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**Freshwater cyclopoids and harpacticoids  
(Crustacea: Copepoda) from the Gnangara  
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## Freshwater cyclopoids and harpacticoids (Crustacea: Copepoda) from the Gnangara Mound region of Western Australia

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## Abstract

The Gngangara Mound is a 2,200 km<sup>2</sup> unconfined aquifer located in the Swan Coastal Plain of Western Australia. This aquifer is one of the most important ground water resources for the Perth Region and supports a number of groundwater-dependent ecosystems, such as the springs of Ellen Brook and root mat communities of the Yanchep Caves. Although freshwater copepods have been documented previously from those caves and springs, their specific identity were hitherto unknown. The current work formally identifies copepod samples collected from 23 sites (12 cave, three bore, five spring and three surface water localities) within the Gngangara Mound region. Fifteen species were documented in this study: the cyclopoids *Australoeucyclops* sp., *Eucyclops edytae* **sp. nov.**, *Macrocyclops albidus* (Jurine, 1820), *Mesocyclops brooksi* Pesce, De Laurentiis & Humphreys, 1996, *Metacyclops arnaudi* (G. O. Sars, 1908), *Mixocyclops mortoni* **sp. nov.**, *Paracyclops chiltoni* (Thomson, 1882), *Paracyclops intermedius* **sp. nov.** and *Tropocyclops confinis* (Kiefer, 1930), and the harpacticoids *Attheyella (Chappuisiella) hirsuta* Chappuis, 1951, *Australocamptus hamondi* Karanovic, 2004, *Elaphoidella bidens* (Schmeil, 1894), *Kinnecaris eberhardi* (Karanovic, 2005), *Nitocra lacustris pacifica* Yeatman, 1983 and *Paranitocrella bastiani* **gen. et sp. nov.** *Tropocyclops confinis* is recorded from Australia for the first time and *A. (Ch.) hirsuta* and *E. bidens* are newly recorded for Western Australia. The only copepod taxa endemic to the Gngangara Mound region are *E. edytae* **sp. nov.** (occurs primarily in springs and rarely in the Yanchep National Park Caves) and *P. bastiani* **gen. et sp. nov.** (confined to the Yanchep National Park Caves containing tuart root mats). *Paracyclops chiltoni* was the most common species, whilst *T. confinis* and *N. l. pacifica* were rarely encountered. *Metacyclops arnaudi* was the only taxon absent from ground waters. The copepod fauna recorded in the caves and springs of the Gngangara Mound region are comparable, with respect to species richness, endemism and the varying degrees of dependency on ground water, to those reported from similar habitats in South Australia and Western Australia. Restoring the root mats and maintaining permanent water flow within the Yanchep Caves, as well as minimising urban development near the Ellen Brook Springs, are essential to protect the copepod species, particularly the endemic *P. bastiani* **gen. et sp. nov.** and *E. edytae* **sp. nov.**, inhabiting these unique ground water environments.

**Keywords:** Ground water, Caves, Springs, Conservation, Taxonomy

## Introduction

The Gngangara Mound is a shallow, unconfined aquifer underlying the Quaternary dune deposits of the Swan Coastal Plain in Western Australia (Davidson 1995). This aquifer reaches a maximum elevation of 70 m above sea level and covers an area of about 2,200 km<sup>2</sup>, bounded by Gingin Brook to the north, the Gingin Scarp to the east, the Swan River to the south and the Indian Ocean to the west. The Gngangara Mound is the primary ground water resource for human use north of the Swan River, Perth Region, and also supports a number of groundwater-dependent ecosystems (Western Australian Planning Commission 1999a, b).

The groundwater-dependent cave and spring communities on the western and eastern side, respectively, of the Gngangara Mound region are of particular scientific interest. The caves occur primarily in Yanchep National Park, which is located about 5 km from the coastline and lies in an area consisting of an aeolian