotum: 1.52-1.56; width base/apex of pronotum: 1.81-1.86; width pronotum/head: 1.87-1.92; length/width of elytra: 1.13-1.15; width elytra/pronotum: 1.29-1.33.

Colour. As in *S. trapezicollis*.

Head. As in *S. trapezicollis*, though antennae even shorter.

Pronotum (Fig. 8G). Moderately trapeziform, because lateral margins very convex. Wide, though comparatively narrow in genus, base comparatively narrow. Apex slightly concave, anterior angles slightly produced, obtusely rounded, sides evenly curved over their whole length, considerably incurved towards base, therefore widest shortly in front of basal angles. Base in lateral third rather oblique, adapted to the oblique base of elytra. Basal angles developed as tiny denticles. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves moderate, slightly oblique, situated close to middle. Anterior transverse sulcus absent, posterior sulcus perceptible in the slightly impressed median part of base. Anterior lateral seta situated at or shortly behind middle, posterior lateral seta situated slightly inside of basal angle. Surface absolutely smooth, without any indication of microsculpture and puncturation, remarkably glossy.

Elytra. As in *S. trapezicollis*, though base slightly less oblique. Lateral margins evenly curved, elytra widest at basal fifth. Two or three inner striae distinctly impressed and finely punctate, intervals between gently convex. Outer striae decreasingly distinct, barely punctate.

Lower surface. As in *S. trapezicollis*.

Legs. As in *S. trapezicollis*.

Male genitalia (Fig. 7D). Genital ring as in *S. rotundata*. Aedeagus and parameres very much as in *S. rotundata*, though right paramere slightly shorter and less deeply sinuate.

Female genitalia. As in *S. rotundata*.

Variation. Some variation in depth and extent of puncturation of elytral striae recognised.

DISTRIBUTION (Fig. 11). Lambs Head, Mt Williams, and Isley Hills, all adjacent parts of the Lamb Range mountain massif, North Queensland.

COLLECTING CIRCUMSTANCES. This species probably also lives rather on the bark or in moss of logs and trunks than in the forest litter. All specimens were sampled above 900m, most were collected at the highest tops of the respective mountains.

Sitaphe hamifera sp. nov.
(Figs 7E, 8J, 11)

ETYMOLOGY. The name of this species refers to the dentiform basal angles of the pronotum.

TYPE MATERIAL EXAMINED. HOLOTYPE: ♂, QMT21776, Cardwell Range, NE. Qld Mt Macalister area, 1000m 19.xii.1986 Monteith, Thompson & Hamlet pyrethrum knockdown (QM).

DIAGNOSIS. Medium sized, pronotum comparatively narrow, decidedly trapeziform, with remarkably incurved lateral margins towards base, with dentiform basal angles. Further distinguished from all other species except for *S. parallelipennis* sp. nov. by rather parallel-sided, not oviform elytra. From *S. parallelipennis* it is distinguished, *inter alia*, by the narrower pronotum with comparatively wider base, and by more regularly convex lateral margins in middle of elytra.

DESCRIPTION. *Measurements.* Length: 5.2mm; width: 2.6mm; Ratios. Length/width of 9th antennomere: 2.25; width/length of pronotum: 1.47; width base/apex of pronotum: 1.98; width pronotum/head: 1.89; length/width of elytra: 1.14; width elytra/pronotum: 1.31.

Colour. As in *S. trapezicollis*.

Head. As in *S. trapezicollis*.

Pronotum (Fig. 8J). Trapeziform, because lateral margins in anterior two thirds oblique and rather straight. Comparatively narrow in genus, though base comparatively wide. Apex faintly concave,

anterior angles slightly produced, obtusely rounded, sides very little curved in anterior two thirds, then remarkably convex and deeply incurved towards base, therefore widest well in front of basal angles, almost at posterior sixth. Base laterally gently obliquely convex, rather adapted to the moderately oblique base of elytra. Basal angles developed as tiny denticles. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves deeply punctiform, obliquely extended anteriomedially, situated close to middle. Anterior transverse sulcus absent, posterior sulcus perceptible in the slightly impressed median part of base. Anterior lateral seta situated about at middle, posterior lateral seta set inside of basal angle. Surface absolutely smooth, without any indication of microsculpture and puncturation, remarkably glossy.

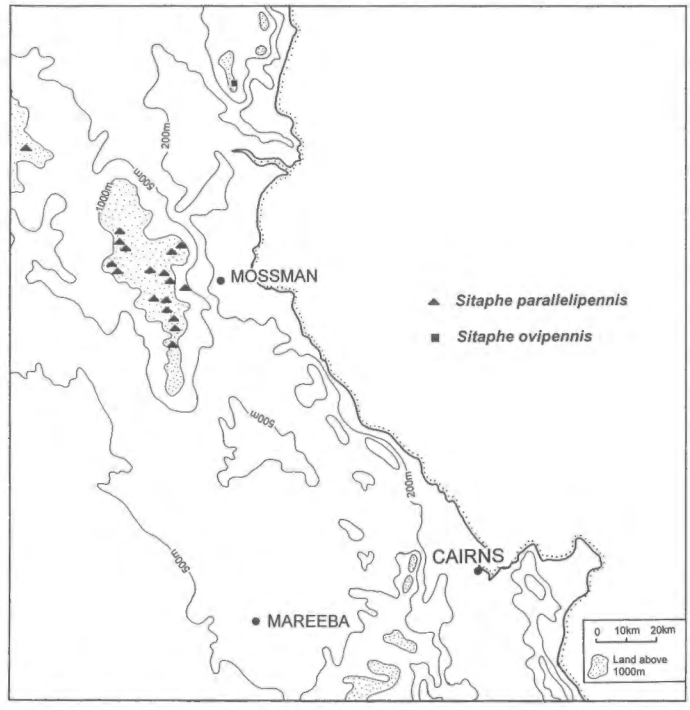

FIG. 10. Distribution of *Sitaphe* spp. (part).

Elytra. As in *S. trapezicollis*, highly convex, though shape far less oviform. Base slightly less oblique. Lateral margins more evenly curved, elytra widest about at middle, apical curvature very short. Three inner striae distinctly impressed and finely punctate, intervals between gently convex. Outer striae decreasingly distinct, barely punctate.

Lower surface. As in *S. trapezicollis*.

Legs. As in *S. trapezicollis*.

Male genitalia (Fig. 7E). Genital ring and aedeagus much as in *S. rotundata*. Left paramere with considerably shorter apex than in *S. rotundata*, right paramere slightly less deeply sinuate on lower surface.

Female genitalia. Unknown.

Variation. Unknown.

DISTRIBUTION (Fig. 12). Mt Macalister in Cardwell Range, North Queensland.

COLLECTING CIRCUMSTANCES. The holotype was collected by pyrethrum knockdown on logs or trees at 1000m, which is close to the top of this mountain.

Sitaphe incurvicollis sp. nov.
(Figs 7F, 8E,F, 12)

ETYMOLOGY. Refers to the deeply incurved lateral margins in the basal part of the pronotum.

MATERIAL. HOLOTYPE: ♂, QMT21782, Upper Boulder Creek 11km N Tully, NE Qld. 5-7 Dec 1989. 1000m Monteith, Thompson & Janetzki (QM). PARATYPES: 1 ♀, Upper Boulder Creek 6km N Tully, NE Qld. 4.xii.1989. 100-500m GM, GT & HJ (QM); 1 ♂, same loc., 650-900m, 24-27.x.1983 GM, DY & GT (QM); 2 ♀, same loc., 500-600m 24-27.x.1983 GM, DY & GT (CBM, QM); 1 ♂, Tully Falls. N Qld. 8.xii.1990, 750m GM, GT & HJ Pyr. Logs & Trees (QM); 1 ♂, Koombooloomba N Q. 1/53 GB. / M. 101. / *Sitaphe rotundata* Moore det. B.P. Moore'69 (ANIC).

DIAGNOSIS. Medium sized, rather short. Due to the basally incurved lateral margin and small, dentiform basal angle of the pronotum probably most closely related to *S. minuta* sp. nov. and *S. hamifera* sp. nov. Distinguished from *S. minuta* by larger size and wider pronotum with wider base; and from *S. hamifera* by less triangular and much wider pronotum, and by more oviform elytra the widest diameter of which is close to the

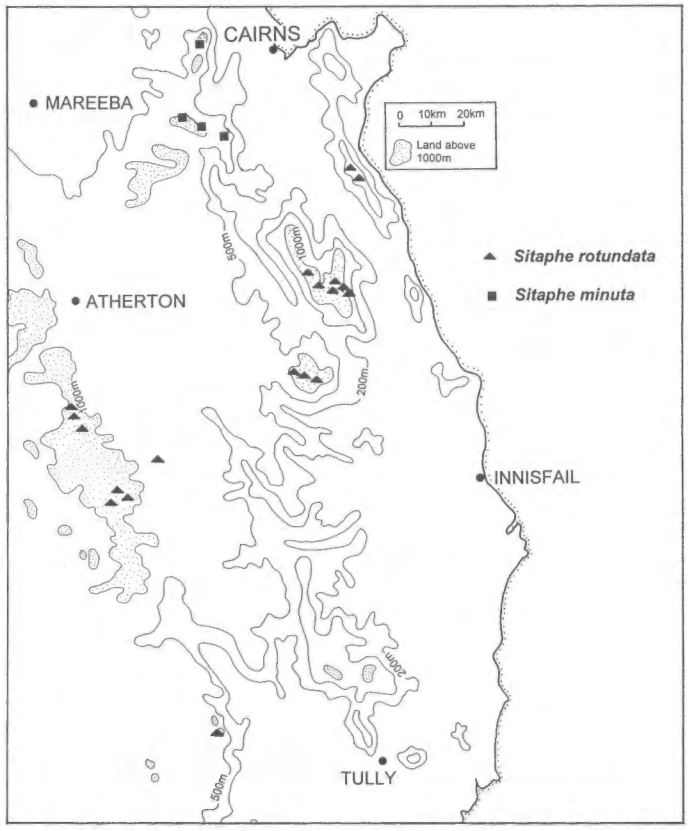

FIG. 11. Distribution of *Sitaphe* spp. (part).

humerus. From both species also distinguished by the absolutely straight apex of the right paramere.

DESCRIPTION. *Measurements.* Length: 5.0-5.4mm; width: 2.65-2.8mm. Length/width of 9th antennomere: 2.1-2.2; width/length of pronotum: 1.54-1.59; width base/apex of pronotum: 1.88-1.94; width pronotum/head: 2.02-2.09; length/width of elytra: 1.11-1.13; width elytra/pronotum: 1.28-1.31.

Colour. As in *S. trapezicollis*, though elytra distinctly piceous which colour, however, may be caused by incomplete pigmentation due to recent hatching.

Head. As in *S. trapezicollis*, though eyes slightly larger and orbits shorter.

Pronotum (Fig. 8E). Moderately trapeziform, because lateral margins rather convex. Wide, though comparatively narrow in genus, but base comparatively wide. Apex slightly concave, anterior angles slightly produced, obtusely rounded, sides evenly curved over their whole length, considerably incurved towards base, therefore widest shortly in front of basal angles. Base in lateral third rather oblique, adapted to the oblique base of elytra. Basal angles developed as tiny denticles. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves fairly deep, punctiform, obliquely extended anterio-medially, situated close to middle. Anterior transverse sulcus absent, posterior sulcus perceptible in the slightly impressed median part of base. Anterior lateral seta situated shortly behind middle, posterior lateral seta situated slightly inside of basal angle. Surface absolutely smooth, without any indication of microsculpture and puncturation, remarkably glossy.

Elytra (Fig. 8F). As in *S. trapezicollis*, though base slightly less oblique. Lateral margins rather evenly curved, elytra not markedly oviform, widest about at basal third. Three or even four inner striae distinctly impressed and finely punctate, intervals between gently convex. Outer striae decreasingly distinct, barely punctate.

Lower surface. As in *S. trapezicollis*.

Legs. As in *S. trapezicollis*.

Male genitalia (Fig. 7F). Genital ring and aedeagus as in *S. rotundata*. Left paramere with shorter apex than in *S. rotundata*, right paramere slightly shorter and with remarkably straight apex.

Female genitalia. As in *S. rotundata.*

Variation. Little variation in size and shape. Variation in depth and extent of puncturation of elytral striae recognised.

DISTRIBUTION (Fig. 12). Upper Boulder Creek at eastern end of the Walter Hill Range, to the south of the Atherton Tableland, North Queensland.

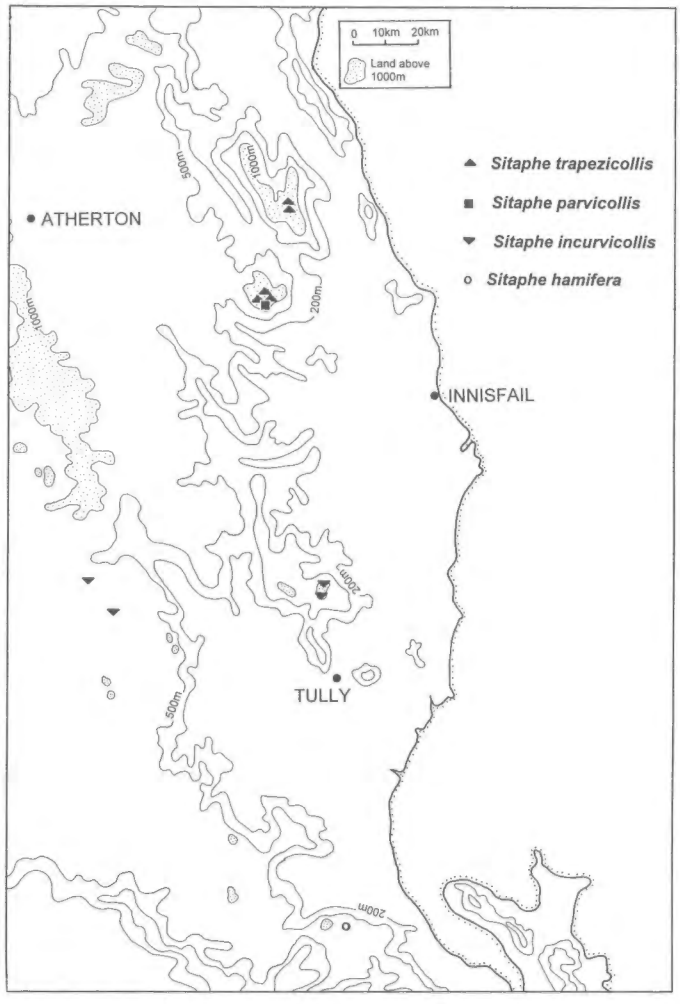

FIG. 12. Distribution of *Sitaphe* spp. (part).

COLLECTING CIRCUMSTANCES. This species probably lives on the bark or in moss of logs and trunks. Altitude records from 500-1000m, with most 500-750m. These altitudes are lower than for most other species.

Sitaphe parallelipennis sp. nov.
(Figs 7G, 8H, 8I, 10)

ETYMOLOGY. Refers to the rather parallel shape of elytra.

MATERIAL. HOLOTYPE: ♂, QMT21838, NE Qld: 16°22'S 145°13'E 7km N Mt Spurgeon (Camp 2) 17-19.x.1991. 1200-1250m Monteith, Janetzki, Cook & Roberts (QM). PARATYPES: 3 ♂, 12 ♀, same data (CBM, QM); 4 ♂, 7 ♀, Stewart Ck 4km NNE Mt Spurgeon (Camp 1), 16°24'S 145°13'E 1250-1300m 15-20.x.1991. GM, HJ, DC & LR (CBM, QM); 2 ♂, Mt Spurgeon Summit 16°26'S 145°12'E 21.xi.1997. 1320m GM, DC & Burwell (QM); 2 ♂, 2 ♀, Mt Spurgeon Summit 16°26'S 145°12'E 21.xi.1997. 1320m GM. Pyrethrum, trees & logs (QM); 1 ♂, 2km SE Mt Spurgeon 16°27'S 145°12'E 13-14.x.1991. 1100m GM, HJ & DC (QM); 2 ♂, 2 ♀, Black Mtn. 4.5km N of Mt Spurgeon. 16°24'S 145°12'E 1200-1250m 17-18.x.1991. GM, HJ, DC & LR (QM).1 ♂, Windsor Tbld, N Qld. 9.i.1989, 1225m E. Schmidt & ANZSES Site 3, Pyr.(QM); 1 ♀, same loc., 27.xii.88 - 9.i.1989 E. Schmidt & ANZSES , pitfall (QM); 2 ♀, Mt Demi, 7km SE of Mossman 29.x.1983, 1100m DY & GT Pyr. in RF. (QM); 1 ♀, Mt Demi summit, 1000m 16°30'S 145°19'S 16-17.xii.1995 GM & GT (QM); 1 ♂, Mt Lewis, Via Julatten, N Qld. 3,500-4000' 27-28.xi.1965. GM (QM); 2 ♂, 1 ♀, Mt Lewis Rd (Hut) 16°31'S 145°16'S 14 July 1996, 1200m GM (QM); 1 ♂, 2.5km N Mt Lewis, via Julatten 3.xi.1983, 1040m DY & GT Pyr. in RF. (QM); 1 ♀, Mt Lewis summit, via Julatten, 10.ix.1981 GM & DC, QM Berl. 287 Rf, 1200m Log debris (QM); 2 ♂, same loc.,via Julatten, 9.ix.1981 GM & DC (QM); 1 ♀, Mt Lewis Rd end, 10km N Mt Lewis, N Qld. 25.xi.1990. 1100m. GM, GT, DC, RS & HJ (QM); 2 ♀, 5.5km N of Mt Lewis, via Julatten 1100m, 8.ix.1981 GM & DC (QM); 2 ♀, Hilltop, 18km N Mt Lewis 16°30'S 145°16'E 23.xi.1998 GM. Pyr. trees. 1300m, RF.(QM); 1 ♂, Carbine Tbld, NE Qld Plane Crash Site 27-28.xi.1990, 1330m GM, GT, DC, RS & HJ Pitfall Traps & Hand (QM); 1 ♀, Nr Plane Crash 11km NW Mossman, N Qld 28.xii.1989, 1240m ANZSES, Pyr.(QM); 1 ♀, Devil's Thumb 12km NW Mossman, N Qld 27.xii.1989, 1000m ANZSES, Pyr.(QM); 4 ♂, 6 ♀, Devils Thumb area, 10km NW Mossman 9-10 Oct. 1982, 1000-1180m GM, DY & Thomson (CBM, QM);1 ♀, Pauls Luck, Platypus Ck, 13km W Mossman, N Qld. 1-2.i.1990, 1100m ANZSES, Pyr.(QM); 1 ♂, Mossman Bluff Summit 10km W Mossman, N Qld. 18.xii.1988. 1300m GM & GT Pyrethrum, Trees & Rocks (QM); 1 ♂, Mossman Bluff Track 9-10km W Mossman, NQ 21.xii.1989, 1000-1300m GM, GT, ANZSES (QM);

DIAGNOSIS. Fairly large, rather short, with basally slightly incurved lateral margins of pronotum and dentiform basal angles. Distinguished from all species with similar base

of pronotum by the remarkably elongate aedeagus and parameres. Further distinguished from *S. ovipennis* sp. nov. by shorter, parallel, and less oviform elytra.

DESCRIPTION. *Measurements.* Length: 4.9-5.6mm; width: 2.6-2.9mm. Length/width of 9th antennomere: 2.1-2.25; width/length of pronotum: 1.56-1.59; width base/apex of pronotum: 1.88-1.93; width pronotum/head: 1.97-2.01; length/width of elytra: 1.13-1.15; width elytra/pronotum: 1.26-1.29.

Colour. As in *S. trapezicollis*.

Head. As in *S. trapezicollis*.

Pronotum (Fig. 8H). Very similar to that of *S. ovipennis*, though slightly wider.

Elytra (Fig. 8I). As in *S. trapezicollis*, though base slightly less oblique. Lateral margins anteriorly rather gently curved, shape not distinctly oviform though in middle rather parallel-sided. Elytra widest about at basal third, or even further behind, in median part lateral margins very little convex, almost straight. Three inner striae, rarely also 4th stria in part, distinctly impressed and finely punctate, intervals between gently convex. Outer striae decreasingly distinct, barely punctate.

Lower surface. As in *S. trapezicollis*.

Legs. As in *S. trapezicollis*.

Male genitalia (Fig. 7G). Genital ring as in *S. rotundata*. Aedeagus structurally as in *S. rotundata*, but much longer and narrower and with longer apex which is distinctly curved down. Both parameres considerably longer than in *S. rotundata*, left paramere also narrower, right paramere far less deeply sinuate on lower surface.

Female genitalia. As in *S. rotundata.*

Variation. Rather little variation in size and shape noted. Only some unimportant variation in depth and extent of puncturation of elytral striae recognised.

DISTRIBUTION (Fig. 10). Widespread on Carbine and Windsor Tablelands, west of Mossman, North Queensland.

COLLECTING CIRCUMSTANCES. Many specimens were collected by pyrethrum knockdown on logs and trees, single specimens also by pitfall trapping or hand collecting. This indicates that this species lives on the bark or in moss on logs and trunks. All specimens were collected above 1000m, most at or near the summits of the respective mountains or ranges.

Sitaphe ovipennis sp. nov.
(Figs 7H, 8K, 8L, 10)

ETYMOLOGY. Refers to the oviform elytra.

MATERIAL. HOLOTYPE: ♂, QMT21756, NE Qld, Thornton Peak, 11km NE Daintree, 1100-1200m 30.x.- 1 Nov., 1983 Monteith, Yeates & Thompson (QM). PARATYPES: 7 ♂, 6 ♀, same data (CBM, QM); 2 ♂, Thornton Peak via Daintree, 1000-1300m. 20-22. ix. 1981 GM & DC (QM); 8 ♂, 3 ♀, Thornton Peak, 1100-1300m via Daintree, N Qld. 24-27.ix.1984 GM & SM (CBM, QM).

DIAGNOSIS. Medium sized, elongate, with basally slightly incurved lateral margins of pronotum and dentiform basal angles. Distinguished from all species with similar base of pronotum by much longer, decidedly oviform elytra. Further distinguished from nearby *S. parallelipennis* sp. nov. by shorter aedeagus and parameres.

DESCRIPTION. *Measurements.* Length: 4.6-5.3mm; width: 2.40-2.75mm. Length/ width of 9th antennomere: 1.8-1.9; width/length of pronotum: 1.52-1.56; width base/apex of pronotum: 1.86-1.91; width pronotum/head: 1.89-1.94; length/width of elytra: 1.18-1.20; width elytra/pronotum: 1.23-1.27.

Colour. As in *S. trapezicollis*, though in most specimens elytra rather piceous which colour, however, may be caused by incomplete pigmentation due to recent hatching.

Head. As in *S. trapezicollis*.

Pronotum (Fig. 8K). Moderately trapeziform, because lateral margins rather convex. Wide, though with comparatively narrow base. Apex gently concave, anterior angles slightly produced, obtusely rounded, sides evenly curved over their whole length, moderately incurved towards base, therefore widest shortly in front of basal angles. Base in lateral third rather oblique, adapted to the oblique base of elytra. Basal angles developed as tiny denticles. Lateral borders coarsely margined, apex and base more finely margined. Lateral channel barely indicated. Median line distinct, though shallow, neither reaching apex nor base. Basal grooves deep, punctiform, obliquely extended anterio-medially, situated close to middle. Anterior transverse sulcus absent, posterior sulcus perceptible in the rather deeply impressed median part of base. Anterior lateral seta situated shortly behind middle, posterior lateral seta set slightly inside of basal angle. Surface absolutely

smooth, without any indication of microsculpture and puncturation, remarkably glossy.

Elytra (Fig. 8L). As in *S. trapezicollis*, though considerably longer and base slightly less oblique. Lateral margins rather evenly curved, shape distinctly oviform with rather elongate apex. Elytra widest about at basal fifth. Two inner striae, rarely also 3rd stria in part, distinctly impressed and finely punctate, intervals between gently convex. Outer striae decreasingly distinct, barely punctate.

Lower surface. As in *S. trapezicollis*.

Legs. As in *S. trapezicollis*.

Male genitalia (Fig. 7H). Genital ring as in *S. rotundata*. Aedeagus as in *S. rotundata*, though apex even shorter. Left paramere very similar, though apex slightly shorter than in *S. rotundata*, right paramere slightly shorter, slightly less deeply sinuate on lower surface, and apex straight.

Female genitalia. As in *S. rotundata.*

Variation. Rather little variation in size and shape noted. Only some unimportant variation in depth and extent of puncturation of elytral striae recognised.

DISTRIBUTION (Fig. 10). Thornton Peak, north of Daintree, North Queensland.

COLLECTING CIRCUMSTANCES. All specimens were hand collected, mostly from surfaces of logs and tree trunks as with all species of *Sitaphe* (G.B.Monteith, pers. comm.). This species has been collected only above 1000m on the highest part of the Thornton Peak massif.

MEASUREMENTS AND RATIOS IN *SITAPHE* MOORE

For better comparison of the species the measurements and ratios of all species are compiled in Table 2.

REMARKS. All taxa of *Sitaphe* are treated as species, because in one area three taxa, in another area two taxa are sympatric and most probably even syntopic. Slight though well distinguished differences can be noted in external structure, mainly shape and structure of pronotum, and shape of elytra. In all species, however, the male genitalia are very similar in shape and structure. Only minor differences in relative length of aedeagus and parameres, shape of apex of aedeagus, and shape and curvature of the parameres have been noted.

Probably some of the allopatric taxa here regarded as species could be as well described as subspecies, but in view of the still unsatisfactory knowledge of the number of existing taxa and of their distribution I have decided to rate all taxa as species, because it may be conceivable that even more taxa possess overlapping ranges. Nevertheless, it should be stressed that in areas where two or three taxa occur sympatrically, the morphological divergence generally is greater than between allopatric taxa. This is not too surprising, because there must be some ecological divergence in sympatric or even syntopic taxa which, as a consequence, certainly will cause more striking morphological differences.

PHYLOGENY AND BIOGEOGRAPHY

Since all existing taxa of *Sitaphe*, and their respective ranges, are probably not yet known, any considerations about phylogenetic relations and biogeographical history of the species are necessarily provisional. Nevertheless, some considerations are possible at this stage. These, however, are still very difficult to assess due to the extremely close relationship between species. Since the male genitalia are similar throughout the genus, with the only divergence being in the northern *S. parallelipennis*, which has a longer aedeagus with bent apex, only external characters are useful. But many of these are also extremely uniform throughout the genus, e.g. shape of head, length of mandibles, size of eyes, surface structure of elytra. But shape of pronotum and of elytra may be of some use. There is also the problem of determining which genus is the nearest relative of *Sitaphe.* These obstacles make any decision about apomorphy versus plesiomorphy within *Sitaphe* extremely difficult.

Character states unique for the whole genus *Sitaphe* are the elongate mandibles, depressed eyes, wide, more or less conspicuously trapezoidal pronotum, wide and short, dorsally convex, oval-shaped elytra, reduction of elytral striae, and absence of any microreticulation or puncturation on the surface. However, as stated above, most of these character states are uniform throughout the genus. All species possess short antennae and a remarkably trapezoidal pronotum, except for *S. parvicollis*, in which the antennae are decidedly longer and narrower and the pronotum is definitively less wide at base. In the other species the pronotum is firmly attached to the base of the elytra, and is almost as wide as the latter. In *S. parvicollis* the elytra are also comparatively longer, making this species

TABLE 2. *Sitaphe* spp. measurements.

	N	body length (mm)	ratio length/ width 9th antennomere	ratio width/ length pronotum	ratio width base/apex pronotum rotundata	ratio width pronotum/ head	ratio length/ width elytra	ratio width elytra/ pronotum
S. rotundata	10	4.6-5.8	2.2-2.5	1.60-1.67	1.98-2.07	2.02-2.12	1.12-1.15	1.25-1.30
S. trapezicollis	10	4.9-6.2	2.25-2.5	1.49-1.53	2.02-2.07	2.03-2.11	1.12-1.13	1.29-1.34
S. parvicollis	2	5.4-6.0	2.7-2.75	1.41	1.92	1.93-1.95	1.18-1.19	1.35-1.37
S. minuta	7	4.1-4.7	1.9-2.0	1.52-1.56	1.81-1.86	1.87-1.92	1.13-1.15	1.29-1.33
S. hamifera	1	5.2	2.25	1.47	1.98	1.89	1.14	1.31
S. incurvicollis	7	5.0-5.4	2.1-2.2	1.54-1.59	1.88-1.94	2.02-2.09	1.11-1.13	1.28-1.31
S. parallelipennis	10	4.9-5.6	2.1-2.25	1.56-1.59	1.88-1.93	1.97-2.01	1.13-1.15	1.26-1.29
S. *ovipennis*	10	4.6-5.3	1.8-1.9	1.52-1.56	1.86-1.91	1.89-1.94	1.18-1.20	1.23-1.27

generally longer and narrower than all others. When compared with other, southern tropopterine genera, it seems conceivable at the first glance, then, that this species should be most plesiotypic within the genus, at least with respect to the above character states.

This compact, smooth, convex, remarkably wedge-shaped body structure, in combination with the narrow head and elongate, stiletto-shaped mandibles, strongly suggests the 'cychriform' body shape of certain snail eating carabid groups as exemplified by the northern hemisphere *Cychrus* and certain *Carabus*. Although virtually nothing is known about foraging methods and diet of *Sitaphe*, its highly specialised body shape suggests either a similar snail eating habit in all *Sitaphe*, or a foraging method of forcing the slender forebody into crevices in the bark raking for prey and using the elongate mandibles as pincers. Both habits, in turn, could explain the highly similar shape and structure in almost all species.

S. trapezicollis has a strikingly trapezoidal pronotum, the basal angles of which are not incurved, and which is very tightly adapted to the base of the elytra. If we admit that the morphological trend within the genus is directed to a most compact, short, ovoid body shape with almost jointless adaptation of pronotum and elytra, then *S. trapezicollis* would seem most apomorphic.

All other species have the base of prothorax more or less incurved to form an obtuse (*S. rotundata)* or faintly dentiform (*S. minuta*, *S. parallelipennis*, *S. ovipennis*) or markedly dentiform basal angle (*S. incurvicollis*, *S. hamifera*). With respect to this character, *S. rotundata* probably represents the most plesiomorphic state.

However *S. parvicollis* is longer and narrower than all other species, has the basal part of pronotum remarkably deeply impressed, and also possesses distinctly longer antennae and mandibles. In combination these features give this species an even stronger 'cychriform' body shape impression than in the other species. From the speculative assumption that all *Sitaphe* eat snails we may further speculate that this special body shape in *S. parvicollis* derives from a more specialised diet and/or foraging mode, e.g. consumption of snails with narrower and deeper aperture.

If all these considerations and assumptions prove right, then *S. rotundata* would be the species that is most plesiomorphic, at least with respect to the character states considered. *Sitaphe trapezicollis* and *S. parvicollis* would be most apomorphic, *S. incurvicollis* and *S. hamifera* would be somewhat intermediate, whereas *S. minuta* and both northern species (*S. parallelipennis* and *S. ovalipennis*) would be more closely related to *S. rotundata*. However, the last two species are unique in at least one character: *S. parallelipennis* has fairly dissimilar male genitalia, and *S. ovipennis* has longer elytra than usual.

We could combine these raw assumptions about relationships with the distribution pattern of the species to get a glimpse of evolution and biogeographic history of the genus. Perhaps five assumptions can be set up:

1) There is no indication where the early stock of the genus came from, except that, as a member of an originally cool adapted group, it probably arrived from the south. The nearest relatives of *Sitaphe* live in southeastern Australia and belong to the *Theprisa-Theraphis-Phersita* complex, but

I do not know which of these three genera is closest.

2) *Sitaphe* is morphologically highly isolated, though the species within the genus are extremely closely related. This suggests that the genus, or at least its original stock, is a comparatively old element of the North Queensland rain forests but that the taxonomic radiation within the genus has probably occurred comparatively recently.

3) Based the above considerations it seems conceivable that the widespread *S. rotundata* is the most plesiotypic species and may be most similar to the original stock of the genus. More apotypic species have more restricted ranges, either in the north on Carbine Tableland (*S. parallelipennis*) and Thornton Peak (*S. ovipennis*), or in the south on Cardwell Range (*S. hamifera*) and Walter Hill Range (*S. incurvicollis*), or in the east on Mts Bellenden Ker and Bartle Frere (*S. trapezicollis*, *S. parvicollis*). Actually the eastern margin of Atherton Tableland is inhabited by four different species including *S. minuta*, that occurs on the mountains northwest of Bellenden Ker/Bartle Frere, being more closely related to *S. rotundata*.

4) The high Bellenden Ker Range (comprising Mt Bellenden Ker, Mt Bartle Frere and the Massey Range) is inhabited by three species. Over part of their ranges these three species are not only sympatric but actually syntopic and have been collected within the same fogging or sieving sample. Thus they may actually live together on the same log. Characteristically, the most plesiotypic species (*S. rotundata*) again has the widest range, since it occurs not only on Bellenden Ker and Bartle Frere, but also on the contiguous Massey Range. The more evolved *S. trapezicollis* occurs on both high peaks, whereas *S. parvicollis*, probably the most specialised species, has been found only on the summit of the highest peak, Bartle Frere.

5) It is notable, therefore, that the three sympatric species on the Bellenden Ker Range show the greatest morphological divergence in the whole genus. This is presumably the result of an ecological shift leading to more essential structural differences than usual.

If the above assumptions are correct, then we have another example of a generalised scenario of distribution patterns very similar to that recognised in some other insect groups (e.g. *Philipis* (Baehr 1995b)) in the Wet Tropics:

– One or few plesiotypic species exhibit a wide distribution over the central Wet Tropics (Atherton Tableland in the broad sense), also further to the south.

– Several or many more or less apotypic species are arranged in an almost semicircular pattern around the central region or these widespread species to the north, east, and south of it.

Meonis Castelnau, 1867

Meonis Castelnau, 1867: 69; Castelnau, 1868: 155; Csiki, 1929: 484; Moore, 1963: 288; Moore et al., 1987: 152.

DIAGNOSIS. Genus of tribe Meonini (which includes *Raphetis*). Moore et al. (1987) included five species, three of which have been so far recorded only in the northern half of New South Wales. However, the genus urgently needs revision to settle the status of synonymised taxa as well as to accommodate certain taxa that are probably yet undescribed.

Meonis ater Castelnau, 1867

Meonis ater Castelnau, 1867: 70; Castelnau, 1868: 156; Sloane, 1900: 563; Sloane, 1911: 827; Sloane, 1916: 201; Csiki, 1929: 484; Straneo, 1941: 86; Moore et al., 1987: 152.

Meonis amplicollis Sloane, 1915: 448; Sloane, 1916: 201; Csiki, 1929: 484; Straneo, 1941: 86; Moore et al., 1987: 152.

REMARKS. Provided the above synonymy is correct, this species occurs in southeastern Queensland (e.g. on Lamington Plateau) and immediately adjacent northeastern New South Wales (Clarence River area). It is a ground dwelling species that inhabits leaf litter and is also found under logs in subtropical to temperate rain forest. The elongate, porrect mandibles, cychriform head and glabrous surface suggest molluscs as the diet for this and other species of *Meonis*.

DISTRIBUTION. Southeastern Queensland and northeastern New South Wales near border.

Meonis niger Castelnau, 1867

Meonis niger Castelnau, 1867: 70; Castelnau, 1868: 156; Sloane, 1911: 826; Sloane, 1916: 201; Csiki, 1929: 484; Straneo, 1941: 86; Moore et al., 1987: 152.

DISTRIBUTION. Southeastern Queensland and adjacent northeastern New South Wales, in Queensland apparently with a slightly wider range than the preceding species.

Raphetis Moore, 1963

Raphetis Moore, 1963: 288; Moore et al., 1987: 152.

TYPE SPECIES. *Raphetis darlingtoni* Moore, 1963, by original designation.

DIAGNOSIS. Meonini. As described by Moore (1963) it is distinguished from *Meonis* by glabrous instead of setose paraglossae, spinose laciniae bearing a strong terminal hook instead of densely setose lacinae lacking the terminal hook, weakly bordered base of elytra instead of unbordered base, and a normal shaped scutellum, whereas in *Meonis* the scutellum is tiny.

In most other respects the two genera are very similar and also share the characteristic body shape, small eyes, and elongate, porrect mandibles. Even the male genitalia do not show much structural differences, apart from some minor differences of size and shape of aedeagus, and length of parameres and extent of their chaetotaxy. Female stylomeres are very uniform throughout *Raphetis*, and they only exhibit minor differences of shape and number of ensiform setae on rim of first and latero-ventral margin of second stylomere.

REMARKS. The Meonini, apart from *Raphetis*, includes only *Meonis* Castelnau in Australia. *Meonis* occurs in subtropical and cool temperate rain forests of southeastern Australia from southern New South Wales to southern Queensland. In southern Queensland, the two genera are sympatric on the Springbrook Plateau.

Moore described *R. darlingtoni* from Eungella Range west of Mackay and *R. gracilis* from the western Atherton Tableland. Until now *Raphetis* was regarded as very rare, and the two species were described from one or two specimens. Through the systematic sampling of the Queensland Museum workers 38 additional specimens are now available, mainly from four rather restricted areas: Springbrook Plateau on the Queensland/ New South Wales border; Bellenden Ker/Bartle Frere Range at the eastern slope of Atherton Tableland; the Millaa Millaa/ Mt Fisher area on the western part of Atherton Tableland (from where *R. gracilis* Moore was described); and the Carbine Tableland to the north of Atherton Tableland. The fifth area from where the genus was recorded is Eungella Plateau west of Mackay in central eastern Queensland, where *R. darlingtoni* Moore occurs. Hence the distribution seems to be very fragmented, though in view of the quite exhaustive sampling that has taken place on other intermediate mountain massifs I suspect that it may reflect the true distribution.

KEY TO THE TAXA OF *RAPHETIS* MOORE

1. Pronotum markedly cordate, deeply sinuate in front of basal angles; base little wider than apex (Figs 14ABD, 15B-C). 2

   Pronotum little cordate, barely sinuate in front of basal angles; base distinctly wider than apex (Figs 14C, 15A). Southeastern Queensland. . . . . *curta* sp. nov.

2. Pronotum laterally more convex; elytra distinctly striate, striae coarsely punctate; aedeagus suddenly curved to apex. Eungella Plateau, central eastern Queensland . . . . . *darlingtoni* Moore

   Pronotum laterally less convex; elytra barely striate, striae, when visible, impunctate; aedeagus more evenly curved to apex (Fig. 13B-F) 3

3. Apex of elytra with distinct, slightly curved spine (Fig. 14G). Mt Lewis area, southern Carbine Tbld . . *gracilis spinosa* subsp. nov.. . . . . .

   Apex of elytra not spinose, at most with tiny denticle (Fig. 14H,I). 4

4. Lower margin of aedeagus slightly sinuate near apex (Fig. 13B,D). 5

   Lower margin of aedeagus straight near apex (Fig. 13C,E,F). 6

5. Pronotum narrow, barely wider than long, relatively narrower in relation to head (Fig. 14A); elytra relatively longer (see appendix). Size generally smaller, 7.0-7.8mm. Millaa Millaa/Mt Fisher area, western part of Atherton Tbld . . . . . *gracilis gracilis* Moore

   Pronotum wider, distinctly wider than long, relatively wider in relation to head (Fig. 14B); elytra relatively shorter (see appendix). Size generally larger, 7.9-8.5mm. Bellenden Ker/Bartle Frere Range, eastern margin of Atherton Tbld . . . . . *gracilis frerei* subsp. nov.

6. Apex of elytra with tiny denticle (Fig. 14H); eyes smaller, <2 × as long as orbits; pronotum narrower (see appendix). Plane Crash Site at eastern margin, and Mt Spurgeon at western margin of Carbine Tbld . *gracilis subarmata* subsp. nov. . . . . .

   Apex of elytra without denticle, regularly convex (Fig. 14I); eyes larger, well >2 × as long as orbits; pronotum wider (see appendix). Area north of Mt Spurgeon at western margin of Carbine Tbld . . *gracilis spurgeoni* subsp. nov.

Raphetis darlingtoni Moore, 1963 (Fig. 16)

Raphetis darlingtoni Moore, 1963: 288; Moore et al., 1987: 153.

MATERIAL. HOLOTYPE: ♂, Eungella Rge. W. of Mackay Q 2-3000' Nov57 Darlingtons/ *Raphetis* gen.n. *darlingtoni* sp.n. holotype ♂ Det. B.P. Moore '63 (ANIC).

REMARKS. The descriptions of *R. darlingtoni* and *R. gracilis* Moore, are brief and hence contain some mistakes. The elytra are not free in *R. darlingtoni*, but are fused as in *R. gracilis*. In the holotype, however, they are opened, because the abdomen had been removed. Separating of the normally fused elytra also has been observed in preserved specimens of *R. gracilis*.

The parameres are not dissimilar in *R. darlingtoni* and similar in *R. gracilis*, but are dissimilar in both species, though slightly less so in *R. gracilis*, because the left paramere is less wide and less triangular in the latter species. Moreover, the right paramere is as well setose on its lower margin in *R. gracilis* as it is in *R. darlingtoni*.

Hence, the two species are less different in certain respects than the descriptions indicate.

For better distinction, measurements and ratios of the holotype of *R. darlingtoni* are added below.

DIAGNOSIS. Easily distinguished by the remarkably cordate prothorax, deeply impressed elytral striae, and deeply curved aedeagus with elongate, blade-like apex.

DESCRIPTION. *Measurements.* Length: 6.1mm; width: 2.55mm. Length eye/orbit: 3.2; width/length of pronotum: 1.17; width base/apex of pronotum: 1.15; width pronotum/head: 1.55; length/width of elytra: 1.37; width elytra/pronotum: 1.35.

DISTRIBUTION (Fig. 16). Eungella Plateau west of Mackay, central eastern Queensland. Known only from type locality. This species has not been recaptured since description.

Raphetis curta sp. nov.
(Figs 2D, 13A, 14C,F, 15A,D, 16)

ETYMOLOGY. Refers to the short, compact hind body compared with the other species.

MATERIAL. HOLOTYPE: ♂,QMT93419, SEQ: 28°15'S 153°16'E Springbrook Repeater, 21 Dec 1996. 1000m G.B. Monteith Pyrethrum, dead trees (QM). PARATYPES: 1 ♂, same loc., GM, Pyr. Tree trunks, 1000m (CBM); 1 ♀, same loc., 9.XII.1972 GM. & SM / *Raphetis* sp. n. det. B.P. Moore '74 (QM).

DIAGNOSIS. Easily distinguished by the barely cordate prothorax, short abdomen, and shorter and wider, on lower margin distinctly bisinuate, aedeagus.

DESCRIPTION. *Measurements.* Length: 5.3-5.7mm; width: 2.3-2.6mm. Length eye/ orbit: 2.3-2.4; width/length of pronotum: 1.20- 1.23; width base/apex of pronotum: 1.34-1.40; width pronotum/head: 1.51-1.58; length/width of elytra: 1.31-1.35; width elytra/pronotum: 1.36-1.43.

Colour. Dark piceous to blackish. Lateral margin of elytra narrowly reddish. Clypeus, labrum, and mandibles reddish-piceous, palpi and antennae reddish. Femora and tarsi reddish, tibiae reddish-piceous. Lower surface of anterior body dark piceous, abdomen reddish-piceous.

Head (Fig. 15A). Considerably narrower than pronotum. Eyes comparatively large (in genus), moderately convex, laterally fairly protruding. Eyes separated from frons by a narrow, straight furrow. Frons with two irregular, slightly curved furrows medially of eyes that are prolonged to clypeal suture. Furrows medially widened to some shallow, irregular grooves, at posterior end laterally bordered by convex ridge. Anterior supraorbital seta situated close to eye near anterior border of eye, posterior seta situated well behind eye and rather moved to upper part of head. Neck separated by a shallow, transverse furrow. Clypeal suture distinct. Labrum anteriorly slightly concave, 6-setose and with some shorter hairs around the anterior angles. Mandibles elongate, straight, though shorter than in related species, inner margin straight for a long distance, then suddenly incurved, with acute apex, with elongate seta in scrobe. Mentum with acute triangular tooth. Submentum bisetose. Gula quadrisetose. Glossa short, narrow, bisetose, paraglossae hyaline, surpassing glossa. Lacinia very elongate, inner margin with few strong spines, apex markedly incurved, very acute. Both palpi glabrous, apex transverse. Antenna rather slender and elongate, surpassing base of pronotum by about two antennomeres, pilose from half of 4th antennomere, central antennomeres c. 2.5 × as long as wide. Surface of head absolutely smooth, without any indication of microsculpture, remarkably glossy.

Pronotum (Figs 14C, 15A). Wide, moderately convex, not markedly cordiform. Apex gently concave, anterior angles slightly produced, obtusely rounded, sides evenly curved, widest at middle, very weakly sinuate in basal half. Basal angles angulate, almost rectangular, angle c. 95°. Base laterally slightly oblique. Apex not margined, base laterally more or less distinctly margined. Lateral channel narrow, slightly explanate near base. Median line distinct, well impressed, neither reaching apex nor base. Basal grooves straight, rather linear, fairly deep. Both, anterior and posterior transverse sulci barely indicated. Anterior lateral seta situated slightly in front of middle, posterior lateral seta absent. Surface absolutely smooth, without any indication of microsculpture and puncturation, though near median line with some short, transverse furrows, remarkably glossy.

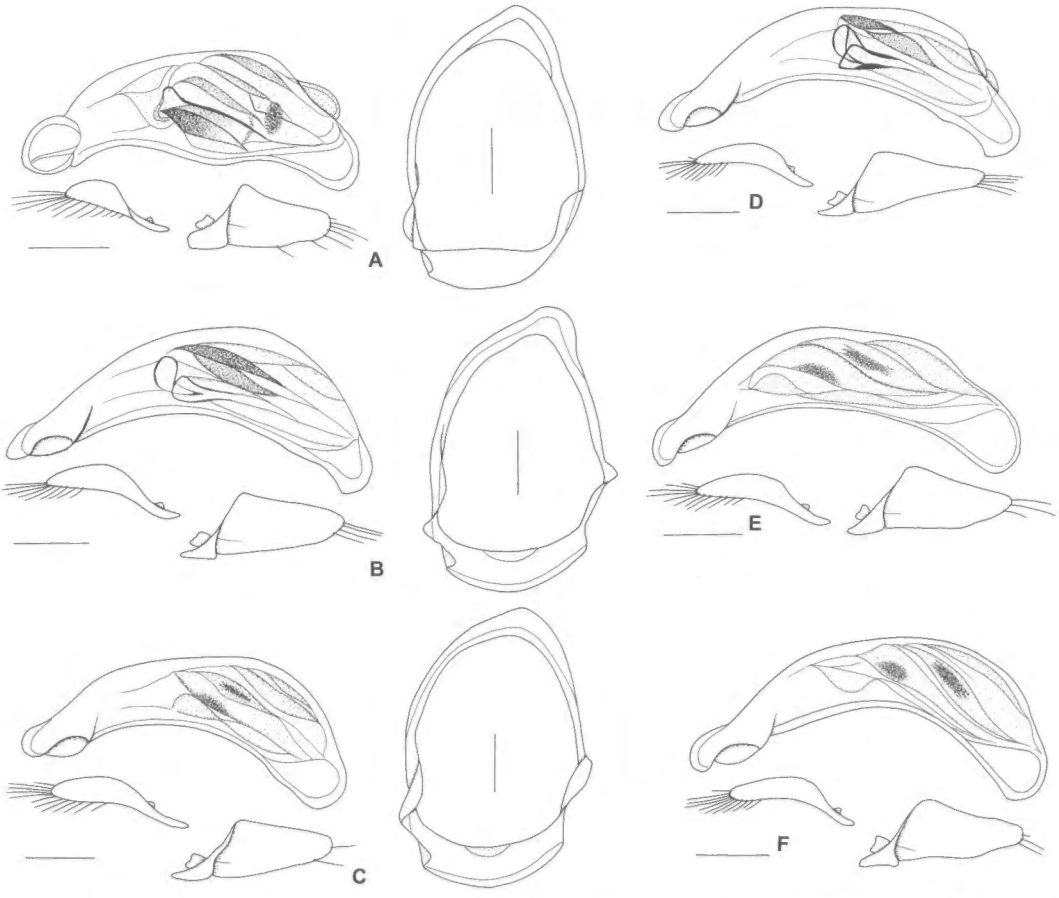

FIG. 13. Male genitalia of *Raphetis* spp. A, *R. curta* sp. nov., aedeagus, parameres, and genital ring; B, *R. gracilis gracilis* Moore, aedeagus, parameres, and genital ring; C, *R. gracilis spinosa* subsp. nov., aedeagus and parameres; D, *R. gracilis frerei* subsp. nov., aedeagus and parameres; E, *R. gracilis spurgeoni* subsp. nov., aedeagus and parameres; F, *R. gracilis subarmata* subsp. nov., aedeagus and parameres. Scales: 0.5mm.

Elytra (Fig. 14F). Wide, convex, considerably wider than pronotum, widest at humeri. Humeri gently angulate, lateral margins feebly convex, elytra widest at anterior fourth or third, than faintly though evenly narrowed. Lateral part of apex slightly sinuate at position of crossing of epipleurae, then evenly convex. Basal margin complete, lateral margin narrow throughout. Scutellary puncture and seta present, at base of 1st stria. Scutellary stria short, inside 1st stria. Striae extremely fine, barely impressed, though in one specimen 1st stria fairly distinct. External striae barely recognisable. Striae barely punctate, or internal striae very finely punctate. 8th stria complete, well impressed. Near apex 1st, 2nd, 5th, and in particular 7th striae well impressed, 7th stria forming an elongate, fairly deep furrow. Intervals depressed, at most 1st and 2nd intervals very feebly convex in apical half. Disk impunctate. Marginal series consisting of two groups of 6-7 and 6 setiferous punctures, respectively, which are widely separated in middle. Inside of deepened 7th stria with two additional punctures near apex. Some of the marginal setae very elongate. Intervals absolutely smooth, without any traces of microreticulation, highly glossy, slightly iridescent.

Lower surface. Metepisternum short, slightly longer than wide at apex. Mesepisternum and metepisternum coarsely though very sparsely punctate. Terminal sternite in male bisetose, in

female quadrisetose along margin, though with some additional shorter setae.

Legs. Fairly elongate. 5th tarsomere asetose beneath. Anterior tarsus in male barely wider than in female, 1st-3rd tarsomeres asymmetrically squamose beneath.

Male genitalia (Fig. 13A). Genital ring short and wide, asymmetrically triangular, with short, rounded apex. Aedeagus short and compact, laterally depressed, lower surface markedly bisinuate, apex short, very wide, convex, slightly turned. Internal sac rather complexly folded, with several sclerotised plates within. Both parameres comparatively short and wide, left larger than right, with wide, obtuse apex, 2-5 apical setae and 0-2 shorter setae on lower margin. Right paramere remarkably short, with acute apex and c. 12 elongate setae at apex and along the whole of lower margin.

Female genitalia (Fig. 2D). Stylomere 1 with 2 ensiform setae at middle of ventro-apical margin. Stylomere 2 rather short, with short apex and 2 large dentiform ventro-lateral ensiform setae of about similar size in middle of lateral margin. Near apex with a large, oblong pit and a short nematiform seta originating from that pit. In middle of dorso-median surface with a large, dentiform, dorso-median ensiform seta. Lateral plate with a densely setose area at median apical margin.

Variation. Some minor variation in relative shape of pronotum and elytra, depth of elytral striae and number of setae on the parameres.

DISTRIBUTION (Fig. 16). Springbrook Plateau at Queensland/New South Wales border.

COLLECTING CIRCUMSTANCES. Collected by pyrethrum knockdown in upland rainforest on 'tree trunks' and 'dead trees'. Apparently, this species lives in crevices of dead wood and, according to observations made by G. Monteith, it comes out to forage at the bark surface at night.

Raphetis gracilis Moore
(Fig. 17)

Raphetis gracilis Moore, 1963: 288; Moore et al., 1987: 153.

REMARKS. Occurs in five populations with slightly different ranges, and for the present these are classified as subspecies. For distinctions see key.

For taxonomic problems see 'Taxonomic Principles' and 'Remarks'.

DIAGNOSIS. Relatively large, easily distinguished by the combination of following character states: extremely elongate mandibles, depressed eyes, distinctly cordate prothorax, weak striation of elytra, evenly but not suddenly curved aedeagus, and rather elongate parameres the right one bearing setae only in apical part of lower rim.

Raphetis gracilis gracilis Moore
(Figs 2E, 13B, 14A, 17)

MATERIAL. HOLOTYPE: ♂, Millaa Millaa, Q. Atherton Tab. Apr. 1 '32. 2500 ft/ Australia, Harvard Exp., Darlington/ *Raphetis* gen.n. *gracilis* sp.n. holotype ♂ Det. B.P. Moore '63 (ANIC).

NEW RECORDS. 2 ♂, NEQ: 17°33'S 145°33'E Mt Fisher, ½km NW 8.ii.1999. 1280m. R/F. GM. Pyr. - trees & logs. 2170 (CBM, QM,); 1 ♂, 2 ♀, Mt Fisher, 1050-1100m 7km SW Millaa Millaa, N Qld 27-29 Apr., 1982 GM, DY & DC (QM); 2 ♂, Millaa Millaa Falls, via Millaa Millaa, N Qld 12 Aug. 1968 B. Cantrell (QM).

DIAGNOSIS. Medium sized subspecies with unarmed elytra and narrow, comparatively elongate, rather cordiform pronotum. Distinguished from the northern subspecies (*R. g. spurgeoni*, *R. g. subarmata*, *R. g. spinosa*) by narrower prothorax and narrower, on lower side slightly downcurved apex of elytra. Distinguished from most closely related *R. g. frerei* by lesser size, slightly narrower pronotum and considerably longer elytra.

REDESCRIPTION. *Measurements*. Length: 7.0-7.8mm; width: 2.65-2.90mm. Length eye/orbit: 1.8-2.0; width/length of pronotum: 1.00-1.03; width base/apex of pronotum: 1.08-1.11; width pronotum/head: 1.35-1.41; length/width of elytra: 1.49-1.52; width elytra/pronotum: 1.49-1.55.

Colour. Black. Clypeus, labrum, and mandibles reddish-piceous, palpi and antennae reddish. Legs reddish. Lower surface of anterior body dark piceous, abdomen reddish-piceous.

Head. Considerably narrower than pronotum. Eyes comparatively small (in genus), little convex, laterally little protruding. Orbits elongate, oblique, straight. Eyes separated from frons by a narrow, straight furrow. Frons with rather deep, irregularly impressed, curved furrows medially of eyes that are prolonged to clypeal suture. Furrows medially widened to shallow, irregular grooves, at posterior end laterally bordered by convex ridge. Anterior supraorbital seta situated close to eye near anterior border of eye, posterior seta situated far behind eye and rather moved to upper part of

head. Neck separated by a shallow, transverse furrow. Clypeal suture distinct. Labrum anteriorly rather deeply concave, 6-setose and with some shorter hairs around the anterior angles. Mandibles very elongate, straight, inner margin straight for a long distance, apex little curved, with elongate seta in scrobe. Mentum with acute triangular tooth. Submentum bisetose, gula quadrisetose, all setae very elongate. Glossa short, rather narrow, bisetose, paraglossae hyaline, surpassing glossa. Lacinia very elongate, inner margin with rather few strong spines, apex markedly incurved, very acute. Both palpi elongate, glabrous, apex transverse. Antenna rather slender and elongate, barely surpassing base of pronotum, pilose from apical half of 4th antennomere, central antennomeres c. 2.5 × as long as wide. Surface of head absolutely smooth, without any indication of microsculpture and puncturation, remarkably glossy.

Pronotum (Fig. 14A). Comparatively narrow, moderately convex, rather cordiform. Apex gently concave, anterior angles slightly produced, angulate, sides evenly curved, widest at middle, sinuate and almost parallel in basal fifth. Basal angles angulate, rectangular. Base laterally slightly oblique. Apex and base not margined. Lateral channel narrow, barely explanate near base. Median line distinct, slightly impressed, neither reaching apex nor base. Basal grooves straight, rather linear, fairly deep. Both transverse sulci barely indicated. Anterior lateral seta situated slightly in front of middle, posterior lateral seta absent. Surface absolutely smooth, without any indication of microsculpture or puncturation, though near median line with some short, transverse furrows, remarkably glossy.

Elytra. Comparatively elongate, convex, considerably wider than pronotum, rather parallel, wide at humeri. Humeri slightly angulate, lateral margins feebly convex, elytra widest at anterior third or near middle, posteriorly evenly narrowed. Lateral part of apex slightly sinuate at position of crossing of epipleurae, then evenly convex. Apex evenly rounded off. Basal margin complete, lateral margin narrow throughout. Scutellary puncture and seta present, at base of 1st stria. Scutellary stria not perceptible. Striae extremely fine, barely perceptible. External striae not recognisable. Striae very finely punctate. 8th stria complete, coarsely punctate, though barely impressed. Near apex only 1st and 7th striae well impressed, 7th stria forming an elongate, fairly deep furrow. Intervals absolutely depressed. Disk impunctate. Marginal series consisting of two groups of 7-8 and 6-7 setiferous punctures, respectively, which are widely separated in middle. Inside of deepened 7th stria with two additional punctures near apex. Some of the marginal setae very elongate. Intervals absolutely smooth, without any traces of microreticulation, highly glossy.

Lower surface. Metepisternum rather short, about 1.25 × as long as wide at anterior margin, considerably narrowed behind. Lower surface impunctate. Terminal sternite in male bisetose, in female quadrisetose along margin, and with two additional shorter setae in middle slightly removed from margin.

Legs. Elongate. 5th tarsomere asetose beneath. Anterior tarsus in male barely wider than in female, 1st-3rd tarsomeres asymmetrically and sparsely squamose beneath.

Male genitalia (Fig. 13B). Genital ring short and wide, asymmetrically triangular, with short, rounded apex. Aedeagus rather elongate (in genus), laterally depressed, lower surface almost evenly concave, slightly sinuate just in front of apex. Apex short, very wide, convex, though on lower side slightly angulate, slightly turned. Internal sac rather complexly folded, with several sclerotised plates within. Both parameres comparatively elongate and narrow, left larger than right, triangular, with obtusely triangular apex, and 4-5 apical setae, without additional setae on lower margin. Right paramere with acute apex and c. 10 elongate setae along the apical third of lower margin.

Female genitalia (Fig. 2E). Stylomere 1 with 3 ensiform setae at middle of ventro-apical margin, sometimes with an additional nematiform seta. Stylomere 2 moderate, with relatively short apex and 2 large dentiform ventro-lateral ensiform setae the upper one of which is considerably larger in middle of lateral margin. Near apex with a large, oblong pit and a short nematiform seta originating from that pit. In middle of dorso-median surface with a large, dentiform, dorso-median ensiform seta. Lateral plate with a densely setose area at median apical margin.

Variation. Slight differences in relative shape of pronotum and elytra.

DISTRIBUTION (Fig. 17). Millaa Millaa/Mt Fisher area in the western part of Atherton Tableland, northeastern Queensland.

COLLECTING CIRCUMSTANCES. Taken by pyrethrum knockdown on trees and logs in upland rainforest.

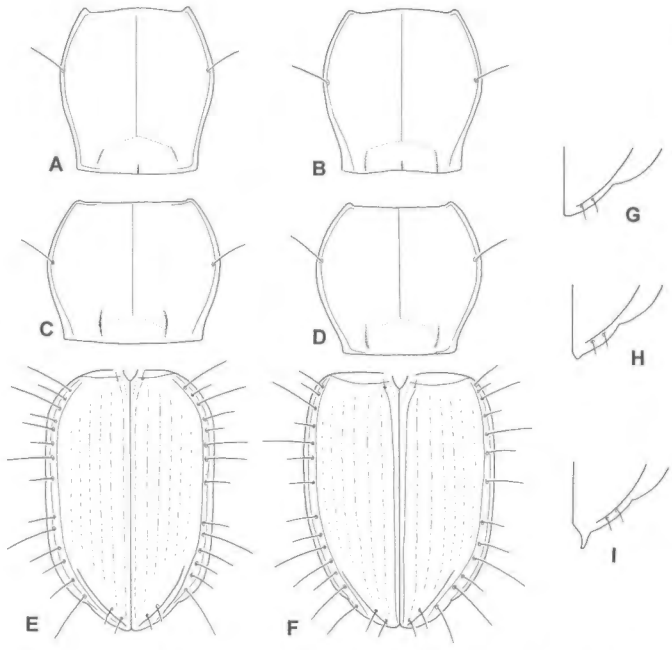

FIG. 14. Pronota, elytra and elytral apices of *Raphetis* spp. A, *R. gracilis gracilis* Moore; B, *R. gracilis frerei* subsp. nov.; C,E, *R. curta* sp. nov.; D,F,I, *R. gracilis spurgeoni* subsp. nov.; G, *R. gracilis spinosa* subsp. nov.; H, *R. gracilis subarmata* subsp. nov.

Raphetis gracilis frerei subsp. nov.
(Figs 13D, 14B, 15B,E, 17)

ETYMOLOGY. Refers to the distribution on Mt Bartle Frere.

MATERIAL. HOLOTYPE: ♂, QMT21872, NEQ: 17°16'S 145°49'E Massey Ra., 4km W of Bellenden Ker, 1250m 10.x.1991. Pyrethrum, Monteith & Janetzki (QM). PARATYPES: 2 ♂, 1 ♀, same data (QM, CBM); 1 ♂, same locality, 11.x.1991 (QM); 2 ♀, same locality, 9-11.x.1991 (QM); 2 ♂, 1 ♀, Mt Bartle Frere. N Qld. Central Ridge. 1500m 27.xii.1989. GM Pyr. Logs (CBM, QM); 1 ♀, Bellenden Ker Range, NQ Cable Tower 3, 1054m 17 Oct.-5 Nov.1981 Earthwatch&QM (QM).

DIAGNOSIS. Large subspecies with unarmed elytra and comparatively narrow and elongate, rather cordiform pronotum. Distinguished from the northern subspecies (*R. g. spurgeoni*, *R. g. subarmata*, *R. g. spinosa*) by larger size, narrower prothorax, and narrower, on lower side slightly downcurved apex of elytra. Distinguished from most closely related *R. g. gracilis* by larger size, slightly wider pronotum and considerably shorter elytra.

DESCRIPTION. *Measurements.* Length: 7.9- 8.5mm; width: 3.1-3.3mm. Length eye/ orbit: 1.7-1.9; width/length of pronotum: 1.04- 1.07; width base/ apex of pronotum: 1.10-1.13; width pronotum/head: 1.46-1.51; length/width of elytra: 1.42-1.47; width elytra/pronotum: 1.54- 1.58.

Colour. As in nominate subspecies.

Head. As in nominate subspecies, though eyes even more depressed.

Pronotum (Figs 14B, 15B). As in nominate subspecies, though pronotum, at the average, slightly wider and with wider base.

Elytra. As in nominate subspecies, though slightly shorter and wider, on average laterally slightly more convex. Inner striae somewhat variable, either barely indicated as a row of extremely fine punctures, or even very gently impressed.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 13D). Much as in nominate subspecies, but aedeagus slightly longer and both parameres slightly narrower.

Female genitalia. As in nominate subspecies.

Variation. Some minor variation in relative shape of pronotum and elytra, and in distinctness of the inner elytral striae.

DISTRIBUTION (Fig. 17). Mt Bellenden Ker, Mt Bartle Frere, and Massey Range at the eastern margin of Atherton Tableland, North Queensland.

COLLECTING CIRCUMSTANCES. Taken by pyrethrum knockdown in upland rainforest on logs. Collected so far between 1050-1500m.

Raphetis gracilis spurgeoni subsp. nov.
(Figs 13E, 14D,E,I, 15C,F, 17)

ETYMOLOGY. Refers to the type locality near Mt Spurgeon.

MATERIAL. HOLOTYPE: ♂, QMT21876, NE.Q: 16°22'S 145°13'E 7km N Mt Spurgeon (Camp 2),17-19.x.1991, 1200-1250m, Monteith, Janetzki, Cook & Roberts (QM). PARATYPES: 2 ♂, 1 ♀, same data (CBM, QM).

DIAGNOSIS. Small subspecies with unarmed elytra and wide, short, moderately cordiform pronotum. Distinguished from both southern subspecies (*R. g. gracilis*, *R. g. frerei*) by wider prothorax and wider, on lower side evenly curved apex of elytra. Distinguished from most closely related *R. g. subarmata* and *R. g. spinosa* by more cordiform pronotum with comparatively narrower base, and by absolute lack of any spine or denticle at apex of elytra.

DESCRIPTION. *Measurements.* Length: 6.6-7.0mm; width: 2.55-2.7mms. Length eye/orbit: 2.1-2.3; width/length of pronotum: 1.12-1.16; width base/apex of pronotum: 1.10-1.15; width pronotum/head: 1.45-1.50; length/width of elytra: 1.48-1.50; width elytra/pronotum: 1.42-1.45.

Colour. As in nominate subspecies.

Head. As in nominate subspecies, though eyes relatively convex.

Pronotum (Figs 14D, 15C). As in nominate subspecies, though pronotum wide with fairly narrow base, hence rather cordiform.

Elytra (Figs 14E, 14I). As in nominate subspecies, but with wider, on lower side, evenly curved apex, and with inner elytral striae invariably very gently though perceptibly impressed, though barely punctate. Hence, inner intervals faintly convex.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 13E). As in nominate subspecies, but aedeagus less curved, apex larger and evenly rounded on lower border, and left paramere with only 3 setae at apex.

Female genitalia. As in nominate subspecies.

Variation. Slight variation noted in relative shape of eyes, prothorax, and elytra.

DISTRIBUTION (Fig. 17). North of Mt Spurgeon near the western edge of the Carbine Tableland, North Queensland.

COLLECTING CIRCUMSTANCES. Taken by pyrethrum knockdown on logs and tree trunks in upland rainforest above 1200m.

Raphetis gracilis subarmata subsp. nov.
(Figs 13F, 14H, 17)

ETYMOLOGY. Refers to the denticle at the apex of the elytra.

MATERIAL. HOLOTYPE: ♂, QMT21866, Carbine Tableland, NE Qld Plane Crash Site 27-28 Nov 1990, 1330m, Monteith, Thompson, Cook, Sheridan & Janetzki, Pitfall Traps & Hand (QM). PARATYPES: 1 ♂, 1 ♀, same data (CBM); 1 ♂, 16°24'S 145°13'E Stewart Ck, 4km NNE. Mt Spurgeon (Camp 1), 1250-1300m, 15-20.x.1991. GM, HJ, DC & LR (QM); 1 ♂, 16°24'S 145°12'E Black Mtn. 4.5km N of Mt Spurgeon, 1250-1330m, 17-18.x.1991. GM, HJ, DC & LR (QM).

DIAGNOSIS. Medium sized subspecies with slightly denticulate elytra and moderately wide and short pronotum. Distinguished from both southern subspecies (*R. g. gracilis*, *R. g. frerei*) by wider prothorax with wider base, and by wider, on lower side evenly curved apex of elytra. Distinguished from *R. g. spurgeoni* by less cordiform prothorax and presence of a denticle at the apex of the elytra; and from *R. g. spinosa* by narrower, slightly more cordiform pronotum, and by denticulate rather than spinose apex of elytra.

DESCRIPTION. *Measurements.* Length: 6.7-7.9mm; width: 2.65-3.1mm. Length eye/ orbit: 1.8-2.0; width/length of pronotum: 1.08- 1.10; width base/apex of pronotum: 1.14-1.18; width pronotum/head: 1.47-1.52; length/width of elytra: 1.45-1.48; width elytra/pronotum: 1.50-1.58.

Colour. As in nominate subspecies.

Head. As in nominate subspecies.

Pronotum. As in nominate subspecies, though base rather wide.

Elytra (Fig. 14H). As in nominate subspecies, though elytra rather short, laterally rather convex, and with a tiny sharply angulate or even denticulate at apex. Inner striae invariably gently though perceptibly impressed, though barely punctate. Inner intervals faintly convex.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 13F). As in nominate subspecies, but aedeagus more curved, apex larger and evenly rounded on lower border, and left paramere with only 2-3 setae at apex.

Female genitalia. As in nominate subspecies.

Variation. Some slight variation noted in size and in relative shape of eyes, prothorax, and elytra.

DISTRIBUTION (Fig. 17). Mt Spurgeon and Plane Crash Site at the western and eastern margins, respectively, of the Carbine Tableland, North Queensland.

COLLECTING CIRCUMSTANCES. Specimens from Mt Spurgeon were collected by pyrethrum knockdown in upland rainforest, those from Plane Crash Site by pitfall trapping and by hand

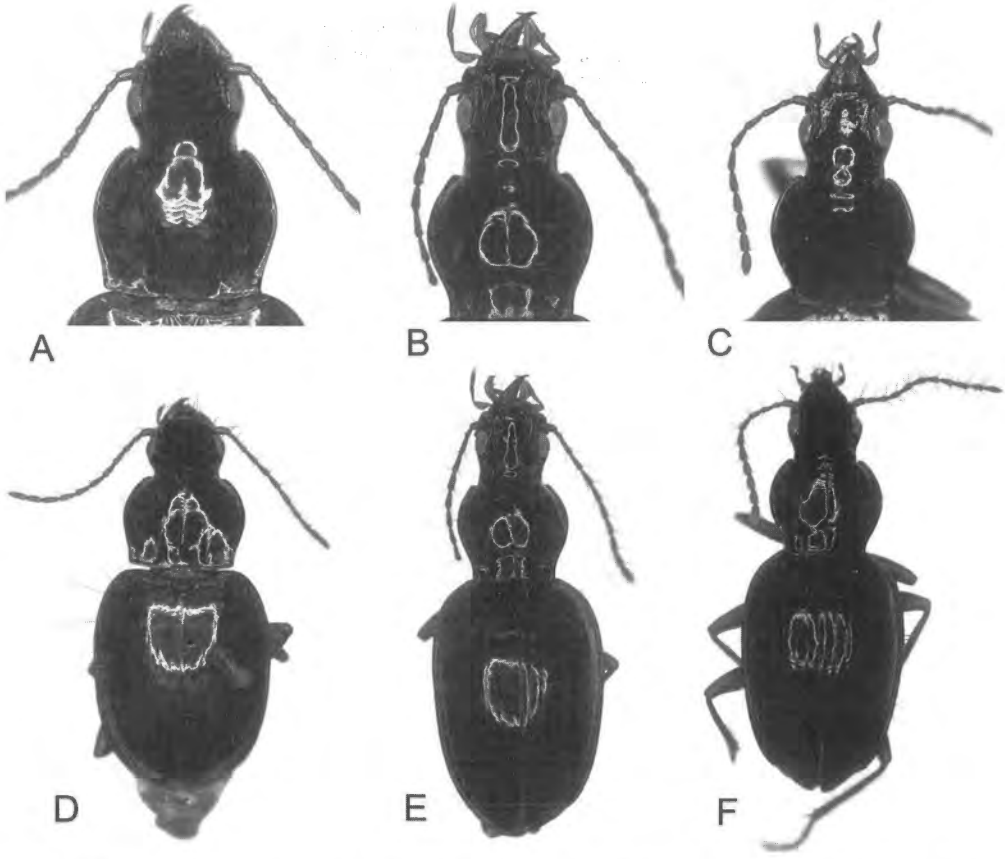

FIG. 15. Head and pronotum of *Raphetis*. A, *Raphetis curta* sp. nov.; B, *R. gracilis frerei* subsp. nov.; C, *R. gracilis spurgeoni* subsp. nov.; habitus of *Raphetis*. D, *Raphetis curta* sp. nov. E, *R. gracilis frerei* subsp. nov. F, *R. gracilis spurgeoni* subsp. nov.; lengths: 5.3mm; 8.3mm; 7.0mm.

collecting. Captured only above 1250m which is at maximum altitude on these mountains.

Raphetis gracilis spinosa subsp. nov.
(Figs 13C, 14G, 17)

ETYMOLOGY. Refers to the spinose elytral apices.

MATERIAL. HOLOTYPE: ♂, QMT21858, Mossman Bluff 10km W Mossman, N Qld. 17-18.xii.1988. 1100-1300m, Monteith & Thompson (QM). PARATYPES: 2 ♂, NEQ: 16°30'Sx145°16'E Hilltop, 18km N Mt Lewis, 23.xi.1998. GM Pyrethrum, trees. 1300m Rf. (CBM); 1 ♂, 2km SE Mt Spurgeon via Mt Carbine. N Qld. 20-21.xii.1988. 1100m, GM & GT (QM); 3 ♀, Mt Lewis Rd end 10km N Mt Lewis 25.xi.1990, 1100m, GM, RS & GT. Pyrethrum, Logs (QM).

DIAGNOSIS. Medium sized subspecies with spinose elytra and moderately wide and short pronotum with very wide base. Distinguished from both southern subspecies (*R. g. gracilis*, *R. g. frerei*) by wider prothorax with wider base, and by wider, on lower side evenly curved apex of elytra. Distinguished from both closely related *R. g. spurgeoni* and *R. g. subarmata* by less cordiform prothorax, remarkably spinose apex of the elytra, and shorter and stouter aedeagus; further on from *R. g. spurgeoni* by wider base of pronotum, and from *R. g. subarmata* by wider pronotum.

DESCRIPTION. *Measurements.* Length: 6.95-8.0mm; width: 2.6-3.2mm. Length eye/ orbit: 2.0-2.1; width/length of pronotum: 1.11- 1.16; width base/apex of pronotum: 1.18-1.22; width pronotum/head: 1.50-1.55; length/width of elytra: 1.48-1.56; width elytra/pronotum: 1.42-1.44.

Colour. As in nominate subspecies.

Head. As in nominate subspecies.

Pronotum. As in nominate subspecies, though pronotum very wide and with wide base.

Elytra (Fig. 14G). As in nominate subspecies, though elytra narrow in comparison to pronotum. Apex with conspicuous hook-shaped spine that is slightly curved outwards. Inner striae very gently impressed, barely punctate. Inner intervals not or extremely faintly convex.

Lower surface. As in nominate subspecies.

Legs. As in nominate subspecies.

Male genitalia (Fig. 13C). As in nominate subspecies, but aedeagus shorter and stouter, more evenly curved, apex larger and evenly rounded on lower border, and left paramere with only 2 setae at apex.

Female genitalia. As in nominate subspecies.

Variation. Some differences in relative shape of pronotum and elytra, and development of elytra striae.

DISTRIBUTION (Fig. 17). Mt Lewis, Mossman Bluff and Mt Spurgeon, Carbine Tableland, North Queensland.

COLLECTING CIRCUMSTANCES. Taken by pyrethrum knockdown in upland rainforest on trees and logs. Collected only above 1100m.

MEASUREMENTS AND RATIOS IN *RAPHETIS* MOORE

For better comparison of the species the measurements and ratios of all species and subspecies are compiled in Table 3.

REMARKS ON THE *RAPHETIS GRACILIS* COMPLEX

As mentioned in the introduction, the five different populations of *R. gracilis* are classified here as subspecies. At first glance, however, at least *R. gracilis spinosa* might be regarded a separate species because of its conspicuously spinose elytra and its wide pronotum with comparatively wide base. Specimens of this population also look rather different in general shape from other populations. However, the male genitalia of *R. gracilis spinosa* are not perceptibly different from those of the other populations of *R. gracilis* from the Carbine Tableland. Measurements and ratios of all five populations also widely overlap. Because of this complexity it is difficult to make reliable distinctions between populations in the present state of knowledge. On the other hand, these beetles live in rain forest at rather high altitude and a lowland barrier that is today free from rainforest exists between at least the southern populations (*R. g. gracilis* and *R. g. frerei*) and the northern populations (*R. g. spinosa*, *R. g. spurgeoni* and *R. g. subarmata)*. That these two groups are sufficiently different to be classified as separate taxa, is also indicated by the shape of the aedeagus that is slightly sinuate subapically at its lower margin in the southern group, and straight in the northern group, and by the structure of the internal sac. This particular lowland barrier is known as the Black Mountain Barrier and has been shown to be effective in several vertebrate and invertebrate groups (Schneider et al. 1998).

It is unknown how substantial the barriers were before the arrival of European settlers in north Queensland after which the tablelands between the ranges were extensively deforested. Though at least some climatic differences must have existed, even in pre-human times, that probably prevented interbreeding between the populations.

Hence, at least the southern and northern groups have been taxonomically separated for an unknown period. Within the northern group (*R. g. spinosa*, *R. g. subarmata*, and *R. g. spurgeoni*) the situation is somewhat different. All three populations live in rather close proximity, and it is even conceivable that they overlap in some areas. Moreover, the environment on the Carbine Tableland is much more homogenous today than it is on the Atherton Tableland, and this may have also been the case in pre-human times . It is conceivable, then, that these populations have differentiated rather recently, and may still be in the course of differentiation with some inter-breeding still occurring.

PHYLOGENY AND BIOGEOGRAPHY OF *RAPHETIS.* Because of comprehensive sampling by the Queensland Museum of rainforested mountains in Queensland the actual distribution of *Raphetis* is probably rather reliably known Hence, some considerations about phylogenetic relations are possible, even though new taxa may be discovered in future.

Within the Psydrinae in general and with respect to the closely related genus *Meonis* in particular, the following character states in *Raphetis* seem to be apomorphic: 1) reduction of elytral striation; 2) lengthening of head; 3) lengthening of mandibles; 4) reduction of eye size in comparison to size of orbit; 5) flattening of eyes; 6) reduction of microreticulation to get a

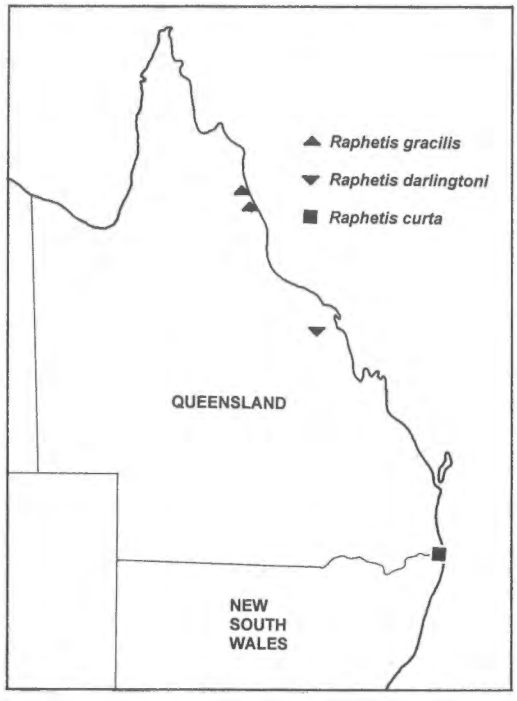

FIG. 16. Distribution of *Raphetis* spp.

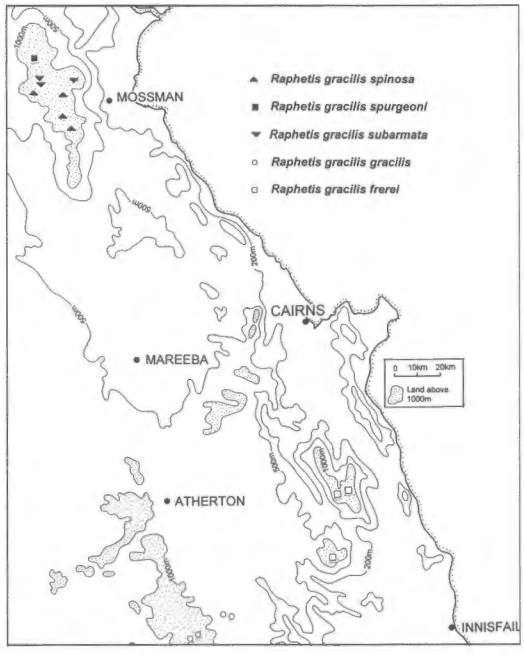

FIG. 17. Distribution of subspecies of *Raphetis gracilis* Moore in northern Queensland.

highly glossy surface; 7) reduction of pilosity on lower margin of right paramere.

These character states apply for the whole genus. But within the genus there are also strong clinal developments within most of the same characters.

When applied to the species, *R. darlingtoni* and *R. curta* are seen to be plesiomorphic in almost all characters when compared with *R. gracilis*. Only in the reduced elytral striation is *R. curta* apomorphic compared to *R. darlingtoni*, though in characters states of head, mandible, and eye size, *R. curta* is more plesiomorphic than *R. darlingtoni*. Certainly, it is not possible to draw a cladogram from the few characters used as they would not yield information about any synapomorphies between the southern species (*R. curta*, *R. darlingtoni*) and the northern *gracilis*-complex.

However, when this rough phylogenetic statement is combined with the distribution pattern of the species, it clearly reveals a clinal increase in apomorphy from south to north in several characters. Thus, the most southern species, *R. curta*, is most plesiomorphic in many respects, with *R. darlingtoni* a little more evolved, whereas *R. gracilis* of north Queensland is apomorphic in almost all character states discussed. Within the *gracilis*-complex some minor further clinal development is seen, with a south-to-north gradient also obvious in several character states. *R. g. gracilis* from Atherton Tableland, for instance, has the plesiomorphic condition of relatively large eyes and unarmed elytra. *R. g. frerei* possesses very depressed eyes, and *R. g. spinosa* has relatively convex eyes but armed elytra. The last two subspecies occur either further north on Carbine Tableland, or on the ranges at the eastern margin of Atherton Tableland.

As noted earlier, the relationships of *R. g. subarmata* and *R. g. spurgeoni* are more difficult to explain. With respect to eye size and development of spined elytra, there seems to exist a cline, but in the opposite direction to the southern populations, with the most plesiotypic *R. g. spurgeoni* in the north, and the most apotypic *R. g. spinosa* in the south. *R. g. subarmata* is intermediate in many respects.

The above distribution pattern is a scenario that has proved to be common in ground living carabids (and other taxa) of the montane rain forests of northern Queensland (e.g. Baehr,

TABLE 3. *Raphetis* spp. measurements.

	N	body length (mm)	ratio length eye/orbit	ratio width/ length pronotum	ratio width base/apex pronotum	ratio width pronotum/ head	ratio length/ width elytra	ratio width elytra/ pronotum
R. curta	3	5.3-5.7	2.3-2.4	1.20-1.23	1.34-1.40	1.51-1.58	1.31-1.35	1.36-1.43
R. darlingtoni	1	6.1	3.2	1.17	1.15	1.55	1.37	1.35
R. gracilis gracilis	8	7.0-7.8	1.8-2.0	1.00-1.03	1.08-1.11	1.35-1.41	1.49-1.52	1.49-1.55
R. gracilis frerei	10	7.9-8.5	1.7-1.9	1.04-1.07	1.10-1.13	1.46-1.51	1.42-1.47	1.54-1.58
R. gracilis spurgeoni	4	6.6-7.0	2.1-2.3	1.12-1.16	1.10-1.15	1.45-1.50	1.48-1.50	1.42-1.45
R. gracilis subarmata	5	6.7-7.9	1.8-2.0	1.08-1.10	1.14-1.18	1.47-1.52	1.45-1.48	1.50-1.58
R. gracilis spinosa	7	6.9-8.0	2.0-2.1	1.11-1.16	1.18-1.22	1.50-1.55	1.48-1.56	1.42-1.44

1995b; genus *Sitaphe*, see above). In several low vagility groups the species occurring on Atherton Tableland not only have a wide range but are usually also rather plesiotypic compared with those from Bellenden Ker/Bartle Frere ranges, Carbine Tableland and mountains tops further north. This pattern is believed to have been caused by vicariance through separation of populations at the eastern and northern borders of a previous larger tableland following its dissection by deep river valleys and due to retreat of the rainforests to the mountain tops. Both events were caused by erosion of the uplifted tablelands into montane blocks and, at the same time, by repeated spreading and retreat of the rain forests during the stadials and interstadials of glaciation period.

Provided no contrary evidence emerges in future, this would mean that *Raphetis* probably originated somewhere in the subtropical or cool temperate rain forests of southern Queensland and later spread northwards to reach eventually the montane tropical rain forests of northern Queensland. There it passed through a considerable taxonomic radiation, presumably rather recently and probably still continuing. This scenario also agrees well with considerations about the origin of the Australian Psydrinae in general that will be developed in my forthcoming revision of the Amblytelinae (Baehr, in press).

GENERAL DISCUSSION

HABITS AND LIFE HISTORIES. Although labels do not always give information about the habits and habitats of the North Queensland psydrines, fortunately many specimens of all three genera were collected by hand. The following notes on their ecology are based on details kindly contributed by the main collector, Geoff Monteith, as summarised below. Regarding all three genera, the first generalisation that can be made is that all specimens have been collected in rainforest at medium to high altitudes and none have been taken in adjacent eucalypt-dominated open forests. Secondly, all hand-collected active individuals have been taken at night during headlight searching, so we can assume that all are nocturnal in activity.

The small species of *Mecyclothorax* live in leaf litter of upland rain forest, and are collected either by Berlese extraction of litter or by hand searching on the ground with a headlight at night. A few specimens may move a short distance up the mossy surface of tree trunks where they are occasionally sampled by pyrethrum knockdown of that situation. They appear to forage among litter at night on the ground.

Both *Sitaphe* and *Raphetis* also live in upland rain forest, generally at very high altitude and most commonly at the absolute summits of the ranges. Rarely, they are taken in leaf litter, and their primary habitat seems to be the surface or even crevices of bark or exposed dead wood. They rarely occur on living trees, but usually on dead trees and logs where there are many cracks and crevices on the surface. Specimens of *Sitaphe* usually rest in depressions and grooves on the wood or bark surface where their strong convex elytra protects them from attack. In the daytime they are usually found resting in depressions on the underside of logs and smaller pieces of wood lying on the ground. At night they run over the surface of dead wood and then they can be detected while hunting with a headlight.

Specimens of *Raphetis* are much rarer and are almost never found by hand-collecting in the daytime. They probably move into tunnels and chambers inside the dead wood in the daytime, and their more slender form also suggests such behaviour. Pyrethrum forces the beetles out from this situation when the tree trunks and log

surfaces are fogged in the daytime. At night they forage on the surface of the dead wood and almost all the hand-collected specimens are taken at night when they are doing this, sometimes on logs and sometimes on standing dead tree trunks.

So the North Queensland psydrines fall into three rather different habitat categories: *Mecyclothorax* live in leaf litter on the ground; *Sitaphe* and *Raphetis* forage on the surface of dead wood with *Raphetis* retreating inside the wood in the daytime while *Sitaphe* conceals itself in crevices on the surface.

In spite of the above information about habits of adults, nothing is known about life histories of any species, especially on their larvae which are so far unknown.

Although the strange looking body shape of *Sitaphe* and *Raphetis*, especially the narrow head and the rather elongate, porrect mandibles in both genera, indicates a specialised feeding method, there are no observations about diet or feeding habits of any *Sitaphe* or *Raphetis* species. We only can speculate about feeding and we may argue that the cychroid structure of head and mandibles could indicate that they eat snails. The very smooth, glossy surface in both genera may also corroborate this opinion.

For the northern species of *Mecyclothorax* information about diet is also lacking. Given their small size feeding on small insects or worms may be most probable, but no observations are available.

To confirm speculations about phylogenetic relations, better knowledge about ecology and ethology, and especially about life history, would be helpful.

BIOGEOGRAPHICAL CONSIDERATIONS. In *Sitaphe*, *Raphetis* and the northern species group of *Mecyclothorax*, very similar patterns of distribution can be noted. In the three genera all taxa are very closely related and most are restricted to very small ranges that repeatedly cover a single rain forest block (in the sense of Baehr 1995b) or even a single mountain top. This is a general pattern common in flightless invertebrates in the montane rain forests of the Wet Tropics of northern Queensland (Baehr, 1995b, Monteith, 1997, Davies & Lambkin, 2000, Harvey, 2000). In *Sitaphe*, however, one species occupies a fairly large range on the Atherton Tableland, which again is a common distribution pattern in the Wet Tropics.

At the first glance, the high grade of morphological similarity of the many taxa should be evidence of a very recent taxonomic radiation of rather old stocks in all three mentioned genera. There has been, however, some discussion in recent papers about the age of the many closely related invertebrate taxa occurring in the Wet Tropics, especially with regard to the montane species (e.g. Moritz et al., 2000; Russell et al., in press). In some papers evidence has been presented, mainly from molecular phylogenetic analyses (expressed in the percentage of sequence divergence of 16S rRNA), suggesting the main speciation events to be of late Tertiary age, in Pliocene or even late Miocene.

However, it seems to me rather audacious to translate such percentages of sequence divergences directly into an absolute time table, because little is known about different rates of development of molecular divergences under different or even rapidly changing environmental conditions. External morphological differences, at least can develop very rapidly when ecological factors are changing.

Hence, as a conclusion, and because molecular data are still lacking for the carabid groups mentioned herein, the high grade of morphological similarity on the background of high species diversity and a high level of endemism are still evidence of quite recent — that is Pleistocene — speciation events that most probably proceeded by allopatric speciation caused mainly by vicariance events, which apparently was a common means of evolution of diversity in tropical rain forest (Joseph et al., 1995).

During the last years when much more scrutinised collecting work was conducted in a multitude of montane rainforests of eastern and northern Queensland, a number of unexpected species of southern origin were recorded far north of the range of their relatives. Examples from ground beetles are two species of the merizodine genus *Sloaneana* in southern Queensland (Baehr, 2002b), or the occurrence of a *Tasmanitachoides* from a decidedly southerly species-group on the top of a rainforested mountain in North Queensland (Baehr, 2001), or the occurrence of about 40 species of the psydrine genera *Amblytelus* and *Dystrichothorax* in eastern and northeastern Queensland (Baehr, in press), or even the discovery of an —as yet undescribed — migadopine species in northern Queensland (G. Monteith, pers. com.), and, obviously, also the numerous species of

Mecyclothorax, *Sitaphe*, and *Raphetis* occurring in the montane rain forests of northeastern Queensland.

It should be remembered, however, that the ranges of certain decidedly northern genera also have been extended to the south due to recent sampling; as one example the first discovery of a species of northern *Philipis* in northern New South Wales (Baehr, 2002a) should be noted.

These new discoveries show that the traditional biogeographical division of the Australian biota is even less rigid than it was believed so far. In particular the geographic border between the so-called Bassian and Torresian subregions in eastern Australia that has been roughly estimated to follow about the Queensland/New South Wales border, turns out more and more to be a fiction. Even the montane regions of North Queensland include more species that originally stem from cool- or even cold-adapted southern groups, than true Torresian faunal elements. If we accept that there is a clear-cut border at all, then this border is — so to speak — rather a horizontal one that extends over a very long distance along the east coast from northern or even mid-New South Wales up to northeastern Queensland. It lies between the warmer and, in parts, drier lowlands and lower reaches of the mountains and the cooler and mostly wetter tablelands and tops of the ranges. Whereas the rain forests, swamps, ponds and large rivers of the lowlands possess a true Torresian fauna, the carabid fauna of the cooler montane tropical rain forests, *Nothofagus* forests, fern bogs, and cold streams likely could be attributed to the Bassian subregion. This Bassian faunal element along the mountain tops of eastern Australia superimposes the Torresian fauna, and it even appears again in the *Nothofagus* forests and bogs of the highlands of New Guinea.

It has been believed that the connection of the Australian block to the southeast Asian insular belt during Miocene not only resulted in the invasion of numerous Oriental species into Australia, but also that these immigrants generally were superior over the native fauna and pushed it back as they advanced to the south (e.g. Darlington, 1968). Certainly, this picture is not right, or, at least, it does not apply for the montane environments of eastern Queensland. On the contrary, it seems that at least the Pleistocene glacial period supported the evolution and taxonomic radiation of Bassian faunal elements even in the montane rainforests of North Queensland.

ACKNOWLEDGEMENTS

I am most indebted to Dr G.B. Monteith, Brisbane, for the generous loan of the material, for preparing the distribution maps, for revising English expression in the MS, and for kindly adding much important information about collecting circumstances and habits of various species. Thanks are also due to Mr T.A. Weir, Canberra, for the kind loan of the types of the described species.

LITERATURE CITED

BAEHR, M. 1992. A new *Mecyclothorax* Sharp from New Guinea (Insecta, Coleoptera, Carabidae, Psydrinae). Spixiana 15: 249-252.

1995a. The genus *Mecyclothorax* SHARP, 1903 in New Guinea (Coleoptera, Carabidae, Psydrinae). Mitteilungen der Münchner Entomologischen Gesellschaft 85: 3-19.

1995b. Revision of *Philipis* (Coleoptera: Carabidae: Bembidiinae). A genus of arboreal Tachyine beetles from the rainforests of eastern Australia: taxonomy, phylogeny and biogeography. Memoirs of the Queensland Museum 38: 315-381.

1998. A further new species of the genus *Mecyclothorax* Sharp from western New Guinea (Insecta, Coleoptera, Carabidae, Psydrinae). Spixiana 21: 21-24.

1999. A preliminary survey of the classification of the Psydrinae (Coleoptera: Carabidae). In, Ball, G.E.,A. Casale & A. Vigna Taglianti (eds) Phylogeny and classification of Caraboidea. Atti di Museo regionale di Scienze naturali de Torino 1998: 359-368.

2000. A new species of the genus *Lestignathus* Erichson from Tasmania. With a note on the Tasmanian species of *Mecyclothorax* Sharp (Insecta: Coleoptera: Carabidae: Licininae, Psydrinae). Records of the South Australian Museum 33: 123-126.

2001. *Tasmanitachoides* Erwin *glabellus* n. sp. from North Queensland, Australia, with a note on *Tasmanitachoides lutus* (Darlington) (Insecta, Coleoptera, Carabidae, Bembidiinae). Animal Biodiversity and Conservation 24: 1-7.

2002a. New species and additional records of the tachyine genus *Philipis* Erwin (Coleoptera: Carabidae: Bembidiinae). Memoirs of the Queensland Museum 48: 1-7.

2002b. Two new species of *Sloaneana* Csiki from southern Queensland (Coleoptera: Carabidae: Merizodinae). Memoirs of the Queensland Museum 48: 9-15.

2000c. Two new species of the genus *Mecyclothorax* Sharp from Papua New Guinea

(Insecta, Coleoptera, Carabidae, Psydrinae). Revue Suisse de Zoologie 109:695-704.

In press. The Amblytelini. A tribe of corticolous ground beetles from Australia. Taxonomy, phylogeny, biogeography (Insecta, Coleoptera, Carabidae, Psydrinae). Coleoptera.

BAEHR, M. & LORENZ, W. 1999. A reevaluation of *Loeffleria globicollis* Mandl from Borneo (Insecta, Coleoptera, Carabidae, Psydrinae). Spixiana 22: 263-267.

BLACKBURN, T. 1889. Further notes on Australian Coleoptera, with descriptions of new genera and species. Proceedings of the Linnean Society of New South Wales 3: 1387-1506.

BOUCHARD, P. 2002. Phylogenetic revision of the flightless Australian genus *Apterotheca* Gebien (Coleoptera: Tenebrionidae: Coelometopinae). Invertebrate Systematics 16: 449-554.

BRANCUCCI, M. & MONTEITH, G.B. 1996. A second *Terradessus* species from Australia (Coleoptera, Dytiscidae). Entomologica Basiliensia 19: 585-591.

BRITTON, E.B. 1948. A revision of the Hawaiian species of *Mecyclothorax* (Coleoptera: Carabidae). Occasional Papers of the Bishop Museum 19: 107-166.

CASTELNAU, LAPORTE DE, F.L. 1867. Notes on Australian Coleoptera. (Royal Society of Victoria: Melbourne).

1868. Notes on Australian Coleoptera. Transactions of the Royal Society of Victoria 8: 95-225.

CSIKI, E. 1929. Carabidae: Harpalinae III. Coleopterorum Catalogus II, 104: 347-528.

DARLINGTON, P.J. Jr 1961a. Australian carabid beetles VII. *Trichosternus*, especially the tropical species. Psyche, Cambridge, 68: 113-130.

1961b. Australian carabid beetles IX. The tropical *Notonomus*. Breviora, Museum of Comparative Zoology 148: 1-14.

1962. The carabid beetles of New Guinea. Part I. Cicindelinae, Carabinae, Harpalinae through Pterostichini. Bulletin of the Museum of Comparative Zoology 126: 321-565.

1971. The carabid beetles of New Guinea. Part IV. General considerations; analysis and history of fauna; taxonomic supplement. Bulletin of the Museum of Comparative Zoology 142: 129-337.

DAVIES, V.T. & LAMBKIN, C. 2000. *Wabua*, a new spider genus (Araneae: Amaurobioidea: Kababininae) from north Queensland, Australia. Memoirs of the Queensland Museum 46: 129-147.

DEUVE, T. 1987. Descriptions de deux carabiques nouveaux de Nouvelle-Calédonie et de Thailande (Coleoptera, Caraboidea, Psydridae, Trechidae). Revue francaise d'Entomologie (Nouveau Séries) 9: 143-146.

HARVEY, M.S. 2000. A review of the Australian schizomid genus *Notozomus* (Hubbardiidae). Memoirs of the Queensland Museum 46: 161-174.

JEANNEL, R. 1944. Un carabique nouveau de la Nouvelle-Calédonie (Coleoptera). Revue francaise d'Entomologie 10: 84-85.

JOSEPH, L., MORITZ, C. & HUGALL, A. 1995. Molecular support for vicariance as a source of diversity in rainforest. Proceedings of the Royal Society of London B 260: 177-182.

LOUWERENS, C.J. 1949. Carabidae (Col.) from the Sunda Islands. Wissenschaftliche Ergebnisse der Sunda-Expedition des Naturhistorischen Museums Basel: 303-325.

MACLEAY, W.J. 1871. Notes on a collection of insects from Gayndah. Transactions of the Entomological Society of New South Wales 2: 79-205.

MANDL, K. 1969. Zwei neue *Heptodonta*-Arten und eine neue Carabidae-Gattung (Col.) aus Nord-Borneo. Zeitschrift der Arbeitsgemeinschaft der österreichischen Entomologen 21: 51-54.

MONTEITH, G.B. 1997. Revision of the Australian flat bugs of the subfamily Mezirinae (Insecta: Hemiptera: Aradidae). Memoirs of the Queensland Museum 41: 1-169.

MOORE, B.P. 1963. Studies in Australian Carabidae (Coleoptera) 3. The Psydrinae. Transactions of the Royal Entomological Society of London 115: 277-290.

1984. Taxonomic notes on some Australasian *Mecyclothorax* (Coleoptera: Carabidae: Psydrini) and descriptions of new species. Journal of the Australian Entomological Society 23: 161-166.

1985. The Carabidae of Norfolk Island. In Ball, G.E. (ed.) Taxonomy, phylogeny and zoogeography of beetles and ants. A volume dedicated to the memory of Philip Jackson Darlington, Jr. Series Entomologia 33: 237-256. (W. Junk).

1992. The Carabidae of Lord Howe Island (Coleoptera: Carabidae). Pp. 159-173. In Noonan, G.R., Ball, G.E. & Stork, N.E. (eds) The biogeography of ground beetles of mountains and islands. (Intercept: Andover).

In press. A new, cave-dwelling, species of *Laccocenus* Sloane (Coleoptera: Carabidae: Psydrini) from southern New South Wales. The Australian Entomologist.

MOORE, B.P., WEIR, T.A. & PYKE, J.E. 1987. Rhysodidae and Carabidae. Pp. 17-320. In Zoological Catalogue of Australia, 4. (Australian Government Publishing Service: Canberra).

MORITZ, C., PATTON, J.L., SCHNEIDER, C.J. & SMITH, T.B. 2000. Diversification of rainforest faunas: an integrated molecular approach. Annals and Revue of Ecology and Sytematics 31: 533-563.

PERRAULT, G.G. 1978. La faune des Carabidae de Tahiti II – genre *Mecyclothorax* (Sharp). Nouvelle Revue d'Entomologie 8: 27-36, 133-162.

1992. Endemism and biogeography among Tahitian *Mecyclothorax* species (Coleoptera: Carabidae: Psydrini). Pp. 201-215. In Noonan, G.R., Ball,

G.E. & Stork, N.E. (eds) The biogeography of ground beetles of mountains and islands. (Intercept: Andover).

RUSSELL, B., MORITZ, C., YEATES, D.K. & MONTEITH, G.B. in press. Biogeography and evolution of the genus *Aellocoris* Kormilev (Hemiptera: Aradidae) in the Queensland Wet Tropics.

SCHNEIDER, C.J., CUNNINGHAM, M. & MORITZ, C. 1998. Comparative phylogeography and the history of endemic vertebrates in the Wet Tropics rainforest of Australia. Molecular Ecology 7: 487-98.

SHARP, D. 1903. Coleoptera Caraboidea. Coleoptera pt. II. Pp. 175-292. In Sharp, D. (ed.) Fauna Hawaiiensis. Vol. III, pt. III. (Cambridge, University Press: Cambridge).

SLOANE, T.G. 1890. Studies in Australian Entomology. No IV. New genera and species of Carabidae. Proceedings of the Linnean Society of New South Wales 5: 641-653.

1898. On Carabidae from West Australia, sent by Mr. A.M. Lea (with descriptions of new genera and species, synoptic tables &c.). Proceedings of the Linnean Society of New South Wales 23: 444-520.

1900. Studies in Australian Entomology. No IX. New species of Carabidae (with notes on some previously described species, and synoptic lists of species). Proceedings of the Linnean Society of New South Wales 24: 553-584.

1911. Carabidae from Dorrigo, N.S.W. Proceedings of the Linnean Society of New South Wales 35: 823-843.

1915. Studies in Australian entomology. No XVII. New genera and species of Carabidae. (Pamborini, Migadopini, Broscini, Cunepectini, Nomiini, Pterostichini, Platynini, Oodini, Harpalini, Lebiini). Proceedings of the Linnean Society of New South Wales 40: 438-473.

1916. Carabidae from the Upper Williams River, N.S.W. (Coleoptera). Proceedings of the Linnean Society of New South Wales 41: 196-208.

1920. The Carabidae of Tasmania. Proceedings of the Linnean Society of New South Wales 45: 113-178.

STRANEO, S.L. 1941. Sui tipi di Pterostichini (Coleopt. Carabid.) Australiani della collezione Castelnau nel Museo Civico di Genova Nota III. Annali de Museo Civico di Storia Naturale de Genova 61: 83-94.