

New records and further description of *Macrothrix hardingi* Petkovski (Cladocera) from granite pools in Western Australia

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Abstract

New geographic records, taxonomic data and descriptive figures are presented for a cladoceran, *Macrothrix hardingi* Petkovski, which is recorded here from 8 new localities, all of which are shallow pools on granite rocks in Western Australia. This cladoceran species, which shows some similarities to *M. longiseta* Smirnov, is characterized *inter alia* by its dark black coloration and distinct occipital notch in the region of the head pore.

Introduction

Extensive collections of invertebrates from temporary pools on granite inselbergs in southern Western Australia have been made by one of us (IAEB) during the winters of 1977, 1990, 1992 and 1993. Some results from these samplings have already been published (Bayly 1982; Frey 1991), but most of it remains unpublished. Despite this, it is already clear that these small ephemeral aquatic habitats harbour a rich fauna (over 80 different metazoan taxa have thus far been recognised) with several species endemic to Western Australia. Frey (1991), for example, described a new genus of chydorid cladoceran (*Plurispina*) containing two species, both presently endemic to Western Australia, from the 1977 collections. Bayly (1992), in a paper dealing with some general aspects of granite rock-pools in Western Australia, listed several additional taxa including the cladoceran *Daphnia jollyi* Petkovski, that are known only from these distinctive habitats. The cladoceran, *Macrothrix hardingi*, which was originally described by Petkovski (1973) from two localities near Merredin, should now be added to this list of species from granite rock-pools. Collections made in 1990 and 1993 contained an abundance of this conspicuous, black cladoceran.

The cladoceran genus *Macrothrix* is well represented in Australia; there were 17 Australian species (including *M. hardingi*) out of a total generic complement of 34 species in a recent world review of the Macrothricidae (Smirnov 1992). Although *Macrothrix hardingi* was well figured by Petkovski (1973), this original description is not readily accessible to Australian workers. Consequently several new figures, including some of the features not included by Petkovski, are presented below.

Distribution and Taxonomy

Macrothrix hardingi Petkovski
(Figs 1-12)

Specimens examined

Specimens were examined from the following localities in Western Australia. Pool on south-west corner

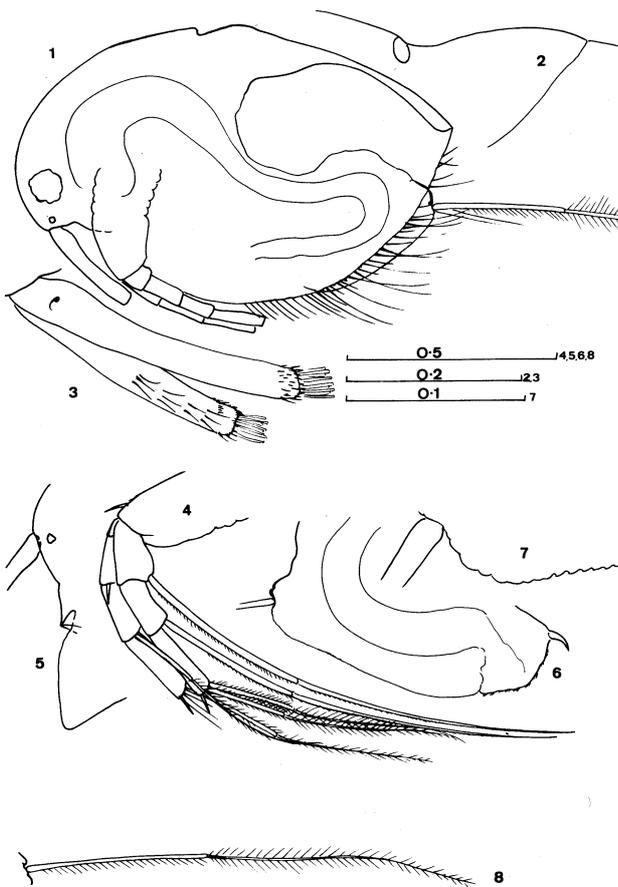
of Elachbutting Rock; 30°36'S, 118°37'E; 15.viii.1990; 49 females. Pool on Sanford Rocks; 31°14'S, 118°46'E; 15.viii.1990; 9 females. Pool at southern edge of Mount Bailey [or Bayly]; 31°47'S, 119°07'E; 19.vi.1993; numerous females. Pool close to summit of Mount Bailey [or Bayly]; 31°47'S, 119°07'E; 19.vi.1993; numerous females. Pool near base of Geeraning Rock; 30°32'S, 118°36'E; 20.vi.1993; numerous females. Pool just below summit of Baladjie Rock; 30°57'S, 118°52'E; 22.vi.1993; numerous females. Pool on Chiddarcooping Hill; 30°54'S, 118°41'E; 22.vi.1993; numerous females. Pool at western end of Weowanie Rock; 31°08'S, 119°45'E; 23.vi.1993; numerous females.

Designation of neotype

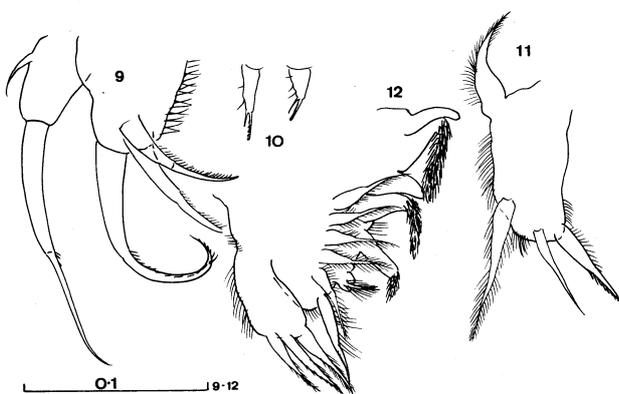
Since it has been established that there is now no original type material of *M. hardingi*, a neotype (female) has been deposited in the Australian Museum (Sydney) [Registered number P42691]. Reference slides have also been deposited in the Zoological Museum of Moscow University [Registered numbers 3672-3679.]

Description of female

Body outline oval in lateral view (Fig 1), with a distinct dorso-posterior angle. Dorsal outline arched, with occipital notch in region of head pore (Fig 2), slight hump posterior to occipital notch. Antennules (AI, Fig 3) rod-like, with groups of setae on distal part, with short sensory papillae. Antennae (AII, Fig 4) with setae 0-0-1-3/1-1-3, spines 0-1-0-1/0-0-1, spines much shorter than length of segments, largest seta of AII (proximal seta of 3-segmented branch) with very short unilateral setules along entire length. Labral lamella (Fig 5) short, cuneiform, with blunt apex. Postabdomen (Figs 6, 7) with minute setules on anal margin, preanal margin bare, with weak serrations. *Setae natatoriae* (Fig 8) with very long distal segments (1.5 times as long as proximal segments); total length of the *setae natatoriae* 0.75 times that of body length. Inner distal lobe of thoracic limb I (Fig 9) with 3 setae of different length, bearing unilateral short setules; Fryer's forks present on thoracic limb I (Fig 10). Exopodites of thoracic limbs III (Fig 11) with 4 setae. Exopodites of thoracic limbs IV (Fig 12) with 3 setae. Up to 10 parthenogenetic eggs in brood pouch. Length ca 1.5 mm. [The male is unknown.]



Figures 1-8. *Macrothrix hardingi* Petkovski, drawn from material collected from Sanford Rocks, Western Australia. Scale bars in mm. 1, left lateral aspect of whole animal; 2, magnification of dorsal occipital notch and head pore; 3, AI (antennules); 4, AII (antennae); 5, labrum; 6, postabdomen; 7, proximal portion of postabdomen; 8, *seta natatoria*.



Figures 9-12. *Macrothrix hardingi* Petkovski. 9, outer distal lobe and inner distal lobes of thoracic limb I; 10, Fryer's forks of thoracic limb I; 11, exopodite of thoracic limb III; 12, thoracic limb IV.

Differential diagnosis

Macrothrix hardingi, in addition to its black colour, differs from other *Macrothrix* species (see Smirnov 1992) in AI not dilating distally and in having no strong spines. The largest antennal seta has short setules on one side only. The dorsal outline has a characteristic depression in the region of head pore. The postabdomen is not bilobed and has very short setules. *Macrothrix hardingi* is somewhat similar to *M. longiseta* Smirnov, differing from it in the absence of long setules along the distal segment of the outer distal lobe of thoracic limb I and in the black colouration.

It is important to note that Smirnov & Timms (1983) separated *Echinisca* Liévin from *Macrothrix* Baird on the key feature that the antennules are dilated distally in the latter but not in the former. On this basis, *hardingi* would have to be referred to *Echinisca*. However, Smirnov (1992) synonymised *Echinisca* with *Macrothrix*.

Ecology

Macrothrix hardingi lives in pools that are commonly less than 10cm deep in the middle, and is often abundant in the very shallow (less than 1cm deep) water at the extreme edges of the pools. It is very conspicuous to the naked eye by virtue of its jet-black colour against the light-coloured granite. In this respect it resembles *Daphnia jollyi*, another cladoceran that is restricted to granite rock-pools in Western Australia. The pools inhabited by *Macrothrix hardingi* and *Daphnia jollyi* contain very clear water and it is physically impossible for these species to avoid strong light because of the extreme shallowness of the pools. It is likely that the heavy black pigmentation is photo-protective, preventing damage from potentially injurious ultraviolet light. The calanoid copepod, *Boeckella opaqua* Fairbridge, another species confined to the same type of habitat as these two cladocerans, is also invariably strongly pigmented but is bright red from the accumulation of carotenoids.

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