



Three new species of copepods (Copepoda: Calanoida and Cyclopoida) from anchialine habitats in Indonesia

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Abstract

Three new species of copepod crustaceans are described from material collected from anchialine and brackish habitats in and around the village of Walengkabola on the coast of Muna Island, to the southeast of Sulawesi. A new species of cyclopoid, *Paracyclopina sacklerae* n. sp., was described from material collected from the tidal inflow entering into the bottom of sinkholes a few metres inland from the shoreline. Detailed comparisons are made with *Paracyclopina orientalis* (Lindberg, 1941), n. comb., a closely related congener here transferred from its original genus *Cyclopetta* Sars, 1913. The assignment of *Paracyclopina* Smirnov, 1935 to the family Cyclopettidae is followed here despite uncertainty over the validity of some of the families created by the break up of the former Cyclopinidae. Two new species of *Boholina* Fosshagen & Iliffe, 1989 are described, based on material from the same sinkholes and from caves located up to 700m inland from the coast and exhibiting further reduced salinity down to 1.8 ppt. One species, *B. parapurgata* n. sp., is very closely related to *B. purgata* Fosshagen & Iliffe, 1989 from Bohol island in the Philippines, the other *B. munaensis* n. sp., is very closely related to *B. crassicephala* Fosshagen & Iliffe, 1989 also from Bohol island, but a number of fine scale differences in the leg 5 of both sexes are recognised in each case. Keys to valid species of both genera are provided.

Key words: taxonomy, anchialine caves, *Paracyclopina*, *Boholina*, Muna Island, Sulawesi

Introduction

Exploration of anchialine habitats around the coastal margins of tropical and subtropical islands and around the coast of Central America (especially on the Yucatan Peninsula) has revealed a rich assemblage of new copepods belonging to the orders Platycopioidea (Fosshagen & Iliffe 1985), Calanoida (e.g. Fosshagen & Iliffe 1989; Fosshagen *et al.* 2001), Harpacticoida (Huys 1988, 1996), Misophrioida (e.g. Boxshall & Iliffe 1986, 1990; Boxshall & Jaume 2000) and Cyclopoida (e.g. Rocha & Iliffe 1991; Jaume & Boxshall 1997). These anchialine copepods often represent relatively basal lineages: the Platycopioidea, for example, is the sister-taxon to the lineage comprising all other copepod orders (Huys & Boxshall 1991). In the Calanoida, typical anchialine families such as the Epactericidae and Ridgewayiidae, were both recovered as basal offshoots in a recent phylogenetic analysis (Bradford Grieve *et al.* 2010). Similarly, the Speleophriidae, within the order Misophrioida – itself an early offshoot of the Podoplea – retains a high proportion of plesiomorphic character states (Boxshall & Jaume 2000).

To date, representatives of 17 different families of copepods have been reported from anchialine habitats world wide (Boxshall & Halsey 2004), but the Indo-Pacific anchialine fauna has proven to be less diverse than that of the Central Atlantic including the Caribbean and Mediterranean Seas. Known Pacific sites for anchialine copepods include the Galapagos Islands, Fiji, Palau and Western Australia (Boxshall & Iliffe 1990; Fosshagen *et al.* 2001; Jaume *et al.* 2001; Figueroa & Hoefel 2008) but collecting effort has been patchy. A preliminary reconnaissance trip to Muna island (south of Sulawesi) in 2001 had collected malacostracan crustaceans from several caves around the island, some of which have already been described, such as the anthurid isopod *Stygocyathura muna* Botosaneanu, 2003 (Botosaneanu 2003) and the brachyuran *Sulaplax ensifer* Naruse, Ng & Guinot, 2008 (Naruse *et al.*