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## DISCOVERY OF THE FIRST REPRESENTATIVE OF THE GENUS *NEOCYCLOPS* GURNEY IN AUSTRALIA, AND DESCRIPTION OF *NEOCYCLOPS (NEOCYCLOPS) PETKOVSKII* N.SP. (COPEPODA, HALICYCLOPINAE)

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Key words: Taxonomy, Copepoda, *Neocyclops*, Australia.

### ABSTRACT

A new species of cyclopoid copepod, *Neocyclops (Neocyclops) petkovskii* n. sp. is described from Australia. The new species belongs to the subgenus *Neocyclops sensu* Petkovski, 1986, and is close to *Neocyclops parvus* (Sewell, 1949) from Maldives (Indian Ocean). The genus *Neocyclops* is for the first time recorded in Australia.

### RÉSUMÉ

Une nouvelle espèce de Copépodes cyclopoïdes, *Neocyclops (Neocyclops) petkovskii* n.sp. est décrite de l'Australie. L'espèce appartient au subgenre *Neocyclops* tel qu'il a été défini par Petkovski (1986) et est proche de *Neocyclops parvus* (Sewell, 1949) de l'océan Indien (Maldives). Le genre *Neocyclops* s.l. est signalé pour la première fois en Australie.

### INTRODUCTION

During biological surveys of wetlands and rivers of the mid-west coast of Western Australia by one of us (S.A.H.) in 1994 and 1995, several cyclopoid copepods were collected. Among the material, to our surprise, was an undescribed species of the genus *Neocyclops* Gurney, 1927 *sensu* Petkovski 1986, previously unrecorded in Australia. The new species is described herein as *Neocyclops (Neocyclops) petkovskii* n.sp.

Type specimens of *N. (N.) petkovskii* were collected from Lake McLeod, a 120 km long, saline claypan situated 10-20 km from the coast, about 40 km north of Carnarvon. The lake occasionally receives freshwater inflow from rivers to the east but the permanent pools along the western side, which support mangroves, are the result of a subterranean marine connection. The species was also collected at Shark Bay, about 150 km south of Carnarvon.

### DESCRIPTIVE PART

Family Cyclopidae Burmeister, 1834 emend. Dana, 1846  
Subfamily Halicyclopinae Kiefer, 1927  
Genus *Neocyclops* Gurney, 1927  
Subgenus *Neocyclops* Gurney, 1927 *sensu* Petkovski, 1986

### *Neocyclops (Neocyclops) petkovskii* n.sp.

### MATERIAL

Lake McLeod, 23° 52' 19" S, 113° 42' 43" E, 6 ♂♂ and 1 ♀, 12.10.94, coll. S.A. Halse; Lake McLeod, 23° 47' 16" S, 113° 44' 44" E, 1 ♀, 20.3.95, coll. S.A. Halse.

Female holotype (WAM 506-97), male allotype (WAM 507-97) and one paratype (WAM 508-97) in Western Australian Museum, Perth. Remaining paratypes (GLP/97.101.105) in the senior authors collection at the "Dipartimento di Scienze



Figs. 1-12. *Neocyclops (Neocyclops) petkovskii* n.sp. (holotype: 2, 4-6, 10, 12) (allotype: 3, 7, 8) (paratype: 1, 9, 11): 1, antenna; 2, maxillular palp; 3, antennula; 4, antennula; 5, abdomen and furcal rami (dorsal view); 6, abdomen and furcal rami (ventral view); 7, abdomen and furcal rami (dorsal view), 8, abdomen and furcal rami (ventral view); 9, mandible; 10, maxilla; 11, maxilliped; 12, maxillular praecoxa, inner.

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The terminology applied to body and appendage segmentation follows that of Huys & Boxshall (1991).

#### Habitat and associated fauna

The type specimens were collected from a seasonally inundated part of the Lake McLeod claypan. At the time of collection, depth was 8 cm, pH 7.4, salinity 54100 mg L<sup>-1</sup> TDS, with sodium and chloride being the dominant ions. The species has been collected in hypersaline water at several sites on the mid-west coast of Western Australia: inundation varied from seasonal to permanent, pH 7.2 to 8.6, and salinity 52000 to 94000 mg L<sup>-1</sup> TDS.

Other copepods found to co-occur with *Neocyclops* (*Neocyclops*) *petkovskii* are the cyclopoid *Apocyclops denizicus* (Lepechkin, 1900) and many harpacticoids, including *Cletocamptus confluens* (Schmeil, 1894), *Mesochra flava* Lang, 1933 and *Onychocamptus bengalensis* (Sewell, 1934).

#### DESCRIPTION

Female.- Body length, excluding caudal setae, 875 to 962 µm (n=7). Prosome longer than urosome (1.68-1.76:1). First pedigerous somite fused with the cephalosome forming cephalothorax. Pore pattern of urosome consisting of circular and slit pores, as illustrated in Figs. 5-6.

Genital double-somite wider than long, with naked lateral prominences in anterior third, and strong notches at about halfway the somite length. Seminal receptacles as in Fig. 6.

Anal somite bearing ventral row of spinules along posterior margin. Anal operculum consisting of a weakly developed naked hyaline membrane.

Caudal rami (Figs. 5-6) about 2.5 times longer than wide, with 6 setae. Posterolateral seta spiniform, bipinnate; terminal accessory seta about as long as the posterolateral seta and bearing stiff setules; dorsal seta slightly longer than the terminal accessory seta; setation of the outer and inner terminal setae without particular modifications.

Antennule (Fig. 4) 10-segmented, as a result of the fusion between the ancestral third and fourth, and seventh and eighth segments. Setal armature as follows: 8, 4, 8, 4, 2, 5, 2, 2, 2, 7; aesthetasc on segments 7 and 10.

Antenna (Fig. 1): coxa reduced; basis with 2 inner plumose setae and one outer seta (exopod) reaching to about the tip of the terminal segment; endopod segments 1-3 spinulose along outer margin and with 1, 5 and 7 setae, respectively.

Mandible (Fig. 9) with coxal gnathobase armed with 7 sharp teeth and 2 dorsal setae with long spinules along one side; transverse row of 6 spinules implanted subdistally on cutting blade. Mandibular palp 1-segmented, bearing 2 unequal setae.

Maxillule (Fig. 12) consisting of praecoxa and 2-segmented palp. Praecoxal arthrite armed with 4 spines, some fused to segment on distal margin, and 6 elements on inner surface. Basis of palp (Fig. 2) armed with 3 inner setae and one outer seta (exopod); endopod reduced and armed with 3 setae.

Maxilla (Fig. 10) 4-segmented; praecoxa partially fused to coxa on posterior surface. Praecoxa with single distal endite armed with 2 elements; proximal coxal endite represented by a single seta; distal coxal endite armed with 1

spine fused to endite and ornamented with 4 strong spinules, and 1 pectinate spine. Basis with endite bearing 2 stout elements and 1 seta. Endopod 1-segmented, bearing 3 stout elements plus 2 unequal setae.

Maxilliped (Fig. 11) 4-segmented. Syncoxa bearing 2 endites with 2 and 1 spines, respectively; basis with 2 distal setae on inner margin; endopod 2-segmented, proximal segment with 2 setae ornamented as in Fig. 11, distal segment with 3 naked setae.

Legs 1-4 armed as follows (Roman numerals representing spines; Arabic numerals setae):

	COXA	BASIS	EXOPOD	ENDOPOD
leg 1	0-1	1-1	1-1; 1-1; III,2,3	0-1; 0-2; I,1+1,3
leg 2	0-1	1-0	1-1; 1-1; III,1+1,4	0-1; 0-2; I,II,3
leg 3	0.1	1-0	1-1; 1-1; III,1+1,4	0-1; 0-2; I,II,3
leg 4	0.1	1-0	1-1; 1-1; II,1+1,4	0-1; 0-2; I,II,2

Leg 4 (Fig. 15) exopod segment 3 without modified setae; endopod segments 2 and 3 partially fused on anterior side; terminal segment only slightly longer than wide and bearing 2 setae and 3 spines, the inner spine longer than segment 3.

Leg 5 (Fig. 18): coxa unarmed; basis with 1 integumental pore near the implantation of the seta; exopod about twice longer than wide, with a distinct concavity at the first third of inner margin and armed with 3 spines and 1 seta; inner apical spine naked, very short, about 0.4 times as long as the segment, outer and lateral spines subequal in length and shorter than exopod; integumental pore on outer surface near indentation of proximal spine.

Integumental pores on anterior surface of legs 1, 2 (identical to leg 3), 4 and 5 [according to Rocha (1995)] as follows:

	COXA	BASIS	EXOPOD	ENDOPOD
leg1	1	1	0-1-1	1-1-1
leg 2/3	1	1	2-1-0	1-1-0
leg 4	1	1	2-1-1	1-0-1
leg 5	0	1	1-1	

Male.- Body length 700 µm. Urosome (Figs. 7-8) 6-segmented.

Caudal rami about twice longer than wide.

Antennule 14-segmented, armature as in Fig. 3.

Leg 5 (Fig. 17) : coxa and basis as in female; exopod 1-segmented, 2.2 times longer than wide and armed with 1 seta and 4 spines.

Leg 6 (Fig. 16) with 2 setae and 1 shorter spine. Integumental pore near the inner margin.

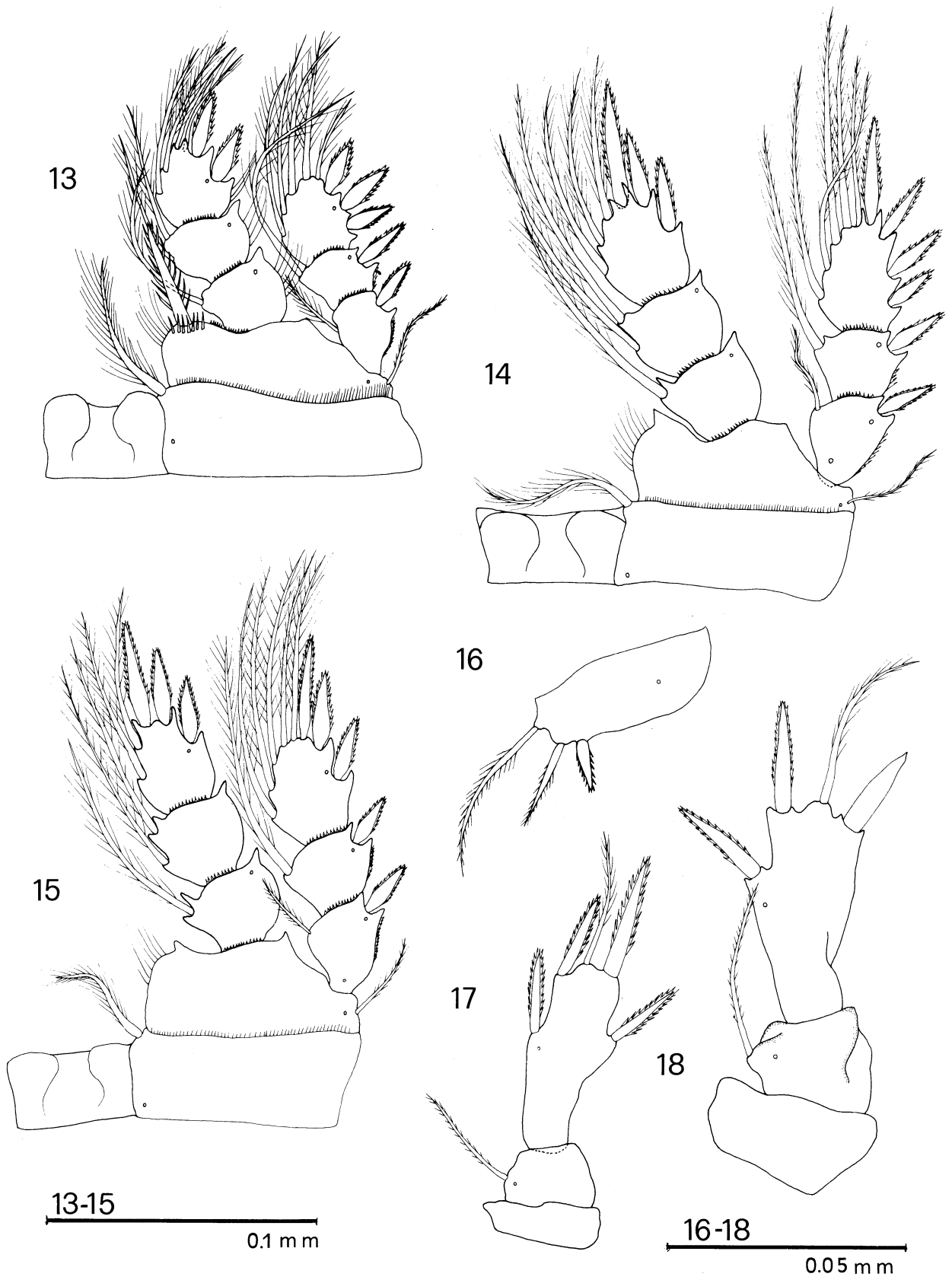
The single available male is identical to the female in all other respects.

#### ETYMOLOGY

Specific epithet after Dr. T. Petkovski, distinguished copepodologist, in recognition of his valuable contribution to the knowledge of the genus *Neocyclops*.

#### DISCUSSION

Petkovski (1986) divided the genus *Neocyclops* Gurney into two subgenera. Particularly, species having the male



Figs. 13-18. *Neocyclops (Neocyclops) petkovskii* n.sp. (holotype: 13, 14) (paratype: 15, 18) (allotype: 16, 17): 13, leg 1; 14, leg 3; 15, leg 4; 16, leg 6; 17, leg 5; 18, leg 5.

exopod of leg 5 2-segmented (plesiomorphic state) are grouped in the subgenus *Protoneocyclops* (seven species), and species with the same exopod 1-segmented (apomorphic state) are included in the subgenus *Neocyclops* (five species).

Three species, viz. *N. improvisus* Plesa, 1973, from Cuba, *N. parvus* (Sewell, 1949) and *N. magnus* (Sewell, 1949), both from the Indian Ocean (Maldive Archipelago), have an undefined subgeneric position since the males of these species are unknown.

Following Petkovski (1986), the new species fits within the diagnosis of the subgenus *Neocyclops*, which at present includes the following other species: *N. (N.) salinarum* (Gurney, 1927), from the Mediterranean coast of Sinai and France; *N. (N.) affinis* Dussart, 1974, from Ethiopia, Madagascar, Ghana and Bahamas; *N. (N.) medius* Herbst, 1955, from Brazil and the West Indies; *N. (N.) vicinus* (Herbst, 1955), from Brazil and the West Indies and *N. (N.) remanei* Herbst, 1952, from the North Sea (Germany).

*N. (N.) petkovskii* n.sp. differs clearly from all the above species, showing slight affinities only with *N. parvus*

with which it shares a similar morphology and construction of the female leg 5. However, the new species differs from *N. parvus* in numerous characters, such as the 10-segmented antennule of the female (distinctive feature of the new species), the setation of the female antenna, the mandibular palp with 2 setae (versus one seta), the longer female genital double-somite, and the different morphology and armature of the endopod of leg 4.

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