

***Porcellanopagurus eldredgei*, a New Species of Bivalve-carrying Hermit Crab from Guam (Crustacea: Decapoda: Anomura: Paguridae)**

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Abstract. A new species of bivalve-carrying hermit crab, *Porcellanopagurus eldredgei*, n.sp., from Guam is described and illustrated, based on collections made from a deep-water shrimp trapping program. The new species is recognized primarily by having a straight, rather than curved, supraorbital border.

Introduction

The hermit crab genus *Porcellanopagurus* Filhol, 1885 includes 13 species (McLaughlin *et al.* 2010). Four species (*P. edwardsi* Filhol, 1885; *P. tridentatus* Whitelegge 1900; *P. platei* Lenz, 1902, and *P. japonicus* Balss, 1913) were described between 1885 and 1913, but the fifth species (*P. truncatifrons* Takeda, 1981) was not described until 1981. From 1985 to 2000, an additional eight species were described (*P. nihonkaiensis* Takeda, 1985; *P. belauensis* Suzuki & Takeda, 1987; *P. foresti* Zarenkov 1990; *P. jacquesi* McLaughlin, 1997; *P. adelocercus* McLaughlin & Hogarth, 1998; *P. chiltoni* de Saint Laurent & McLaughlin, 2000; *P. filholi* de Saint Laurent & McLaughlin, 2000; and *P. haptodactylus* McLaughlin, 2000). Komai & Takeda (2006) provided revised descriptions of two species from Japan, *P. japonicus* and *P. nihonkaiensis*. Of known species of *Porcellanopagurus*, two were found relatively near the Mariana Islands, *P. truncatifrons* from the Ogasawara Islands and *P. belauensis* from Palau. During a trapping program conducted in the late 1970s to collect deep-water shrimp (*Heterocarpus* spp.) from the sea surrounding Guam (Wilder, 1979), two specimens of *Porcellanopagurus* were collected that were not referable to any known species.

Material and Methods

The description of the morphology of the new species, except for the telson, is based on the holotype. Because of damage to the telson of the holotype, the telson of the paratype is described. Where the state of a particular character found on the paratype differs from that found on the holotype, the state found on the paratype is enclosed by brackets. Abbreviations used are: cl, carapace length; cw, carapace width; ft, feet; m, meters; mm, millimeters; BPBM, Bernice P. Bishop Museum, Honolulu, Hawai'i.

Family Paguridae

Genus *Porcellanopagurus* Filhol, 1885

***Porcellanopagurus eldredgei*, new species**

Figs. 1–4

Type material. *Holotype*: male, cl. 15.1 mm, cw. 21.7 mm; GUAM, Double Reef, Sta. 96, 1200 ft (354 m); 30 Dec 1976; BPBM S16174. *Paratype*: male, cl. 10.5 mm, cw. 16.1 mm; same collection data, BPBM S16175. Each holding a valve of an undescribed species of *Plicastes* Vokes, 1963 (Mollusca, Bivalvia, Limidae).



Fig. 1. *Porcellanopagurus eldredgei* new species, holotype male (BPBM S16174), Guam. Dorsal view.

Description. Shield about 1.4 times broader than long, widening posteriorly, flattened in lateral view; surface roughened by short scalloped ridges bearing simple setae anteriorly, with furrows approximately defining regions of shield; gastric region slightly swollen, anterior portion partly divided by median furrow; posterior part marked by well-defined furrow; lateral borders with numerous simple setae (Figs. 1, 2). First lateral lobe with 3 teeth; anterior tooth rounded, without spine; middle tooth subacute; posterior tooth poorly developed, rounded. Second lateral lobe produced anteriorly, triangular, narrowly rounded at tip. Third lateral tooth (“posterior carapace lateral lobe” of McLaughlin 2000) subtriangular, transverse, not produced anteriorly and broadly rounded at tip. Cardiac region not inflated, faintly defined. Rostrum narrowly triangular, lateral margins straight in dorsal view, very slightly inflated above base of eyestalks, tip rounded. Supraorbital border straight, transverse; external orbital tooth slightly produced anteriorly, rounded, lateral border oblique to median line.

Eyestalk stout, about 2 times longer than rostrum, markedly constricted at middle portion, with scattered simple setae.

Basal article of antenna with serrated spine forming lateral distal angle; mesial angle short, broad, setose. Third segment 1.4 times longer than antennal acicle. Antennal acicle elongate, narrow, longer than second segment.

Distal 5 segments of third maxilliped subequal in length; mesial surface of ischium with longitudinal row of conical teeth (*crista dentata*) on mesial edge, 1 spine distally near lateral margin; merus slightly longer than ischium, with distal spine on lateral margin; propodus with simple, serrate setae distally on mesial margin; dactylus with numerous serrate setae mesially.

Chelipeds unequal in mass; right cheliped massive (Figs. 3A, B). Merus with dense patch of setae mesially, spines on dorsal and ventral margins. Carpus with oblique rugae, rugae with simple setae on anterior edges; outer surface concave on upper half, convex on lower half. Palm swollen;

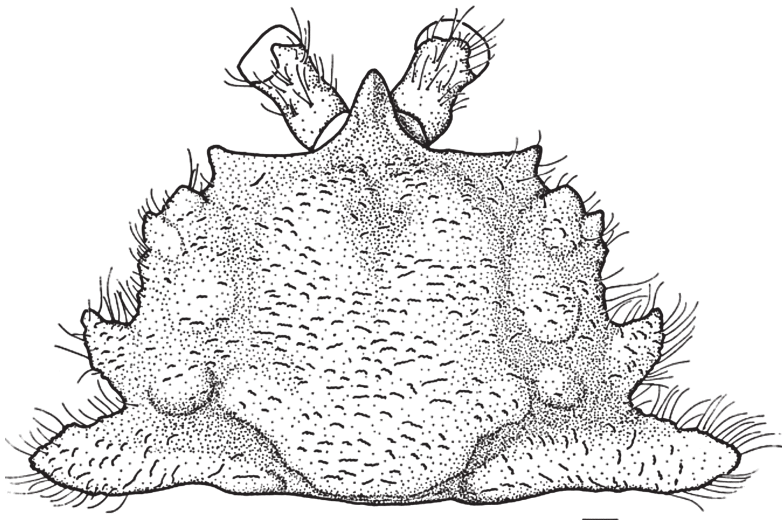


Fig. 2. *Porcellanopagurus eldredgei* new species, holotype male (BPBM S16174), Guam. Dorsal view of anterior part of carapace. Scale = 1.0 mm.

upper margin with low, broad tubercles forming ridge, lower margin with longitudinal rugae becoming flattened circular tubercles forming slight ridge on upper margin, inner surface finely granular. Fixed finger with 6 teeth; dactylus with 7 teeth.

Left cheliped slender (Fig. 3C). Ischium irregularly tuberculate, with elongate simple setae. Merus compressed proximally, lower border tuberculate, dorsal surface ridged, with setae. Carpus slightly greater than merus; outer surface flattened, with regular shallow depression; inner surface inflated; surfaces with scattered rugae, each with setae on distal margin. Palm slightly compressed, with scattered setose rugae. Fingers shorter than carpus, about 2 times length of manus, curved mesially; cutting edges denticulate.

Pereopods 2 and 3 similar in size and shape, (Figs. 4A, B); right pereopod 2 reaching base of fingers of right cheliped; pereopod 3 slightly longer than pereopod 2. Merus bicarinate, irregularly tuberculate on ventral surface; dorsal margin with setae-bearing transverse ridges, surface with scalloped rugae having setae extending from distal margin, without spines. Carpus with longitudinal ridge comprised of scalloped setae-bearing rugaedorsal to midline of lateral surface; dorsal margin similar to that of merus. Propodus with longitudinal depression near lower margin; upper margin similar to that of merus; ventral margin with 8 [6] single or paired movable spines; ventrodistal angle with 3 [2] spines; dorsodistal angle with 2 [1 or 2] smaller spines. Dactylus compressed, with slight longitudinal depression along midline; lateral surface with some setae-bearing rugae; ventral margin with 13 [11 or 12] (pereopod 2) and 14 [14 or 15] (pereopod 3), flattened movable spines increasing in size distally.

Pereopod 4 very setose. Carpus expanded distally on dorsal surface, with scattered setae-bearing rugae. Propodus compressed, dorsal margin scalloped, ventral margin extending beyond joint with dactylus, not pointed terminally, lateral surface slightly concave. Dactylus strongly curved, with terminal spine; ventral surface with conical spines on distal 2/3, increasing in size distally.

Pereopod 5 smaller than pereopod 4, chelate. Propodus moderately setose, with patch of scales distally on dorsal surface; ventral margin densely setose, distal border expanded transversely, spoon-tipped, lined with conical spines. Dactylus broadly flattened; dorsal surface setose, with scales distally; ventral surface concave, distal margin lined with conical spines.

Endopod of uropod elliptical, with 6 [5] rows of scales; exopod of uropod oval, with 11 [9] rows of scales.

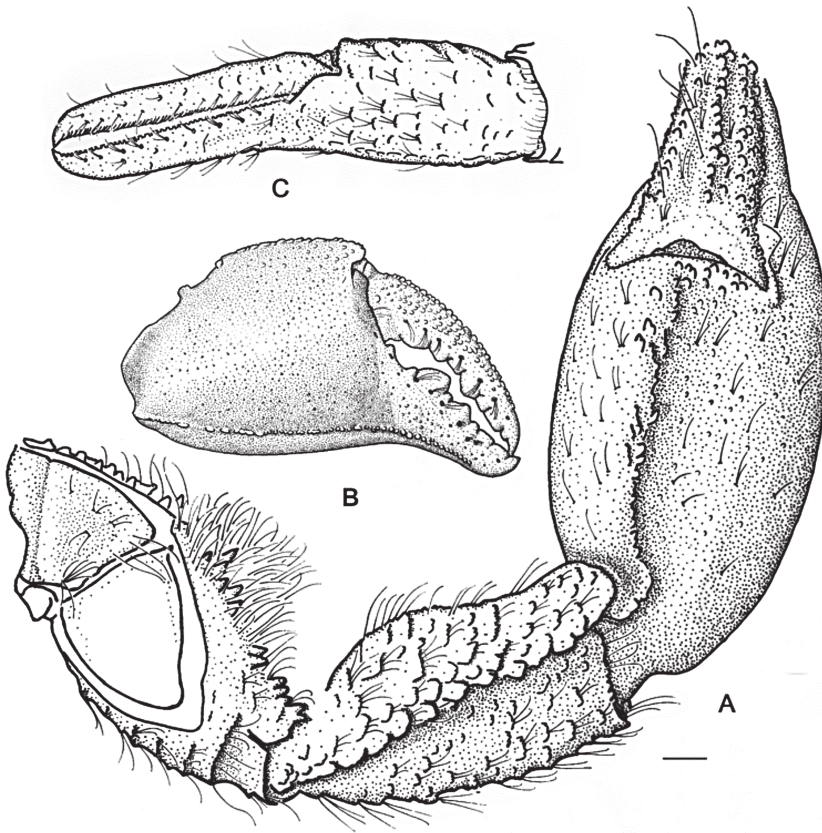


Fig. 3. *Porcellanopagurus eldredgei* new species, holotype male (BPBM S16174), Guam. **A**, mesial view of right cheliped (tip of dactyl not visible). **B**, dorsal view of right cheliped manus. **C**, dorsal view of left cheliped manus. Scales: A, C = 1.5 mm, B = 0.75 mm.

Telson (paratype) wider than long, with median longitudinal depression, with median transverse ridge interrupted mesially by longitudinal depression.

Etymology. The new species is dedicated to, and named for, the late Lucius G. Eldredge who directed the trapping program on which the crabs were collected. Lu was my professor, mentor, and most of all my friend. He and his family made me and many other graduate students feel as though we were part of theirs.

Remarks. The new species is the 14th species of *Porcellanopagurus* to be described. Eleven *Porcellanopagurus* species, including *P. eldredgei*, new species, have a triangular or subtriangular rostrum (McLaughlin 2000). The remaining three species have a truncate rostrum. The species that have a triangular or subtriangular rostrum can be separated into two groups by the form of the second lateral lobe of the shield (posterolateral projection of the carapace), which is bluntly rounded in *P. belauensis*, *P. chiltoni*, *P. edwardsi*, and *P. nihonkaiensis*. The posterolateral projection is acute or subacute in *P. eldredgei*, *P. filholi*, *P. foresti*, *P. jacquesi*, *P. japonicus*, *P. platei*, and *P. tridentatus*. Among these species, the lateral margins of the rostrum are straight in *P. eldredgei*, *P. filholi*, *P. foresti*, and *P. platei* but slightly sinuous in the other three species.

Porcellanopagurus eldredgei can be distinguished from *P. filholi* and *P. foresti* by the transverse orbit, which is moderately to strongly concave in the other species. Additionally, the rostrum is rel-

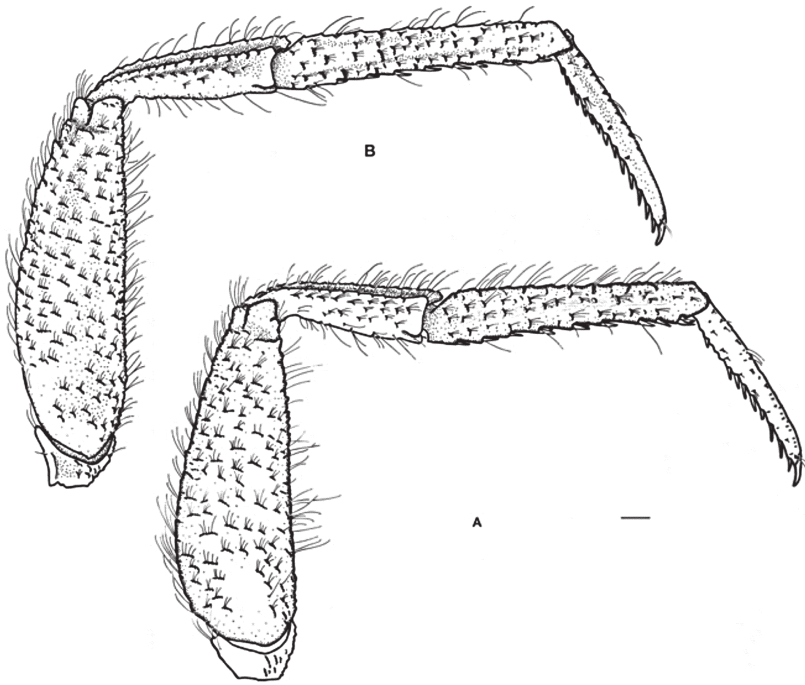


Fig. 4. *Porcellanopagurus eldredgei* new species, holotype male (BPBM S16174), Guam. **A**, lateral view of right pereopod 2; **B**, lateral view of right pereopod 3. Scale: = 1.5 mm.

atively short (extends about half length of the eyestalk, not reaching the base of the cornea) and slightly rounded in *P. eldredgei*, but it is relatively long (overreaches half the length of the eyestalk, reaching or almost reaching the base of cornea) and somewhat to sharply acute in the other two species. The anterolateral angles of the carapace are rounded and weakly directed anteriorly in *P. eldredgei*, but they are rather acute and sharply directed anteriorly in *P. filholi* and *P. foresti*.

Porcellanopagurus eldredgei occurs relatively near the type localities of two other species, *P. truncatifrons* (Ogasawara Islands) and *P. belauensis* (Palau), but it is easily distinguished from them by the combinations of characters discussed above.

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Literature Cited

- Filhol, H.** 1885. Description d'un nouveau genre de crustacés provenant de la Nouvelle-Zélande. *Bulletin de la Société Philomatique de Paris* (7) **9**: 47–48.
- Komai, T. & Takeda, M.** 2006. A review of the pagurid hermit crab (Decapoda: Anomura: Paguroidea) fauna of the Sagami Sea, central Japan. *Memoirs of the National Science Museum* **41**: 71–144.

- Lenz, H.** 1902. Die Crustaceen der Sammlung Plate. (Decapoda und Stomatopoda). *Zoologischer Jahrbücher, Supplement* **5**: 731–772.
- McLaughlin, P.A.** 1997. Crustacea Decapoda: Hermit crabs of the family Paguridae from the KARUBAR expedition in Indonesia. In: Crosnier, A. & Bouchet, P. (eds.), Résultats des campagnes MUSORSTOM, 16. *Mémoires du Muséum National d'Histoire Naturelle* **172**: 433–572.
- McLaughlin, P.A.** 2000. Crustacea Decapoda: *Porcellanopagurus* Filhol and *Solitariopagurus* Türkay (Paguridae), from the New Caledonia area, Vanuatu and the Marquesas: new records, new species. In: Crosnier, A. (ed.), Résultats des campagnes MUSORSTOM, 21. *Mémoires du Muséum National d'Histoire Naturelle* **184**: 389–414.
- McLaughlin, P.A. & Hogarth, P.J.** 1998. Hermit crabs (Decapoda: Anomura: Paguridea) from the Seychelles. *Zoologische Verhandlungen* **318**: 1–48.
- McLaughlin, P.A., Komai, T., Lemaitre, R. & Rahayu, D.L.** (2010) Annotated checklist of anomuran decapod crustaceans of the world (exclusive of the Kiwaoidea and families Chirostylidae and Galatheidae of the Galatheoidea) Part I–Lithodoidea, Lomisoidea and Paguroidea. *The Raffles Bulletin of Zoology, Supplement* **23**: 5–107.
- Saint Laurent, M. de & McLaughlin, P.A.** 2000. Superfamily Paguroidea, Family Paguridae. In: Forest, J., Saint Laurent, M. de, McLaughlin, P.A. & Lemaitre, R. (eds.), The marine fauna of New Zealand: Paguridea (Decapoda: Anomura) exclusive of the Lithodidae. *NIWA Biodiversity Memoir* **114**: 104–209.
- Suzuki, H. & Takeda, M.** 1987. Occurrence of a new hermit crab of the genus *Porcellanopagurus* (Decapoda, Paguridae) in the sea adjacent to the Palau Islands. *Proceedings of the Japanese Society of Systematic Zoology* **36**: 17–24.
- Takeda, M.** 1981. A new hermit crab of the genus *Porcellanopagurus* from the Ogasawara Islands. *Bulletin of the Biogeographic Society of Japan* **36**: 8–13.
- Takeda, M.** 1985. Occurrence of a new hermit crab of the genus *Porcellanopagurus* in the Sea of Japan. *Memoirs of the National Science Museum* **18**: 141–144.
- Whitelegge, T.** 1900. Scientific results of the trawling expedition of H.M.C.S. “Thetis,” off the coast of New South Wales, in February and March, 1898. Crustacea. Part 1. *Memoirs of the Australian Museum* **4**: 135–199.
- Wilder, M.J.** 1979. *A handbook of deep-water shrimp trapping*. Guam Economic Development Authority. 22 pp.
- Zarenkov, M.A.** 1990. Decapoda (Stenopodidea, Brachyura, Anomura) of the Naska and Sala-i-Gomes underwater ridges. *Trudy Instituta Okeanologii Akademiia Nauk, USSR* **124**: 218–244. [In Russian, with English summary.]