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A new epigean *Paroster* Sharp, 1882 from coastal New South Wales, Australia

(Coleoptera, Dytiscidae, Hydroporini)

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Paroster lorimeri spec. nov. is described from Bombah Point Swamp, in the Myall Lakes National Park, in coastal New South Wales, Australia. The type locality marks the north-eastern-most record of an aquatic epigean species of the Australian *Paroster* Sharp, 1882. It is very similar to *Paroster gibbi* Watts, 1978 from S Victoria and S Australia but well characterized by its stronger microreticulation, form of median lobe, and slightly enlarged male antennomeres 6–10. *Paroster lorimeri* spec. nov. is most probably a lentic species, being sieved from leaf litter at the edge of a coastal and ephemeral sedge swamp. Important species characters (habitus, male antennae and median lobe) are illustrated. The total number of described epigean aquatic *Paroster* is now 15.

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Introduction

The diving beetle genus *Paroster* Sharp, 1882 is endemic in Australia. Its epigean species were revised by Watts & Leys 2008 who described three new species. According to the results of a comprehensive phylogeographic study of the Australian Hydroporini by Toussaint et al. (2014) *Paroster* is sister of a clade of ([*Necterosoma*] + [*Carabhydrus* + {*Barretthydrus* + *Sternopriscus*}]).Two terrestrial species, described under the genus name *Terradessus* Watts, 1985, and living in wet soil of Queensland rainforests, were recently transferred to *Paroster* (Toussaint et al. 2016). Most species diversity of *Paroster* is, however, found in underground waters of Australia.

Within the last two decades, biological surveys, often associated with environmental impact assessments of mining and other projects, have greatly increased knowledge about Australian stygofauna (Leys et al. 2003). Especially Western Australia is now known to be a world hotspot for such organisms. Within *Paroster*, the stygobitic species are morphologically very similar, with, apart from male sexual characters, only colour and size separating many of them. The stygofauna is concentrated on the Yilgarn area in Western Australia, inland of Northern Territory and South Australia (Watts & Humphreys 1999, 2003, 2006, 2009, Leys et al. 2010). Most authors aiming at deciphering the origin of hypogean taxa proposed that these lineages might have colonized underground ecosystems in response to climatic change (e. g. Leys et al. 2003). For Australian diving beetles, the dominant hypothesis has proposed that the *Paroster* radiation is the result of a groundwater colonization following the onset of Miocene aridification at ca. 15 million years (Ma) ago. At this time, epigean populations might have colonized subterranean aquifers to avoid increasing aridity (Leys et al. 2003).

The epigean species are mainly distributed in SW Australia and the southern parts of South Australia and Victoria (Watts & Leys 2008). The habitat preference is lentic living in temporary creeks, swamps, flooded areas and puddles on isolated granite outcrops in the south-west of Australia (so called "pan-gnammas") that form in late winter and early spring but are dry by mid to late summer (Hendrich & Fery 2008). In many places, particularly shallow gutters and pools, they are the dominant species and occur in considerable numbers for a relatively short time in spring. Usually adults cannot be observed well before the water has dried up (Watts & Leys 2008).

Altogether 51 species, 15 epigean, two terrestrial and 34 species of the stygofauna belong to the genus *Paroster* now (Nilsson 2016, Toussaint et al. 2016; this paper). The aim of this paper is to describe a new species from coastal New South Wales, which marks the north-eastern most distribution record of an aquatic epigean *Paroster* species.

Material and methods

The beetles were studied with a Leica MZ 12.5 stereo microscope at 10–100 × magnification. Drawings of the male genitalia were made based on digital images. Photographs of the habitus were taken with a digital photo imaging system, composed of a Leica Z6 APO and a Nikon V3 camera. Image stacks were aligned and assembled with the computer software Helicon Focus 4.77TM.

The following abbreviations were used in the text: TL (total length), TL-H (total length without head), and MW (maximum width). The terminology to denote the orientation of the genitalia follows Miller & Nilsson (2003). Label data of the type material are cited in quotation marks and the style of the descriptive notes follows Watts & Leys (2008) and Hendrich & Fery (2008). We used Google Earth (http://earth.google.com) to locate localities and the coordinates are given in Degrees, Minutes (DDD° MM'). Our map bases on "MICROSOFT ENCARTA World-Atlas 2000".

Specimens mentioned in this work are deposited in several collections which are abbreviated in the text as follows:

AM	Australian Museum, Sydney, Australia
ANIC	Australian National Insect Collection, Canberra, Australia
CLH	Collection Lars Hendrich, Munich, Germany; property of NMW
NMW	Naturhistorisches Museum Wien, Austria
SAMA	South Australian Museum, Adelaide, Australia
ZSM	Zoologische Staatssammlung, München, Germany

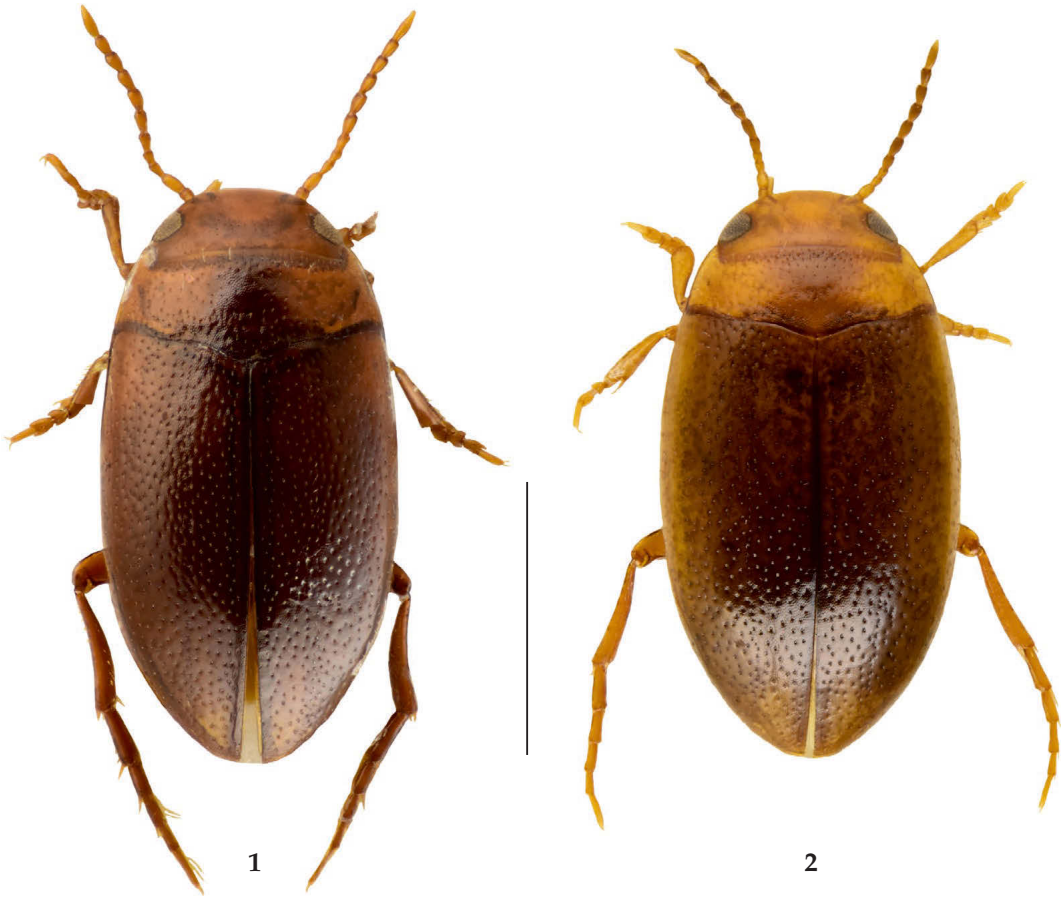
Taxonomy

Checklist of epigean and aquatic species of *Paroster*

Paroster acutipenis Watts & Leys, 2009
Central Western Australia
Paroster baylyi Hendrich & Fery, 2008
SW of Western Australia
Paroster couragei Watts, 1978
SW of Western Australia
Paroster ellenbrookensis Watts & Leys, 2009
SW of Western Australia
Paroster gibbi Watts, 1978
South Australia, Victoria
Paroster insculptilis (Clark, 1862)
South Australia, Victoria
Paroster lorimeri spec. nov.
New South Wales
Paroster leai Watts & Leys, 2009
SW of Western Australia
Paroster michaelseni Régimbart, 1908
SW of Western Australia
Paroster niger Watts, 1978
SW of Western Australia
Paroster nigroadumbratus (Clark, 1862)
South Australia, Victoria
Paroster pallescens Sharp, 1882
SW of Western Australia
Paroster sharpi Watts, 1978
SW of Western Australia
Paroster thapsinus (Guignot, 1955)
South Australia, New South Wales
Paroster ursulae Hendrich & Fery, 2008
SW of Western Australia

Genus *Paroster* Sharp, 1882

Within the tribe Hydroporini, *Paroster* can be recognised by their exposed metatrochanter bases, evenly punctate metatibia and relatively strong microreticulation, particularly in the females. The metacoxae are closely adpressed to the first abdominal segment. The metacoxal cavities are exposed and well separated, and the metacoxal processes produced backwards in the midline. The middle and the posterior portions of the epipleuron are very narrow, and crossed by an oblique carina near the shoulders (Watts 1985, 2002, Hendrich & Fery 2008).



Figs 1–2. *Paroster lorimeri* spec. nov., male, holotype (1) and *P. gibbi*, male (2). Scale bar = 1 mm.

Paroster lorimeri spec. nov.

Type locality. Bombah Point Swamp [032°30'S 152° 17'E], Myall Lakes National Park, New South Wales, Australia.

Type material. Holotype, male: "Australia-NSW Bombah Point Swamp 032°30'S 152°17'E 1 May 1993 VWH Lorimer", "leaf-litter/detritus in swamp VWHL-347" (AM). – Paratypes: 1 male and 2 females with same data as holotype (AM, CLH, ZSM).

Diagnosis. Small, dark testaceous, oval and relatively flat bodied *Paroster*. Lateral outline of junction of pronotum and elytra smooth, not slightly sinuate (Fig. 1).

Description

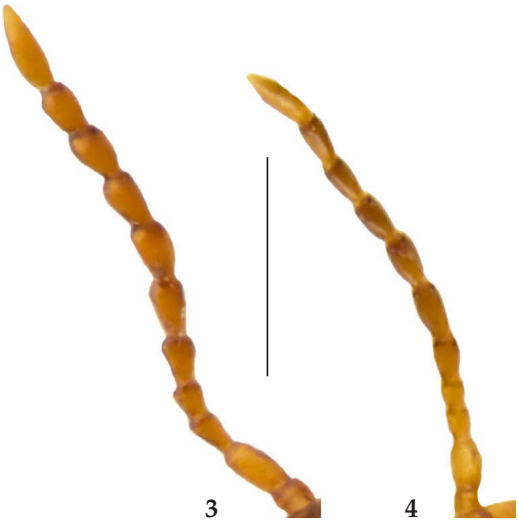
Measurements. Holotype: TL = 2.15 mm, TL-H = 1.9 mm; MW = 1.0 mm. Paratypes: TL = 2.0–2.15 mm, TL–H = 1.75–1.90 mm; MW = 1.0 mm.

Head. Dark testaceous. Microreticulation deeply marked, meshes small, round/oval; sparsely and unevenly covered with small punctures, mostly little smaller than reticulation meshes. Antennae relatively short, stout. Antennal segments testaceous.

Pronotum. Dark testaceous, front and rear margins in central half narrowly dark-testaceous to black, area between them tending lighter laterally; microreticulate as on head, sparsely covered with unevenly distributed punctures, those on disc same size as those on head, denser and larger along front and rear margins.

Elytron. Evenly dark-testaceous; microreticulation very strong, meshes as on pronotum, moderately, evenly covered with large well-marked and deep punctures larger than those on rear of pronotum, serial punctures hard to trace.

Ventral surface. Pronotal process quite broad, strongly keeled, tip pointed, reaching mesoventrite. Metathorax with lateral extensions of metaven-



Figs 3–4. Left antennae in dorsal view of *Paroster lorimeri* spec. nov. (5) and of *P. gibbi* (6). Scale bar = 0.3 mm.

trite short; moderately microreticulate, with a few relatively strong punctures. Metacoxal plates large, weakly depressed in midline, quite strongly microreticulate, meshes fine; rather sparsely covered with large punctures, coxal lines relatively close, weakly diverging in front ½, reaching metathorax.

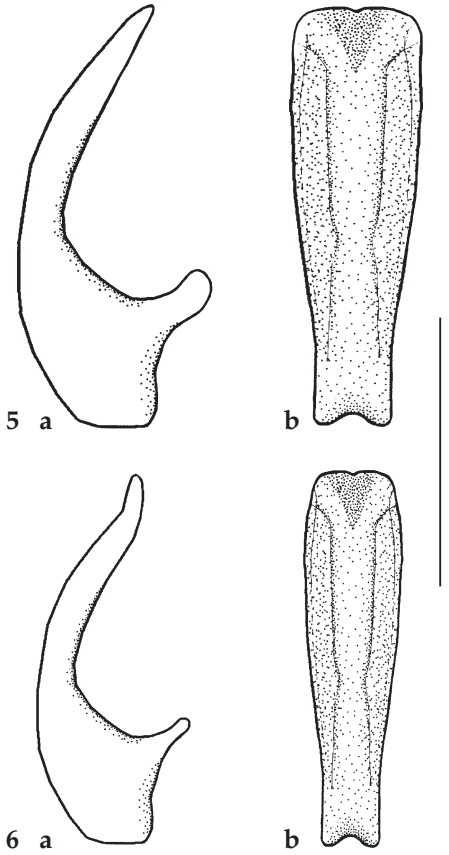
Ventrites microreticulate, punctures smaller than those on metacoxal plate. Appendages rufo-piceous.

Male. Protarsomeres broadened and proximally expanded, those on mesotarsomeres little expanded. Segments 6–10 of male antennae slightly enlarged (Fig. 3). Fore claws weak, equal in size and shape. Median lobe in ventral view of aedeagus broad, very flat, wider towards front, apex truncated (Fig. 5).

Variation. There is no variation between specimens.

Etymology. Named after the collector of the type material, the rove beetle specialist Vincent W. H. Lorimer (Sydney, Australia). The specific epithet is a substantive in the genitive case.

Differential diagnosis. A relatively small, flat-bodied, SE Australian species, with evenly dark, strongly punctate elytra and with post coxal lines relatively long and close. It might be confused with *P. gibbi* (2) from South Australia and SW Victoria (Fig. 7), which is slightly darker, especially the central marking on pronotum, and has a more mat surface because of stronger punctuation and microreticuation on elytra. Furthermore, in males of *P. lorimeri*



Figs 5–6. 5. *Paroster lorimeri* spec. nov.: Median lobe, ventral view (**a**), lateral view (**b**). **6.** *P. gibbi*: Median lobe, ventral view (**a**), lateral view (**b**). Modified after Hammond in Watts & Leys (2008). Scale bar = 0.2 mm.

spec. nov. the male antennomeres 6–10 are slightly enlarged (Fig. 3); they are not enlarged in *P. gibbi* (Fig. 4). All antennomeres of *P. lorimeri* spec. nov. are testaceous, whereas in *P. gibbi* antennomeres 5–11 are apically darkened. The median lobe in lateral view is more slender in *P. lorimeri* spec. nov. (Fig. 5) than in *P. gibbi* (Fig. 6) and has a distinctly different curvature.

Distribution. Only known from the type locality in New South Wales (Fig. 7).

Habitat. Nothing is known about the habitat but according to the label data and analyzing the satellite images in google earth, possibly shifted from debris at the edge of a swamp searching for rove beetles.

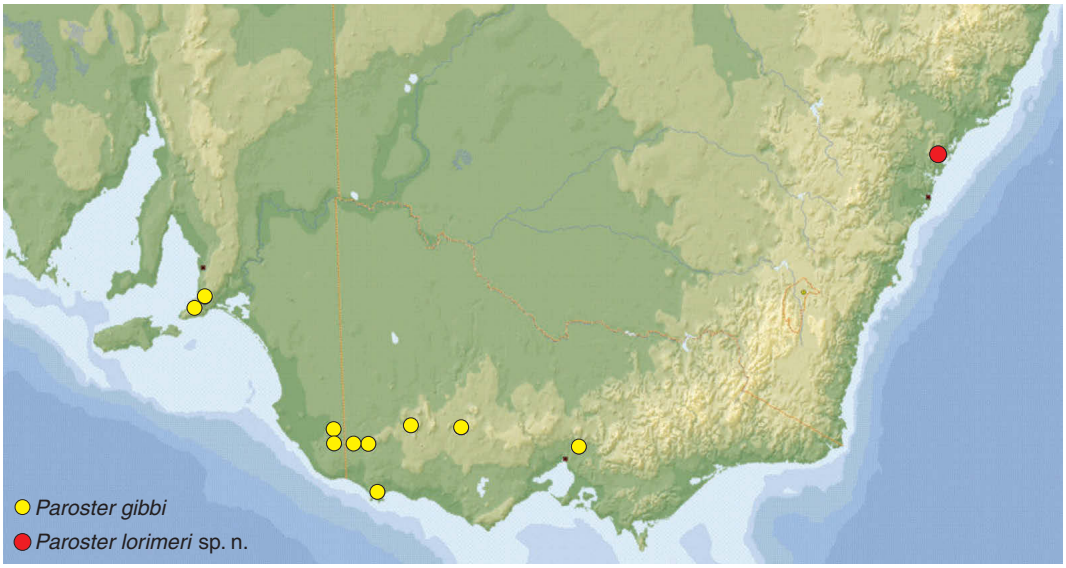


Fig. 7. Distribution of *Paroster lorimeri* spec. nov. (●) and *P. gibbi* (●), based on literature records (Watts & Leys 2008) and the material studied and listed herein.

Additional material studied

Paroster gibbi Watts, 1978

Paroster gibbi Watts 1978: 58–59; Watts 1985: 24; Lawrence et al. 1987: 339; Nilsson 2016: 163; Watts 2002: 45; Hendrich & Fery 2008: 30; Watts & Leys 2008: 15.

Type material. Holotype, male: "Myponga, South Australia, A. H. Elston 2696" (AM). Paratypes: 1 ex., "Healesville V 12/68 CW"; 5 exs., "Mt Compass SA 8.61 C. Watts" (SAMA).

Additional material. 4 exs., "SA Penola area, 30–31.X. 2001, Balke & Watts leg." (ZSM, NMW); 4 exs., "18 Km W Casterton Vic 25.9.98 C. Watts" (CLH); 1 ex., "4 Km S Glenisla 24/9/98 C. Watts" (CLH).

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