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# A review of New Zealand and southeast Australian echinothuriinids (Echinodermata: Echinothuriidae) with descriptions of seven new species

OWEN F. ANDERSON
*National Institute of Water and Atmospheric Research Limited, Private Bag 14 901, Wellington, New Zealand.*
*E-mail owen.anderson@niwa.co.nz*

## Abstract

Examination of a large collection of echinothurioid echinoids from museum collections in New Zealand and Australia revealed six new species in the genus *Araeosoma* (*A. bidentatum* sp. nov., *A. migratum* sp. nov., *A. anatirostrum* sp. nov., *A. tertii* sp. nov., *A. leppienae* sp. nov., and *A. bakeri* sp. nov.) and one in the genus *Hapalosoma* (*H. amynina* sp. nov.), while the recorded presence of *A. coriaceum* in northwest New Zealand was found to be incorrect. Several of the species described are rarely collected, their distribution being strongly associated with seamount type habitat in a relatively narrow depth range. The majority of the records of these new species are from the New Zealand region, with a strong centre of diversity revealed among the seamounts of the Bay of Plenty. The new species are clearly distinguished from known forms by characters of their pedicellariae, spines, coronal plate structure, colouring, and tuberculation. A key to the Echinothuriinae of the region is included.

**Key words:** Echinoid, *Echinothurioida*, *Echinothuriidae*, *Echinothuriinae*, *Araeosoma*, *Hapalosoma*, new species, taxonomy

## Introduction

New Zealand echinoids of the order Echinothurioida are known locally as tam o'shanters due to their supposed similarity to the Scottish cap named after a character in a famous poem by Robert Burns. Elsewhere these echinoids are also known as pancake-urchins, bag-urchins, beret-urchins, or leather-urchins. With as many as 16 species in 7 genera present in New Zealand, in depths ranging from a little over 100 m to nearly 5000 m, they are a common bycatch of the many bottom trawl fisheries operating in the region, and familiar to many fishermen.

The classification used in this paper follows that given by Smith and Wright (1990). Echinoids of the order Echinothurioida are readily distinguished from other echinoids by their flexible, leathery test with thin, imbricating plates. Other distinguishing characters include: compound ambulacral plates in which two plates are usually reduced in size such that they are only large enough to accommodate the ambulacral pores; a broad, low form of Aristotles lantern, and the presence of dactylous pedicellariae in some genera.

Species in the subfamily Echinothuriinae are characterised by the arrangement of ambulacral pores into three discrete columns on both the oral and aboral surfaces, an apical system based on a contiguous ring of ocular and genital plates, hoofs on the adoral primary spines, and teeth with a bluntly angled tip. The Echinothuriinae include the genera *Echinothuria*, *Asthenosoma*, *Araeosoma*, *Hapalosoma*, and *Calveriosoma*. Of these, *Echinothuria* is extinct and *Asthenosoma* and *Calveriosoma* are unknown from New Zealand and southeast Australia.

Prior to this review only three echinothuriinids had been reported from New Zealand and southeast Australia. *Araeosoma thetidis* (H.L. Clark, 1909) is a large, robust species, previously known in Australia from off New South Wales and Tasmania and in New Zealand from the West Norfolk Ridge, Bay of Plenty, and East Cape (where the first New Zealand records were taken by the *Terra Nova* Expedition of 1909–1913 (Mortensen 1922)). Another large species, *A. coriaceum* (Agassiz, 1879), previously known from Fiji and the Philippines, was reported from northeast New Zealand, firstly by the *Challenger* expedition (Agassiz 1879) and then later by Baker (1972). A third species, *Hapalosoma pulchrum* (Rowe, 1989), is known from a single small specimen taken from near Norfolk Island. It has a pale green and purple test with similarly banded spines, and lacks aboral primary spines (Rowe 1989).

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