



## Aphanodactylidae, a new family of thoracotreme crabs (Crustacea: Brachyura) symbiotic with polychaete worms

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### Abstract

The pea crabs of the family Pinnotheridae De Haan, 1833, have traditionally been recognised on the basis of their simplified external morphology, modified third maxillipeds, and general habit of living in association with invertebrate hosts, usually bivalve molluscs. Recent morphological and molecular studies of Pinnotheridae show that it is not a natural group as traditionally conceived. The subfamily Asthenognathinae Stimpson, 1858, actually belongs in the Varunidae H. Milne Edwards, 1853, and the subfamily Tritodynamiinae Števcíć, 2005, is part of the Macrophthalmidae Dana, 1851. However, several ‘pinnotherid’ genera that are superficially similar to asthenognathines and allied to *Aphanodactylus* Tesch, 1918, appear to form a discrete group, but lack the chief synapomorphy of Pinnotheridae, namely, the highly modified maxilliped 3. Moreover, *Aphanodactylus* and allies do not share synapomorphies with any presently recognised thoracotreme family. A new family, Aphanodactylidae, is therefore established for *Aphanodactylus*, *Gandoa* Kammerer, 2006, *Uruma* Naruse, Fujita & Ng, 2009, and a new genus and species described herein, *Gustavus mecognathus*. Aphanodactylids (where known) are symbiotic with terebellid polychaete worms and share short, stout, ambulatory legs with one or more spines lining the flexor margins of the ischiomeri of at least some of the ambulatory legs; a row of distal flexor spines on the ambulatory propodi opposing a claw-like dactylus; very short ambulatory dactyli that are less than half the respective propodus length; and marked sexual dimorphism in which the female is distinctly wider than the male. The phylogenetic position of Aphanodactylidae remains to be determined but the morphology of the third maxillipeds and the position of the male gonopore suggests that it may belong in the Pinnotheroidea, to which it is tentatively assigned. Each genus of the Aphanodactylidae is diagnosed and illustrated, and a key to the genera provided.

**Keywords:** Decapoda, Brachyura, Thoracotremata, Pinnotheroidea, Aphanodactylidae, Pinnotheridae, symbiosis, Polychaeta, Terebellidae

### Introduction

The crabs of the family Pinnotheridae De Haan, 1833, have long been recognised as symbionts, usually living within the mantle chamber of bivalve molluscs or with polychaete worms. Most pinnotherids possess a relatively poorly calcified carapace with indistinct regions, have a highly modified maxilliped 3 and a simplified habitus, particularly with regards to the general lack of surface ornamentation. Among crabs traditionally regarded as pinnotherids were a group of genera that have long been placed in the subfamily Asthenognathinae Stimpson, 1858. Unlike most pinnotherids, which have a highly modified maxilliped 3, asthenognathines are atypical in having the ischium and merus as distinct segments, with the ischium larger than the merus, and the palp consisting of the carpus, propodus and dactylus clearly demarcated and not enlarged.