



## Phylogenetic relationships within the Pylochelidae (Decapoda: Anomura: Paguroidea): A cladistic analysis based on morphological characters

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### Abstract

Phylogenetic relationships within the “symmetrical” hermit crab family Pylochelidae were analyzed for 41 of the 45 species and subspecies currently considered valid. In the analyses, 78 morphological characters comprised the data matrix and the outgroup consisted of *Thalassinia anomala*, a member of the Thalassinidae, and *Munida quadrispina*, a member of the Galatheidae. A poorly resolved strict consensus tree was obtained from a heuristic parsimony analysis of unweighted and unordered characters, which showed the family Pylochelidae and the subfamilies Pylochelinae and Pomatochelinae to be monophyletic taxa – the latter two groups had the highest Bremer support values. Additionally, while the subgenus *Pylocheles* (*Pylocheles*) was strongly supported, the subgenera *Xylocheles*, and *Bathycheles* were not. More fully resolved trees were obtained when using implied weighting, which recognized the monotypic subfamilies Parapylochelinae, Cancellochelinae and Mixtopagurinae. The subfamily Trizochelinae was found to have four distinct clades and several ambiguously placed taxa.

**Key words:** Decapoda, Anomura, Paguroidea, Pylochelidae, phylogenetic relationships

### Introduction

Species of the family Pylochelidae Bate, 1888 are known as “symmetrical” hermit crabs because unlike their better known “asymmetrical” counterparts, most have symmetrical chelipeds, a pleon that is most often straight and provided with at least partially calcified, articulated tergites, paired pleopods, and generally symmetrical uropods. They are cryptic in habitat, living in pieces of wood, rocks, sponges, tusk shells, and rarely gastropods. Most of the 45 species and subspecies known from the world are distributed in tropical waters of the Indo-Pacific, with only three known from the western Atlantic; the species range in depth from 30 to 1570 m although they are most frequently found from 200 to 500 m (Forest 1987a, b).

The Pylochelidae were discovered in the late 19<sup>th</sup> century when the first species, *Pomatocheles jeffreysii* Miers, 1879, was described. Miers placed this unique species in the Paguridea, but noted a mix of characters that led him to believe that *P. jeffreysii* established a “transition from the Paguridea to the Macrura” (Miers 1879: 50). As more “symmetrical” species were discovered (Fig. 1), this evolutionary view was maintained by other carcinologists (e.g., A. Milne-Edwards 1880; Bate 1888; Henderson 1888; Alcock 1905; Bouvier 1940) who allied these hermit crabs with thalassinideans or homarids. It was Bate (1888) who proposed the family Pylochelidae for these unusual hermit crabs, although he placed great importance on their gill structure and classified them in his division Trichobranchiata alongside Macrura with similar gill structure. Despite the evolutionary significance of pylochelids in deciphering hermit crab ancestry or even the Anomura, they were