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A new subspecies of *Mecyclothorax punctatus* (Sloane) from south-western Australia

(Coleoptera, Carabidae, Psydrini, Mecyclothoracina)

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A new subspecies of the south-eastern Australian psydrine species *Mecyclothorax punctatus* (Sloane) is described from south-western Australia: *M. punctatus peckorum*, subspec. nov. Male and female genitalia of the new taxon are figured, and a key is provided for the three taxa of the *punctatus* group of the genus *Mecyclothorax* Sharp.

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Introduction

The psydrine genus *Mecyclothorax* Sharp, 1903 is widely distributed in the area between Australia, New Guinea, New Caledonia, New Zealand, Indonesia, and far out in the Pacific on Tahiti and Hawaii (Baehr 2009). 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 (Moore et al. 1987). With respect to their phylogenetic status, the most plesiotypic species of the genus apparently occur in southern Australia.

In Australia, (including Norfolk and Lord Howe Islands and Tasmania) 24 taxa of *Mecyclothorax* have so far been recorded; they range from Atherton and Windsor Tablelands in north-eastern Queensland along the east and southern coasts through Queensland, New South Wales, Victoria, Tasmania, and southern South Australia to southern Western Australia. Moore (1984) and Baehr (2003) published partial taxonomic treatments, but a number of very similar species are still in need of revision.

The new taxon belongs to a group of small, characteristically shaped and structured species which includes *Mecyclothorax punctatus* (Sloane, 1895) from Victoria and southern New South Wales and *M. moorei* Baehr, 2009 from north-eastern New South Wales. The specimens were sorted out during a recent visit at Australian National Insect Collection, Canberra (ANIC), and kindly loaned for identification. They much remind *M. punctatus* from south-eastern Australia, but differ in some characters of their external and genital morphology from their eastern counterparts, therefore they are provisionally described as a south-western subspecies of that species.

Material and methods

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

In the taxonomic survey standard methods are used. For dissecting the genitalia, the specimens were relaxed overnight in a jar under moist atmosphere, then cleaned for a short while in 10 % KOH. The habitus

Fig. 1. *Mecyclothorax punctatus peckorum*, subspec. nov. Habitus. Body length: 2.8 mm.

photograph was obtained by a digital camera using ProgRes CapturePro 2.6 and AutoMontage and subsequently was edited with Corel Photo Paint 14.

The types are located in the Australian National Insect Collection (ANIC) and in the working collection of the author at Zoologische Staatssammlung München (CBM).

Taxonomy

Mecyclothorax Sharp, 1903

Mecyclothorax Sharp, 1903: 243. – Moore et al. 1987: 147.

Type species: *Cyclothorax montivagus* Blackburn, 1878, designated by Andrewes 1939: 135.

Geographic distribution: Australia, New Zealand, Pacific Islands, Java, Borneo.

Mecyclothorax punctatus peckorum, spec. nov.

Figs 1–3

Types. Holotype: ♂, "Pemberton Warren N.P. WA 12 Jul. 1980 S. & J. Peck SBP106 / Berlesate karri litter and moss" (ANIC). – Paratypes: 1♂, same data (CBM); 1♂, "Pemberton WA Brockman Saw Pit 7–13 Jul. 1980 S. &J. Peck SBP100 / dung trap jarrah forest" (ANIC); 2♂♂, 2♀♀, "40 km ESE of Manimup WA 15 Jul. 1980 S. & J. Peck SBP116 / Berlesate jarrah forest litter" (ANIC, CBM); 1♂, 1♀, "Walpole Rd. WA Nornalup Beach Rd. 20–26 Jun. 1980 S. & J. Peck SBP73 / flight intercept traps" (ANIC).

Etymology. The name is a patronym in honour of S. and J. Peck, who collected the species during their extensive collecting trip for litter inhabiting insects in 1980.

Diagnosis. Small, compact, dorsally convex species, characterized by exceptionally coarse punctation of the upper surface of pronotum and elytral striae. Distinguished from the nominate subspecies by shorter and more oviform elytra, much more abbreviated elytra striae, less dense but much coarser punctation of pronotum and elytral striae, and slightly different shape of the apex of the aedeagus which in the nominate subspecies is not angulate or hooked at the right side and less twisted.

Description

Measurements. Length: 2.6–3.0 mm; width: 1.1–1.3 mm. Ratios: width/length of pronotum: 1.19–1.27; width base/apex of pronotum: 1.16–1.23; width pronotum/head: 1.32–1.41; length/width of elytra: 1.29–1.35; width elytra/pronotum: 1.28–1.34.

Colour (Fig. 1). Either completely, more or less dark, reddish-piceous, or only head, or head and pronotum, reddish-piceous, and pronotum and elytra, or only elytra, black, in specimens with black elytra commonly the base narrowly reddish. In specimens with dark elytra the border narrowly pale. Palpi, antenna, and legs yellow.

Head (Fig. 1). Narrow in comparison with prothorax. Frons convex. Frontal furrows deep, anteriorly almost straight to slightly curved, then suddenly curved laterad to meet the anterior supraorbital seta. Eye large, laterally moderately protruded, orbit extremely small, barely recognizable. Clypeofrontal suture distinct but shallow. Frons laterally with 3–4 coarse, deep punctures in a triangular or diamond-shaped arrangement. Anterior margin of clypeus straight, bisetose, punctures large and deep. Labrum short and wide, apex straight, 6-setose. Mandibles of moderate size, apex acute. Seta in outer scrobe elongate. Terminal palpomeres elongate, acute, impilose. Mentum with obtuse, triangular tooth, bisetose. Gula quadrisetose. Glossa narrow, bisetose, paraglossae membranous, far surpassing glossa. Antenna rather short, just surpassing base of pronotum, median antennomeres c. 1.3 × as long as wide, three basal antennomeres almost impilose, only the basal antennomere with 1–2 additional setae; antenna densely setose from middle of 4th anten-

Fig. 2. *Mecyclothorax punctatus peckorum*, subspec. nov. Male genitalia: aedeagus, left side and lower surface, right and left parameres, genital ring. Scale bars: 0.25 mm.

nomere. Posterior supraorbital seta located slightly in front of posterior margin of eye. Only labrum distinctly microreticulate, rest of surface glabrous and very glossy.

Pronotum (Fig. 1). Wide, laterally and dorsally convex. Base slightly wider than apex. Lateral margins in anterior half markedly convex, in posterior half almost straight but oblique, pronotum widest about at middle. Apex straight to even slightly convex, apical angles not produced, obtuse. Base in middle slightly protruded, apical angles inconspicuously dentiform. Both, apex and base not margined, marginal sulcus narrow throughout, not widened towards base. Median line barely recognizable. Basal grooves inconspicuous, moderately deep, short, about circular. Anterior transversal sulcus barely indicated, basal transverse sulcus shallow. Anterior marginal seta situated about in middle at widest diameter, the posterior seta at basal angle. Disk with rather irregularly arranged, moderately dense, very coarse and deep punctures, at widest diameter about 5–6 punctures present from margin to middle. Distance between punctures mostly larger than their diameter. Surface without any microreticulation, very glossy.

Elytra (Fig. 1). Very short and wide, dorsally very convex, somewhat oviform. Humerus wide, slightly produced but widely rounded, lateral margin convex throughout. Base completely bordered. Scutellary stria indicated only by a few large punctures, situated in first interval, scutellary pore and seta situated at or slightly laterad of origin of 1st stria. Five, or more commonly, six striae present, indicated by rows of coarse punctures, but all striae, apart of the sutural one, disappearing at or shortly behind middle, the two most lateral ones usually indicated by only a few punctures in basal third. 1st stria in apical third still slightly impressed but impunctate. Distance between punctures in basal half not greater than the diameter of the punctures. Intervals apart from 1st absolutely depressed. Dorsal setiferous punctures situated near 3rd stria or in middle between 2nd and 3rd striae, inconspicuous, the anterior one situated at or slightly behind basal third, the posterior one situated at apical third. Setae fairly elongate. Series of marginal setae consisting of 7 anterior and 6 posterior setae that are not widely separated in middle, punctures coarse, setae, if unbroken, very elongate. At the position where the third interval would end, with a deep puncture and a fairly elongate seta. Intervals without any microreticulation and punctures, absolutely smooth, very glossy. Metathoracic wings very short.

Lower surface. Lateral parts of prothorax and mesothorax, and prosternum with dense and very coarse punctures, the diameter of which is about as large as the distance between them. Metepisternum short, quadrate. Surface of abdomen without any microreticulation and punctures, glossy. Terminal sternum in both sexes quadrisetose.

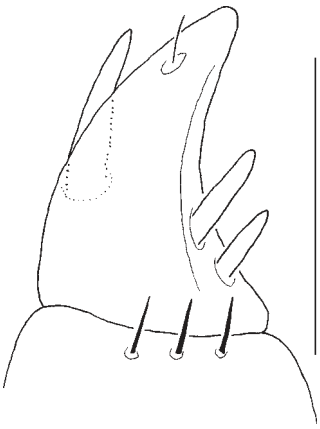

Fig. 3. *Mecyclothorax punctatus peckorum*, subspec. nov. Female gonocoxites 1 and 2. Scale bar: 0.1 mm.

Legs. Moderately elongate. Four basal tarsomeres of male protarsus slightly widened, first to third tarsomeres asymmetrically squamose on lower surface. Mesotibia and metatibia with distinct microreticulation on the upper surface.

Male genitalia (Fig. 2). Genital ring moderately elongate, asymmetrically triangular, apex moderately wide, fairly elongate, very oblique. Aedeagus slightly turned to the right side (in beetle), rather short and compact (in genus), lower surface evenly concave. Apex short and very wide, slightly twisted, obtusely rounded but slightly asymmetric at tip, on the right side angulate. Margin of right side concave towards apex. Ostium moderately elongate. Internal sac rather simply folded, with two sclerotized spine-like parts one of which medially is triangularly widened. Parameres large, dissimilar, left stout, with elongate, very narrow, down curved apex, and with a single, short, apical seta. Right paramere narrow and elongate, with evenly tapering apex, with one short apical seta, about ten elongate setae along lower margin which are grouped into 5 subapical ones, and two and three in the middle, respectively near base; upper surface with a single short seta at apical third.

Female gonocoxites (Fig. 3). Gonocoxite 1 with two or three nematiform setae at ventro-apical margin. Gonocoxite 2 rather short and compact, 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 but apparently with only a single 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 variation noted in coloration, length of the elytral striae, and relative width of pronotum.

Distribution. Southern part Western Australia in the near coastal area between Pemberton and Walpole.

Collecting circumstances. Specimens were collected by Berlese extraction of Karri and Jarrah litter and in flight intercept traps.

Relationships. According to the degree of punctation of the surface and the number of visible elytral striae this taxon apparently is more closely related to *M. punctatus* (Sloane) than to *M. moorei* Baehr. In view of the similar body shape it is tentatively described as a subspecies of the eastern *M. punctatus*. Future evidence, perhaps by use of molecular methods, may corroborate or deny this taxonomic decision.

Key to the taxa of the punctatus-group of the genus *Mecyclothorax* Sharp

1. Pronotum sparsely and irregularly punctate; only the sutural elytral stria distinct, remnants of one or two additional striae sometimes visible. North-eastern New South Wales. .... *moorei* Baehr, 2009
– Pronotum fairly regularly and almost completely punctate; at least 5 elytral striae well visible. Southern New South Wales, Victoria, south-western Western Australia. ..... 2.
2. Punctation of pronotum denser and less coarse, c. 8 punctures visible from margin to middle at widest diameter; punctures of striae less coarse, in basal third of elytra distance between punctures larger than their diameter. Southern New South Wales, Victoria, south-eastern South Australia. ..... *punctatus punctatus* (Sloane, 1895)
– Punctation of pronotum less dense but coarser, 5–6 punctures visible from margin to middle at widest diameter; punctures of striae coarser, in basal third of elytra distance between punctures smaller than their diameter. Southern-western Western Australia near coast. .... *punctatus peckorum*, subsp. nov.

Remarks

The *punctatus* group within the genus *Mecyclothorax* Sharp is very distinctive, not only because of the remarkably coarse punctation and the very glossy

surface, but also in view of the small body size, very convex body shape, and the shape of the pronotum. Although the male genitalia are somewhat different from those of most other Australian species of the genus, in their constitutive characters they match well the structure of a generalized mecyclothoracine aedeagus and, in particular, the mecyclothoracine parameres. Whether the differences in external morphology warrant the separation of the *punctatus*-group as a subgenus of *Mecyclothorax*, is doubtful, but perhaps this may be corroborated, or denied, by future molecular analysis.

The dense and quite wet Karri (*Eucalyptus diversicolor*) forests of the coastal areas in south-western Western Australia are home of a rich carabid fauna, both living on the ground in leaf litter, and on and under bark of trees. In a couple of genera this fauna includes species, or subspecies, that are closely related to taxa which occur in south-eastern Australia in similar habitats, but those species do not occur elsewhere in Western Australia. Those pairs of wet forest inhabiting taxa are separated by the very wide dry corridor of the Nullarbor Plain and adjacent desert and semidesert areas. The new *Mecyclothorax* is another example that belongs to such a pair of taxa. Certainly this sort of widely divided ranges of closely related taxa is a remnant of former, continuous ranges, when the climate in Australia was much wetter and the wet, densely forested environments in the east and the west were not as abruptly separated as they are today.

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