



A new genus and new species of hermit crab (Crustacea: Anomura: Paguroidea: Diogenidae) from the eastern tropical Pacific

MANUEL AYÓN-PARENTE¹ & MICHEL E. HENDRICKX²

Laboratorio de Invertebrados Bentónicos, Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, P.O. Box 811, Mazatlán, Sinaloa, 82000. México.

E-mail: ¹manuel@ola.icmyl.unam.mx; ²michel@ola.icmyl.unam.mx

Abstract

Tetralobistes **gen. nov.**, a presently monotypic genus of hermit crab of the family Diogenidae, is described to accommodate a new species, *Tetralobistes bicentenarius* **sp. nov.** In many characters, *Tetralobistes* **gen. nov.** is similar to *Areopaguristes* Rahayu & McLaughlin, 2010, *Paguristes* Dana, 1851, and *Pseudopaguristes* McLaughlin, 2002. However, it differs most significantly in the morphology of the male first pleopods and lacks male second and female first pleopods. The most conspicuous character separating *Tetralobistes* **gen. nov.** from the other three genera is the shape of the telson, with a typical subdivided (four-lobes) posterior margin.

Key words: Crustacea, Decapoda, Paguroidea, Diogenidae, new genus, new species, eastern Pacific

Introduction

During the last decade there has been a significant increase in the number of genera and species of hermit crabs described worldwide. Descriptions of new taxa were based on thorough revisions of the systematics of the group, combined with the examination of freshly collected and museum specimens (e.g., Lemaitre & McLaughlin 2006, McLaughlin & Rahayu 2008, Ayón-Parente & Hendrickx 2009).

Despite the fact that hermit crabs are usually very abundant in coastal ecosystems, particularly in the tropics, they are often small to medium-sized and superficially similar, thus making their correct identification difficult. During the study of the hermit crabs of the family Diogenidae from the Mexican Pacific, a small series of specimens of this family was collected in shallow water at Matanchen Bay, Nayarit, Mexico. The very small size and attractive color pattern set these specimens apart from previously collected species and clearly were of a new species. Furthermore, some characters of generic value were observed, indicating that this species did not fit within any of the currently recognized genera of Diogenidae. Although the specimens show some similarity to *Paguristes* Dana, 1851, *Pseudopaguristes* McLaughlin, 2002, and *Areopaguristes* Rahayu & McLaughlin, 2010 (a genus-group name recently proposed to replace the preoccupied name *Stratiotes* Thomson, 1899), they are so morphologically different that a new monotypic genus is justified for this new species.

Material and methods

The material was obtained in June 2005, November 2006 and October 2010, from hand-collected samples from Matanchen Bay, Nayarit, Mexico. McLaughlin (1974, 2003) is followed for general terminology. Shield length (SL in mm) was measured from the tip of the rostrum to the midpoint of the posterior margin of shield. Specimens are deposited in the Regional Collection of Invertebrates (EMU) in the Laboratorio de Invertebrados Bentónicos, ICML, UNAM, in Mazatlán, Mexico, in the Crustacean Collection of Los Angeles

County Museum of Natural History (LACM-CR), and in the National Collection of Crustacean, Instituto de Biología (CNCR) UNAM, Mexico, D.F., Mexico.

Taxonomy

Family Diogenidae

Tetralobistes gen. nov.

(Fig. 2)

Diagnosis. Thirteen pairs of biserial gills; shield well calcified; rostrum short, subtriangular. Ocular acicles well developed, terminating in strong multifid projection, mesial margins contiguous. Antennal peduncles with supernumerary segmentation; acicles short, spinose. Antennal flagella of medium length, longer than carapace, with long setae ventrally. Mandible with unarmed mesial margin, palp 3-segmented. Endopod of maxillule (Fig. 2A) with well developed, recurved external lobe. Maxilla (Fig. 2B) with elongate endopod. First maxilliped (Fig. 2C) with well developed epipod. Second maxilliped (Fig. 2D) without distinguishing characters. Third maxilliped (Fig. 2E) with basal segments approximate; crista dentata well developed; no accessory tooth.

Chelipeds subequal, right usually slightly longer than left, similar in armature; fingers opening in horizontal plane, fingertips acuminate. Fourth pereopods simple, without preungual process at base of claw. Fifth pereopods chelate.

Males with paired gonopores; paired pleopods modified as gonopods on first pleonal somite; no pleopods on the second somite; unpaired, well developed, uniramous left pleopods on somites 3–5.

Females with paired gonopores; first pleonal somite without modified pleopods; following 3 pleomeres with unequally biramous left pleopods; fifth pleopod uniramous; brood pouch represented by row of setae.

Uropods asymmetrical. Telson asymmetrical, with lateral indentation; posterior margin divided into four lobes (tetralobular); external lobes unequal, larger than symmetrical, inner lobes.

Type species. *Tetralobistes bicentenarius* n. sp., by present designation.

Etymology. The name of the genus refer to the posterior margin of the telson which is divided into four lobes (tetralobular), and is a combination of the Greek words *tetra* (four) and *lobos* (lobe), and the Greek suffix *-istes*. Gender, masculine.

Distribution. Matanchen Bay, Nayarit, Mexico; 0.5–1.5 m.

Remarks. Diogenidae have long been considered as evolutionarily more primitive than Paguridae. In her review of characters used to define affinities among hermit crabs, de Saint Laurent (1970) recognised the importance of the presence and number of pleurobranchiae on pereopods, the modification of pleopods into gonopods in males, the presence or absence of first (males and females) and second (males only) pleopods, and relative lengths of the endo- and exopodites of the pleopods. Additionally, the presence, reduction or absence of the brood pouch in females has also been considered an important phylogenetic character (McLaughlin & Hogarth 1998).

Considering the most significant characters that separate the genera of Diogenidae, *Tetralobistes* gen. nov. is more closely related to *Areopaguristes*, *Paguristes* and *Pseudopaguristes* than to other genera. For comparative purposes, 12 characters were selected and analysed (see Tab. 1). In *Tetralobistes* gen. nov., some of these characters are similar to one, two or all these three other genera, but other characters are clearly distinct or even unique. In *Tetralobistes* gen. nov., for example, the presence of 13 pairs of phyllobranchiate biserial gills is unique among these four genera.

In her review of *Paguristes* sensu lato Rahayu (2005) considered reduction of the number of gills (branchiae) as an evolutionary trend. On this basis, she suggested splitting *Paguristes* sensu lato into three genera: *Paguristes* sensu stricto, with 13 pairs of gills, *Areopaguristes* with 12 pairs, and *Pseudopaguristes* with only 8 pairs. This is also supported by Lemaitre *et al.* (2009), who considered *Paguroopsis* Henderson, 1888, and *Paguristes* (both with 13 pairs of gills) among the most primitive of diogenids. Species of these two

TABLE 1. Selected comparative characters observed in genera of Diogenidae closely related to *Tetralobistes* **gen. nov.**

	<i>Paguristes</i> Dana, 1851	<i>Areopaguristes</i> Rahayu & McLaughlin, 2010	<i>Pseudopaguristes</i> McLaughlin, 2002	<i>Tetralobistes</i> gen. nov.
Number of gills	13	12	8	13
Type of gills	Phyllobranchiate; bi or quadriserial	Phyllobranchiate; bi or quadriserial	Phyllobranchiate; bi or quadriserial	Phyllobranchiate; biserial
Ocular acicles	Well developed, often multispinous, more or less separated	Well developed or reduced, simple, bi or multidenticulate, contiguous or widely separated	Well developed, simple, bi or multidenticulate, widely separated	Well developed, multidenticulate, contiguous
Maxillules	External lobe of endopod well developed, recurved	External lobe of endopod prominently recurved	External lobe of endopod well developed, recurved	External lobe of endopod well developed, recurved
First maxillipeds	Epipod well developed	Epipod well developed or absent	Epipod well developed	Epipod well developed
Third maxillipeds	Crista dentata well developed, no accessory tooth	Crista dentata well developed, no accessory tooth	Crista dentata consisting of row of quite small teeth, no accessory tooth	Crista dentata well developed, no accessory tooth
Chelipeds	Usually subequal; claws with fingers opening in horizontal plane	Equal, subequal or unequal; claws with fingers opening in horizontal or oblique plane	Subequal or unequal; claws with fingers opening in horizontal or oblique plane	Subequal; claws with fingers opening in horizontal plane
Fourth pereopods	Simple, with or without preungual process at base of claw	Subchelate or weakly semichelate, with or without preungual process at base of claw	Simple, with or without preungual process at base of claw	Simple, without preungual process at base of claw
Male first pleopods	Modified as gonopod	Modified as gonopod	Modified as gonopod	Modified as gonopod
Male second pleopods	Modified as gonopod	Modified as gonopod	Modified as gonopod or absent	Absent
Female first pleopods	Modified as gonopod	Modified as gonopod or absent	Modified as gonopod	Absent
Brood pouch	Usually well developed or absent	Usually well developed, occasionally entirely absent	Present or absent	Absent
Telson	Posterior margin divided into two subequal to markedly unequal lobes	Posterior margin divided into two subequal to markedly unequal lobes	Posterior margin divided into two slightly to markedly asymmetrical lobes	Posterior margin tetralobular; external lobules unequal, larger than symmetrical, inner lobules

genera have first and second pairs of males pleopods modified as gonopods, a character considered by McLaughlin & Lemaitre (1997) to be a plesiomorphic condition that evolved into a more advanced, apomorphic condition in which reduction and ultimate loss are eventually observed. The first and second pairs of pleopods (modified as gonopods) are also conserved in *Areopaguristes*. However, this is not true in some species of *Pseudopaguristes* [e.g., *P. hians* (Henderson, 1888), *P. asper* Rahayu, 2005] and in *Tetralobistes* **gen. nov.** Rahayu (2005) concluded that *Areopaguristes* and *Pseudopaguristes* (12 and 8 pairs of gills, respectively; first and second pair of gonopods usually present in males) are more derived than *Paguristes* and also suggested that a well developed brood pouch, as is found in *Paguristes*, denotes a primitive state.

