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A remarkable new crab-like hermit crab (Decapoda: Paguridae) from French Polynesia, with comments on carcinization in the Anomura

ARTHUR ANKER[1,2] & GUSTAV PAULAY[1]

[1]*Florida Museum of Natural History, University of Florida, Gainesville, FL, 32611-7800, U.S.A.*
[2]*Department of Biological Sciences, National University of Singapore, Lower Kent Ridge Road, 119260, Singapore*

Abstract

Patagurus rex **gen. et sp. nov.**, a deep-water pagurid hermit crab, is described and illustrated based on a single specimen dredged from 400 m off Moorea, Society Islands, French Polynesia. *Patagurus* is characterized by a subtriangular, vaulted, calcified carapace, with large, wing-like lateral processes, and is closely related to two other atypical pagurid genera, *Porcellanopagurus* Filhol, 1885 and *Solitariopagurus* Türkay, 1986. The broad, fully calcified carapace, calcified branchiostegites, as well as broad and rigidly articulated thoracic sternites make this remarkable animal one of the most crab-like hermit crabs. *Patagurus rex* carries small bivalve shells to protect its greatly reduced pleon. Carcinization pathways among asymmetrical hermit crabs and other anomurans are briefly reviewed and discussed.

Key words: Decapoda, Paguridae, hermit crab, deep-water, carcinization, *Porcellanopagurus*, *Solitariopagurus,* Indo-West Pacific

Introduction

Carcinization, or development of a crab-like body plan, is a term describing an important evolutionary tendency within the large crustacean order Decapoda. The term "carcinization" was coined by Borradaile (1916) with reference to crab-like modifications in the hermit crab genus *Porcellanopagurus* Filhol, 1885 (Paguridae). However, the concept of carcinization originates with Boas' hypothesis (Boas 1880a, 1880b) that king crabs (Lithodidae[1]) represent highly derived, heavily calcified, shell-less hermit crabs. Several morphological transformations are involved in carcinization, the most conspicuous and important being the flattening, broadening, and sclerotization of the cephalothorax, and reduction and underfolding of the pleon (McLaughlin & Lemaitre 1997). Among Recent decapods, carcinization exists in various degrees only in Anomura (squat lobsters, hermit crabs, king crabs, porcelain crabs, mole crabs etc.) and Brachyura (true crabs).

The large family Paguridae includes mostly non-carcinized hermit crabs. Typical pagurids have a weakly to moderately sclerotized carapace and a soft abdomen protected by a domicile, such as a gastropod shell, scaphopod shell, or hard polychaete tube (McLaughlin & Lemaitre 1993; McLaughlin & Konishi 1994). Partly carcinized forms are known only in a few pagurid genera, most notably *Porcellanopagurus, Solitariopagurus* Türkay, 1986, and *Ostraconotus* A. Milne Edwards, 1880 (Borradaile 1916; Türkay 1986; McLaughlin 2000). These genera are characterized by a squarish, well-sclerotized carapace, a more or less reduced abdomen, and (when known) a domicile consisting of a bivalve or a limpet shell (Poupin & McLaughlin 1996; McLaughlin 2000; Martin *et al.* 2009).

1. Throughout this paper we use king crabs and Lithodidae interchangeably to refer to the clade of decapods referred to in recent publications as the Lithodoidea. Kieler et al (2013) noted that "the term Lithodoidea … to describe a superfamily comprising Lithodidae and Hapalogastridae, however, is problematic ... both linguistically and taxonomically due to the king crabs' phylogenetically supported position within the (superfamily) Paguroidea." Therefore, we here follow the traditional concept of Lithodidae (with Lithodinae and Hapalogastrinae as subfamilies) until the classification of the Paguroidea is appropriately addressed.

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