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## A new species of the genus *Mecyclothorax* Sharp from New Guinea

(Coleoptera, Carabidae, Psydrini, Mecyclothoracina)

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A new species of the psydrine genus *Mecyclothorax* Sharp, 1903 from central Papua Indonesia (former Irian Jaya), in the western half of New Guinea is described: *M. obtuseangulatus* spec. nov. The new species belongs to the group of New Guinean species that lack the posterior marginal pronotal seta. It is inserted in the most recent key to the New Guinean species of *Mecyclothorax*.

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### Introduction

The psydrine genus *Mecyclothorax* Sharp, 1903 is widely distributed in the area between Australia (Moore 1984, 1992; Moore et al. 1987; Baehr 2000, 2003, 2009), New Guinea (see below), New Caledonia (Jeannel 1944, Deuve 1987), New Zealand (Larochelle & Larivière 2001), Java (Louwerens 1949), Borneo (Baehr & Lorenz 1999), and far out in the Pacific on Tahiti (Perrault 1978, 1992; Liebherr 2013) and Hawaii (Britton 1948; Liebherr 2005, 2006, 2008a, 2009, 2011). In both latter archipelagoes, the genus has developed its highest species diversity. Most probably the genus is of Australian origin; it is very widely distributed in the southern part of Australia and along the whole east coast. With respect to their phylogenetic status, the most plesiotypic species of the genus apparently occur in southern Australia.

In New Guinea the genus was repeatedly subject of descriptions of new species. These papers (Darlington 1962, 1971; Baehr 1992, 1995, 1998, 2002, 2008; Liebherr 2008b; Gueorguiev 2013) demonstrate that the mecyclothoracine fauna of New Guinea is by no means adequately recorded yet.

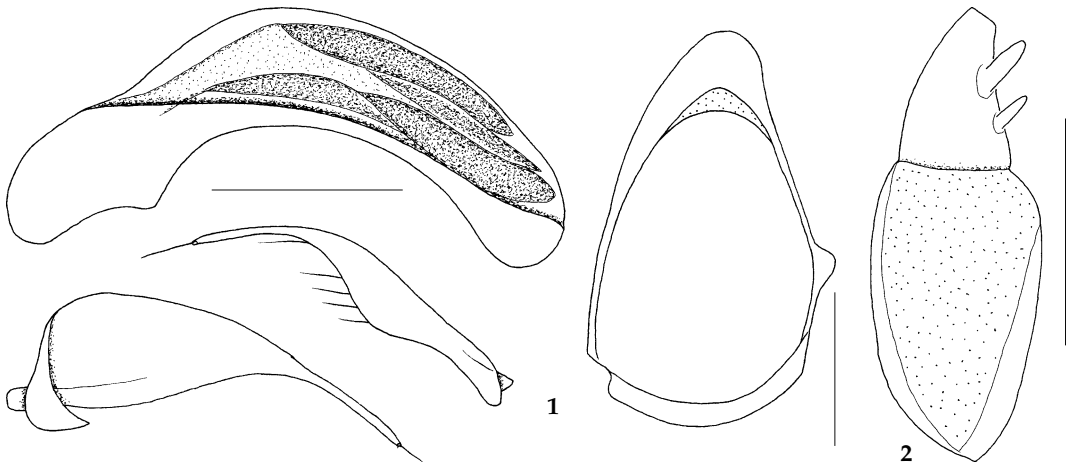
Until now, altogether 16 species were described from the whole island of New Guinea, most of them only known from single or few specimens. It is yet unknown whether their recorded scattered occur-

rence simply demonstrates our limited knowledge, or whether it mirrors their truly restricted ranges. Thus far, most species were recorded from central and eastern Papua Indonesia (former Irian Jaya). In spite of much longer and better exploration, from the eastern half of the island (Papua New Guinea) only few species have been recorded. The extremely scattered records may reflect the yet absolutely inadequate sampling of these small beetles that probably are best collected by sieving or Berlese extraction of litter or soil. Apparently, those sampling methods so far have been very rarely deployed.

As a conclusion, in New Guinea the genus *Mecyclothorax* is yet unknown from Owen Stanley Range, the western part of Papua New Guinea, and also from the whole western part of Papua Indonesia including Snow Mountains and Vogelkop Peninsula. Very probably species will be discovered in most of these areas in future, because the genus is as well distributed to the east of New Guinea as to the west.

### Material and methods

For the taxonomic treatment standard methods were used. The genitalia were removed from specimens relaxed for a night in a jar under moist atmosphere, then cleaned for a short while in hot 4% KOH.



**Fig. 1.** *Mecyclothorax obtuseangulatus* spec. nov. Male genitalia: aedeagus, parameres, and genital ring. Scale bars: 0.25 mm.

**Fig. 2.** *Mecyclothorax obtuseangulatus* spec. nov. Female gonocoxites 1 and 2. Scale bar: 0.1 mm.

The habitus photographs were obtained with a digital camera using ProgRes Capture Basic and Auto-Montage and subsequently were edited with Corel Photo Paint X14.

Measurements were taken using a stereo microscope with an ocular micrometre. Length has been measured from apex of labrum to apex of elytra. Length of pronotum was measured along midline, width of base of pronotum at the extreme tips of the basal angles. Measurements and ratios were obtained in the same manner as in Baehr (1992, 1995, 1998, 2002, 2008).

The holotype is located in Museum of Zoology, Buitenzorg, Cibinong (MZB), paratypes are shared with Staatliches Museum für Naturkunde, Karlsruhe (SMNK) and the working collection of the author in Zoologische Staatssammlung, München (CBM).

*Mecyclothorax obtuseangulatus*, spec. nov.

Figs 1–4

**Type material.** Holotype: ♂, “Papua Indonesia, Poga, S03°47.406’, E138°35.507’, 2410 m, 14.vii.2010 Nothofagus-forest, sifted, A. Riedel” (MZB). – Paratypes: 2 ♂♂, 1 ♀, same data (CBM, SMNK).

**Etymology.** The name refers to the obtusely angulate basal angle of the pronotum.

**Diagnosis.** Small, black species with narrow pale lateral margin and wide pale apical margin of the elytra, characterized by absence of the posterior lateral pronotal seta, wide pronotum with obtusely angulate basal angles and impunctate base, rather short, convex, somewhat oviform elytra with gently punctate striae, and glossy, though not iridescent surface. According to external morphological characters

and to shape of aedeagus the species probably is most similar and probably also related to *M. jiwikae* Baehr, 1995 and *M. lackneri* Baehr, 2008, but is distinguished from both species by wider base of the pronotum with slightly projected, angulate basal angles, in addition from *M. jiwikae* by shorter elytra and a much shorter aedeagus, and from *M. lackneri* by narrower pronotum, longer, less widened elytra bearing two setiferous punctures, and less stout aedeagus.

**Description**

**Measurements.** Length: 3.3–3.4 mm; width: 1.45–1.5 mm. Ratios. Width prothorax/head: 1.59–1.62; width/length of prothorax: 1.22–1.25; width base/apex of prothorax: 1.20–1.24; width elytra/prothorax: 1.34–1.38; length/width of elytra: 1.31–1.35.

**Colour.** Very dark piceous to almost black, elytra with narrow pale reddish lateral margin and rather wide apical margin. Labrum and mandibles reddish, palpi yellow, antenna and legs pale reddish. Lower surface dark piceous, elytral epipleurae pale reddish.

**Head** (Fig. 4). Rather narrow in relation to prothorax. Eye moderately large, convex, laterad rather protruded, orbit small, oblique, c. ¼ of length of eye. Frontal furrows deep, elongate, oblique, completely encircling the eye. Frons with a distinct, oval-shaped, median pit. Posterior supraorbital seta situated slightly behind posterior margin of eye. Clypeal suture well impressed. Labrum transverse, truncate, 6-setose. Mandibles moderately elongate, apically suddenly curved. Mentum with distinct, apically rounded tooth. Submentum with very elongate setae. Antenna rather elongate, slightly surpassing



Fig. 3. *Mecyclothorax obtuseangulatus* spec. nov. Habitus. Body length: 3.5 mm.



Fig. 4. *Mecyclothorax obtuseangulatus* spec. nov. Head and pronotum.

posterior base of pronotum, median antennomeres c.  $2\frac{1}{4}$  × as long as wide. Surface impunctate, without microreticulation, very glossy.

Pronotum (Fig. 4). Large, wide, circular, considerably wider than long, disk fairly convex, laterally evenly curved, with a faint excision in front of the basal angles. Widest diameter slightly in front of middle. Base wide, considerably wider than apex. Apex straight, apical angles slightly projected but rounded. Base slightly convex. Basal angles distinct, obtusely angulate. Marginal channel narrow, barely widened towards angle. Apex not margined, base inconspicuously margined. Anterior transverse sulcus distinct, well impressed, v-shaped, posterior transverse sulcus distinct, moderately impressed. Median line well impressed, anteriorly and posteriorly abbreviated. Basal grooves short, about linear, well impressed. Basal area moderately convex, on lower level than disk, impunctate. Anterior marginal seta situated slightly in front of middle, slightly removed from lateral margin, posterior marginal seta absent. Surface impunctate, without any microreticulation, very glossy.

Elytra (Fig. 3). Moderately short and wide, dorsally convex, not widened apicad, widest diameter about at middle. Humeri obtusely rounded, lateral margin evenly curved. Basal margin distinct, oblique, slightly sinuate, connected to scutellary striole. Four median striae distinct, not abbreviated at base, lateral striae increasingly indistinct, 6<sup>th</sup> and 7<sup>th</sup> striae barely perceptible; all striae except for sutural stria abbreviated far in front of apex. Median striae well

impressed, slightly crenulate. Four median intervals in basal half distinctly convex. Scutellary striole short, deep, situated mediad of the outturned sutural stria. Marginal channel narrow. 3<sup>rd</sup> interval with 2 setiferous punctures attached to 3<sup>rd</sup> stria, anterior puncture situated in basal third, posterior puncture slightly behind middle. Punctures distinct, setae extremely short. Near apex with a single setiferous puncture at end of 3<sup>rd</sup> stria. Marginal punctures moderately conspicuous, 14–15 in a row that is slightly interrupted in middle, marginal setae elongate if not broken. Intervals impunctate, without any traces of microreticulation. Surface very glossy, though not iridescent. Metathoracic wings absent.

Lower surface. Largely impunctate. Metepisternum about as long as wide. Sternum VII in male bisetose, in female quadrisetose.

Legs. Without striking features. Three basal tarsomeres of male anterior tarsus expanded and biserially squamose.

Male genitalia (Fig. 1). Genital ring comparatively elongate, asymmetrically triangular, with narrow base and rather wide, convex apex. Aedeagus short and stout, lower surface evenly concave. Apex compressed, foliaceous, broadly convex, strongly sclerotized, slightly curved to left side and slightly concave on left side. Internal sac with several sclerotized folds. Left paramere large, wide in basal half, with narrow, elongate, down-curved apex, unisetose at apex and without setae at lower margin. Right paramere narrower, but in middle markedly widened, likewise with elongate, curved apical part,

unisetose at apex and with about 5–6 setae at lower margin, most of these situated in middle.

Female gonocoxites (Fig. 2). Gonocoxite 1 compact, apical rim asetose. Gonocoxite 2 rather short, dentiform, slightly curved, with two stout ventrolateral ensiform setae, the upper one being stouter than the lower one; apparently without a dorsomedian ensiform seta. Because in the single female the apex of both gonocoxites 2 is cut, shape of apex and number of nematiform setae are unknown.

Variation. Barely noted except for slight differences in relative width/length of prothorax and elytra.

**Distribution.** Vicinity of Star Range, western Papua Indonesia, western New Guinea. Known only from type locality.

**Collecting circumstances.** Sifted, from leaf litter, in montane Nothofagus forest at 2410 m.

**Relationships.** According to external morphological characters and to shape and structure of the male genitalia most similar, and probably also closely related, to *M. jiwikae* Baehr, 1995 and *M. lackneri* Baehr, 2008.

### Recognition

To insert the new species into the most recent key to the New Guinean *Mecyclothorax*, this must be slightly altered. For easier determination, figures from the former papers (Baehr, 1992, 1995, 1998, 2002, 2008) are quoted where necessary. *M. kavanaughi* Liebherr, 2008 and *M. baehri* Gueorguiev, 2013 are also included in the key. Although range is not a “prima facie” distinguishing character, the ranges of most species seem to be so restricted that they can be used as support for the differentiation of the species. Therefore, geographic and altitudinal ranges are included in the key as exactly as possible.

### Revised key to the New Guinean *Mecyclothorax*

1. Elytral striae 3 and 5 with setiferous punctures. .... 2.
  - Only elytral stria 3 with setiferous punctures. . .... 3.
2. Dorsal surface with distinct microreticulation.
  - Wilhelmina Top (Gn. Trikora), central Papua Indonesia, at 4200 m. .... *toxopei* Darlington, 1962
  - Dorsal surface glabrous, without perceptible microreticulation. Finisterre Range, north-eastern Papua New Guinea, at 3450 m. .... *kavanaughi* Liebherr, 2008
3. Posterior lateral seta of pronotum present .... 4.
  - Posterior lateral seta of pronotum absent. .... 8.
4. Lateral margin of pronotum distinctly sinuate in front of the subdentiform basal angles (Baehr 2008, Fig. 3). Papua New Guinea. .... 5.
  - Lateral margin of pronotum not perceptibly sinuate in front of the rather obtuse basal angles (Baehr 1995, figs 3, 4). Papua Indonesia. .... 7.
5. Elytra with 5 discal punctures and setae (Baehr 2008, fig. 6); body length 4.4 mm; aedeagus unknown. Papua New Guinea, Kubor Range, at 3600 m. .... *kubor* Baehr, 2008
  - Elytra with 2–3 discal punctures and setae; body size either smaller, or larger. .... 6.
6. Body length <4.2 mm; prothorax wide, ratio w/l >1.28; aedeagus with narrow, elongate and slightly sinuate apex and with two elongate sclerites in internal sac (Baehr 2008, fig. 2). Papua New Guinea, Bismarck Range, Mt. Wilhelm, 3200–4250 m. .... *sedlaceki* Darlington, 1971
  - Body length about 5 mm. Pronotum globe-shaped, ratio w/l 1.15; aedeagus relatively short and wide. Papua New Guinea, Star Mountains, Mt. Capella, at 3960 m. .... *baehri* Gueorguiev, 2013
7. Elytra with 4 discal punctures and setae; base of pronotum coarsely punctate; elytral striae well impressed, crenulate, intervals convex, stria 7 fairly well developed (Baehr 1995, fig. 3). Juliana Top (Gn. Mandala), eastern central Papua Indonesia, at 3500 m. .... *julianae* Baehr, 1995
  - Elytra with 2 discal punctures and setae; base of pronotum impunctate; elytral striae weakly impressed, outer striae consisting of rows of punctures only, intervals depressed, stria 7 scarcely indicated (Baehr 1995, fig. 4). Eipomek-Langda area, eastern central Papua Indonesia, at 3500 m. .... *eipomeki* Baehr, 1995
8. Basal angles of pronotum almost rectangular, lateral margin near base distinctly sinuate; aedeagus see Baehr (1995, figs 5, 7; 2002, fig. 1)... .... 9.
  - Basal angles of pronotum obtuse, lateral margin near base not or barely sinuate; aedeagus see fig. 1 and Baehr (1992, fig. 2; 1995, figs 11, 12; 1998, fig. 2; 2002, fig. 2). .... 11.

- 9. Body length >5 mm; surface at least with traces of microreticulation; aedeagus see Baehr (1995, figs 5, 7). Eastern central Papua Indonesia, above 3200 m. .... 10.
- Body length <4 mm; surface without traces of microreticulation; aedeagus see Baehr (2002, fig. 1). Bulldog Rd., Morobe Prov., eastern central Papua New Guinea, at 2550 m. ....  
..... *cuccodoroi* Baehr, 2002
- 10. Body length >5.7 mm; microreticulation on head and pronotum barely indicated, on elytra superficial, but present on apical part of elytra; basal angles of pronotum obtuse at apex, lateral margins distinct, explanate and slightly upturned; at least two or three median elytral striae deeply impressed, intervals distinctly convex (Baehr 1995, fig. 8); aedeagus see Baehr (1995, fig. 5). Gunung Elit, eastern central Papua Indonesia, at 3200–3300 m. .... *eliti* Baehr, 1995
- Body length c. 5.3 mm; microreticulation distinct, on elytra even very conspicuous, but absent on apical part of elytra; basal angles of pronotum rectangular, lateral margins very narrow, barely explanate and upturned; elytral striae barely impressed, intervals depressed (Baehr 1995, fig. 9); aedeagus see Baehr (1995, fig. 7). Sape Valley, north of Juliana Top (Gn. Mandala), eastern central Papua Indonesia, at 3400 m. ....  
..... *sapei* Baehr, 1995
- 11. Aedeagus with short, wide, laminate apical plate that is bent down (Fig. 1; Baehr 1995, figs 10, 11; Baehr 2008, fig. 1); either very small species (body length <3.8 mm) with short elytra, or larger species (body length 4.6 mm) with elongate elytra. .... 12.
- Aedeagus either with short, laminate apex that is markedly falciform (Baehr 1998, fig. 2) or with elongate, less wide apex that is slightly curved upwards at tip (Baehr 1992, fig. 2; 2002, fig. 2); medium sized species (length 3.8–4.4 mm). ....  
..... 15.
- 12. Smaller and shorter species, length <3.8 mm, ratio l/w of elytra <1.37; left paramere elongate, less curved (Fig. 1; Baehr 1995, fig. 10; 2008, fig. 1). Central and western Papua Indonesia. ...  
..... 13.
- Larger and more elongate species, length >4.5 mm, ratio l/w of elytra >1.50; basal angles of pronotum distinct, though obtuse (Baehr 1995, fig. 12); left paramere shorter, more curved (Baehr 1995, fig. 11). Langda area, 2100–2300 m; eastern central Papua Indonesia. ....  
..... *langdae* Baehr, 1995

**Table 1.** Measurements and ratios of the *Mecyclothorax* species of New Guinea.

For better comparison of the species the measurements and ratios are compiled in the following table. For *M. toxopei* Darlington and *M. baehri* ratios were taken from the descriptions. For *M. kavanaughi* Liebherr no ratios were found in the description, but this species is easily identified.

	Body length (mm)	ratio width pronotum/ head	ratio width/ length of pronotum	ratio width base/apex pronotum	ratio width elytra/ pronotum	ratio length/ width elytra
<i>toxopei</i> Darlington	4.7	1.32	1.29	0.98	1.50	1.41
<i>kavanaughi</i> Liebherr	4.0–4.8					
<i>sedlaceki</i> Darlington	3.4–4.2	1.28–1.39	1.28–1.38	0.9–1.0	1.45–1.65	1.28–1.37
<i>baehri</i> Guerguiev	5.1	1.33	1.15	1.06	1.55	1.37
<i>kubor</i> Baehr	4.4	1.41	1.30	0.99	1.42	1.34
<i>julianae</i> Baehr	4.6	1.45	1.25	1.11	1.42	1.47
<i>eipomeki</i> Baehr	5.5	1.45	1.18	1.06	1.38	1.49
<i>eliti</i> Baehr	5.8–6.3	1.45–1.54	1.15–1.19	1.09–1.12	1.38–1.40	1.42–1.45
<i>sapei</i> Baehr	5.25	1.33	1.13	0.96	1.50	1.39
<i>cuccodoroi</i> Baehr	3.5–3.8	1.47–1.56	1.21–1.27	1.04–1.07	1.33–1.35	1.30–1.32
<i>lackneri</i> Baehr	3.55–3.75	1.67–1.72	1.32–1.34	1.11–1.14	1.37–1.38	1.27–1.32
<i>jivikae</i> Baehr	3.5–3.75	1.52–1.56	1.18–1.20	0.95–0.98	1.42–1.43	1.37
<i>obtuseangulatus</i>	3.3–3.4	1.59–1.62	1.22–1.25	1.20–1.24	1.34–1.38	1.31–1.35
<i>langdae</i> Baehr	4.6	1.54	1.17	1.05	1.38	1.52
<i>bilaianus</i> Baehr	4.0	1.54	1.17	1.01	1.45	1.42
<i>riedeli</i> Baehr	4.0–4.4	1.69	1.18–1.21	1.18–1.19	1.35–1.38	1.42–1.44
<i>loebli</i> Baehr	3.8–4.2	1.54–1.58	1.19–1.25	0.87–0.92	1.46–1.50	1.26–1.30

13. Elytra shorter and wider, more oval-shaped, ratio  $l/w < 1.32$ ; unipunctate (Baehr 2008, fig. 5); pronotum wider, ratio  $l/w > 1.32$ ; aedeagus very short and compact (Baehr 2008, fig. 1); Pass Valley, between 1700 and 2250 m. .... *lackneri* Baehr, 2008
- Elytra longer and narrower, less oval-shaped, ratio  $l/w > 1.35$ ; bipunctate (Fig. 2; Baehr 1995, fig. 12); pronotum narrower, ratio  $l/w < 1.24$ ; aedeagus longer and slenderer (Fig. 1; Baehr 1995, fig. 10). .... 14.
14. Pronotum narrower, ratio  $l/w < 1.20$ , with narrower base, ratio width of base/width of apex  $< 1.0$ ; basal angles almost rounded; anterior transverse sulcus very weak (Baehr 1995, fig. 12); aedeagus slender and elongate, with triangular apex (Baehr 1995, fig. 10). Jiwika area, at 2300 m. .... *jiwika* Baehr, 1995
- Pronotum wider, ratio  $l/w > 1.24$ , with wider base, ratio width of base/width of apex  $> 1.2$ ; basal angles obtusely angulate; anterior transverse sulcus distinct and complete (Fig. 4); aedeagus shorter and more compact, with rounded apex (Fig. 1). Poga, western Papua Indonesia, at 2410 m. .... *obtuseangulata* spec. nov.
15. Apex of aedeagus short, laminate, markedly falciform (Baehr 1998, fig. 2). Bilai area, central Papua Indonesia, at 1900–2300 m. .... *bilaianus* Baehr, 1998
- Apex of aedeagus elongate, not falciform, only feebly curved up, see Baehr (1992, fig. 2; 2002, fig. 2). .... 16.
16. Elytra longer and narrower (ratio length/width  $> 1.42$ ), more oviform (Baehr 1992, fig. 1); base of pronotum distinctly wider than apex (ratio base/apex  $> 1.18$ ); lower surface of aedeagus in middle straight, apex less upturned (Baehr 1992, fig. 2). Kangine area, Baliem Valley, central Papua Indonesia, at 1900 m. .... *riedeli* Baehr, 1992
- Elytra shorter and wider (ratio length/width  $< 1.30$ ), more quadrate (Baehr 2002, fig. 4); base of pronotum distinctly narrower than apex (ratio base/apex  $< 0.92$ ); lower surface of aedeagus in middle evenly concave, apex more distinctly upturned (Baehr 2002, fig. 2). Bulldog Rd. area, Morobe Prov., eastern central Papua New Guinea, at 2550–2600 m. .... *loebli* Baehr, 2002

## Remarks

In my most recent paper on New Guinean *Mecyclothorax* (Baehr 2008) I enumerated several areas in New Guinea without any record of species of this genus and stressed the very inadequate knowledge of species inventory and distribution of this genus in New Guinea. However, with the descriptions of *M. kavanaughi* Liebherr, 2008 from Huon Peninsula, *M. baehri* Guerguijev, 2013 and the new species described in the present paper, both from Star Range in western Papua Indonesia two areas hitherto without any records now can be removed from the list of *Mecyclothorax*-free areas. It is to be expected that additional sampling efforts in other parts of the island, and, in particular, application of specialized collecting methods, will fill additional gaps in the distribution of species. Because almost all species seem to possess very restricted ranges and because most species are unable for flight and apparently live in leaf litter of montane rain forest, sieving or Berlese extraction of leaf litter at as many localities as possible would be desirable.

In view of the restricted ranges of all species and the inadequate knowledge it would be interesting to learn whether adequate and intensified collecting activities will reveal a similarly high species diversity of *Mecyclothorax* in New Guinea as on Tahiti and Hawaii Islands.

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