

## Two New Species of Lithodid (Anomura, Paguridea, Lithodidae) Crabs from Guam<sup>1</sup>

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**Abstract**—Two new species of stone crabs of the family Lithodidae are described from depths of 730 m, from the island of Guam, the southernmost of the Mariana Islands. These crabs represent the first record of the family in the northwestern Pacific south of Japan. The crabs were collected in experimental shrimp traps along with a number of other deep-water crustaceans.

The genus *Paralomis* as outlined and mapped by Takeda (1974) used to include eighteen species. Three new species have been added recently (Haig, 1974; Birshtein and Vinogradov, 1972). All the described species have been reviewed and their geographic distribution noted. Two new Guam species have been found and described in this paper. These two new species will bring the total number to six species of lithodid crabs for the northwestern Pacific, the others being *P. multispina*, *P. doffeini*, *P. japonica*, and *P. hytrix*. Sakai (1971) offers a key to species encountered in Japan.

Type specimens are deposited in the Bernice P. Bishop Museum, Honolulu, and the Smithsonian Institution, Washington, D. C.

### *Paralomis seagranti* n. sp.

Figs. 1a, 1b, 1c, 1d, 2c

**DESCRIPTION:** Carapace rounded, pentagonal. No gastric spine. Carapace surface with low areolations, covered with minute bristles or setae arranged mostly in circular patterns at the bases of the areolations, occasional shorter setae on surface of mounds. Carapace areas well defined. Gastric region moderately convex without spine, relatively smoother than other regions. Cardiac and branchial regions separated from gastric region by deep furrow. Cardiac region not distinctly separated toward posterior. Branchial regions rounded, mesobranchial area somewhat concave; divided by hepatic, in part, by a raised, smooth elevation (boss). Intestinal region slightly convex, not distinctly separated from other regions.

Anterolateral border with 14–16 spines of varying lengths, each with many long setae. Posterolateral and posterior borders without spines or other elevations. Postorbital angle consists of one large spine with two low spines at its base, also with very short setae, none of which is as long as that as the anterolateral border spines.

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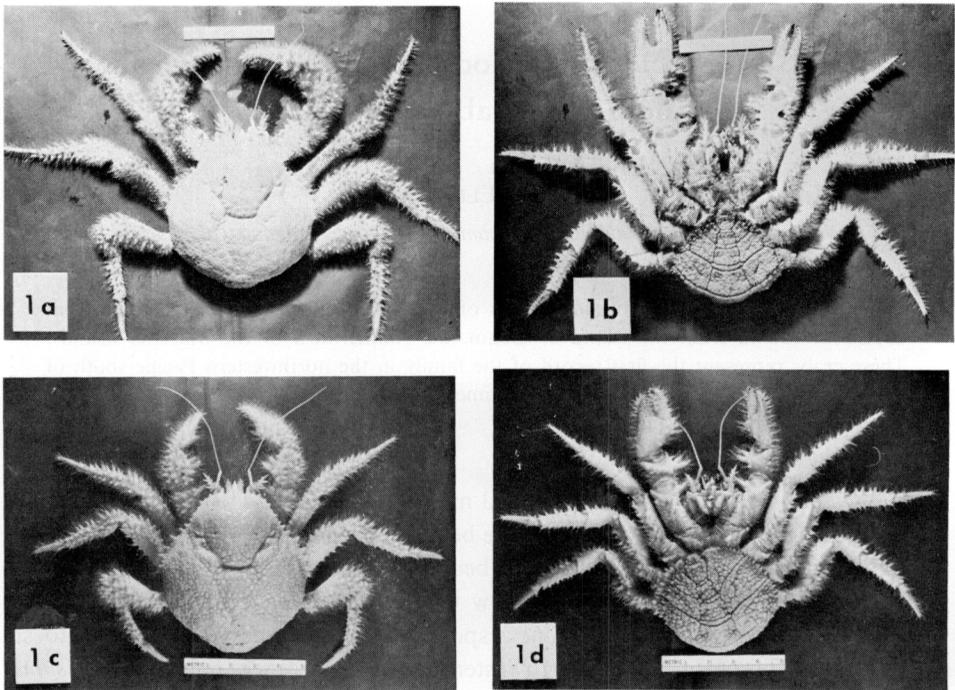


Fig. 1. *Paralomis seagranti*, a male, dorsal; b male, ventral; c female, dorsal; d female, ventral. (Scale length 5 cm)

Rostrum short, not longer than eyestalks, the inferiormost spine terminates in a flattened, blunt end; the median spine longest, slightly upturned, two small basal spines uppermost at the supraorbital margin. Rostrum covered with short setae.

Eyestalks long with six spines, the largest one anteriormost; many long setae on spines and on inside of eyestalk; right eyestalk of male damaged. Antennal acicle with 9 spines and numerous setae; the anteriormost spine pointed, turned up slightly; remaining spines alternate; second and fourth lateral spines longest, three medial spines shorter but equal in length, smallest medial spine at base of acicle. Antennal flagellum long.

Chelipeds unequal, right being larger, slightly longer, with numerous tubercles and spines on dorsal surface, each with numerous long setae. For female cheliped merus with two long pointed spines distally; carpus with enlarged spines at inner border, longest somewhat anteriorly curved, two shorter spines at base, numerous other spines on upper (dorsal) surface; propodus with numerous long pointed spines at inner border; dactylus with 1 small spine at base. Pollex of right propodus and dactylus of female each with 3 rounded denticles ("teeth") on cutting edges, for male pollex with ridge, dactylus with four denticles, each finger with black corneous tip, nearly horse-shoe-shaped; left pollex and dactylus without tubercles. Walking legs, flattened in cross section, with numerous spines with long setae, about equal in size and length, each dactylus ends with black, recurved, pointed corneous spine; third

walking leg length 1–1.3 carapace length.

Female abdomen, asymmetrical, covered with low rounded areolations as on carapace, elevations becoming more pointed and longer and with long setae posteriorward, entire margin of abdomen with pointed spines and setae, margin itself with row of dense setae. Male abdomen symmetrical.

**COLOR ALIVE:** Dorsal surface of carapace light pinkish orange, depression between regions whitish; anterolateral spines light yellow, darker yellow distally; spines on legs light yellow, background color pinkish orange. Setae yellowish. Abdomen tan with gray mottling. Ovigerous female with numerous orange eggs (2.5 mm diameter).

**COLOR PRESERVED:** Even tan, yellow.

**MATERIAL EXAMINED:** 1 ovigerous female (holotype-BPBM), off northwest coast of Guam (Double Reef area), 250 m, 5 March 1975, collected in shrimp trap (No. 20) with 1088 *Heterocarpus ensifer*, 18 *Parapagurus* spp., 1 *Trizopagurus* sp.; 1 male (paratype, allotype-BPBM), 2 miles off Tanguisson Point, Guam, 620 m, 30 January 1976, in commercial shrimp trap.

**MEASUREMENTS** (in mm): The measurements for the [holotype] and paratype (allotype) follow: carapace width [57], (81); carapace length including rostrum [62], (80.5); rostrum [5.5], (8); eyestalks [6], (7); antennal acicle [8], (12); antennal flagellum [46], (65); right cheliped merus [19], (30); carpus [17], (24); propodus [31], (50); dactylus [17], (28); right third walking leg merus [21.5], (34), carpus [14], (23), propodus [15], (25.5), dactylus [17], (25.5).

**REMARKS:** This species is most similar to those categorized by Dawson and Yaldwyn (1971) as not having spines on the carapace surface but having lateral spines. These species are *P. aspera* Faxon, *P. verrilli* (Benedict), *P. longipes* Faxon, *P. investigatoris* Alcock and Anderson, *P. medipacifica* Takeda, and juvenile *P. inca* Haig. *P. seagranti* resembles *P. verrilli* closely, however, *P. seagranti* has more spines on the anterolateral margin, more spines on the antennal acicle, and more spinous walking legs. Unfortunately, Benedict's original description (1895) does not include an illustration; however Schmitt (1921) does provide a photograph of the holotype. Sakai's (1971) photograph illustrates a gastric spine. *P. seagranti* resembles *P. investigatoris* even more closely in its general features—anterolateral spines, carapace surface, and leg spines. *P. seagranti* differs in not having a "crown of small stiff hairs" encircling each tubercle, in having 9 antennal acicle spines arranged 4 medially and 5 laterally, in having a rostrum with four regions rather than three, in having groups of large spines on the chelipeds, and in having the legs heavily covered with long and short setae. Recorded specimens of *P. investigatoris* are much smaller than *P. seagranti*, the largest having a width of 29.5 mm and length of 33 mm.

These specimens appear to represent a new species named for the Office of Sea Grant Programs under whose auspices the specimens were collected.

***Paralomis haigae* n. sp.**

Figs. 2a, 2b, 2d

**DESCRIPTION:** Carapace pentagonal, covered with large and small round tubercles, each with a circlet of short setae near the uppermost portion. No gastric spine, surface of gastric area with two verruciform tubercles at center of general location of spine. Carapace areas well defined. Gastric area quite convex, defined at lateral sides from hepatic and orbital areas, and posterolaterally, from the branchial areas. A deep, smooth furrow separates the gastric from the cardiac areas. Cardiac area separated from metabranchial areas by grooves; not distinctly divided at posterior. Branchial areas generally convex, with four raised regions: a large and a small one in the epibranchial, and a larger one at the center of each side. A smooth, rounded elevation (boss) at each side separating the hepatic from the mesobranchial areas.

Anterolateral border without spines. Postorbital angle of female consists of one major spine surrounded by a number of tubercles, each with a circlet of setae; of male, major spine subdivided into three small dorsal spines.

Rostrum short, tubercle covered, somewhat massive with one blunt spine anteromedially in female, pointed in male, and a blunt, tubercle-covered, ventral protuberance. All tubercles with circlet of short setae. Eyestalks short with one major sharp spine at the uppermost margin of the orbit in female, one slightly shorter

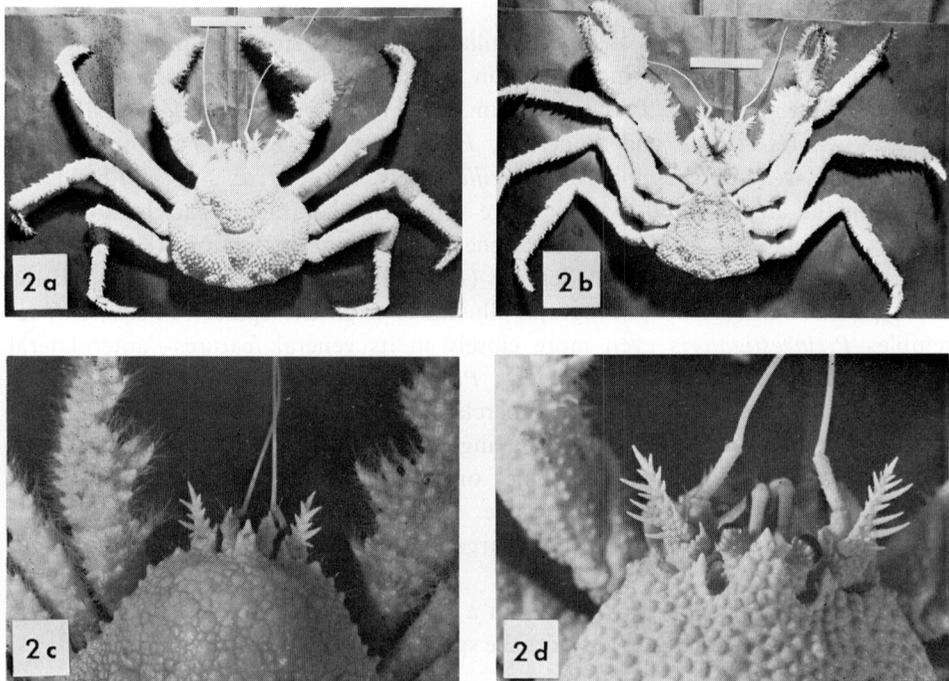


Fig. 2. *Paralomis haigae*, a male, dorsal; b male, ventral; c *P. seagranti* anterior detail; d *P. haigae* anterior detail. (Scale length 5 cm)

anterior to larger; one in male, several shorter, pointed spines on either side; the peduncle of the eyestalks themselves covered with low tubercles. Antennal acicle long with 14–17 spines in female, 19 in male, each of varying lengths, the lateral spines longer than the medial spines. Antennal flagellum long, although some appeared broken. Chelipeds unequal, right larger and longer, with numerous low tubercles, long spines on inner dorsal edge of merus and carpus. Tubercles with circlet of low setae, setae longer in male. Merus with one large spine and several other smaller pointed spines, all with setae. Carpus with 6 pointed spines, the third the largest, second and fourth about equal and shorter, fifth shorter, first and sixth about equal and shortest. Propodus covered with tubercles (none pointed), setae becoming longer toward distal tip. Dactylus (right) with one blunt tubercle, numerous setae. Pollex of right propodus and dactylus each with 3 rounded denticles on the cutting edge, each finger with a black, nearly horse-shoe-shaped tip, and for the female with 4 very small denticles on the pollex cutting edge and 2 on the dactylus; for the male with 3 small denticles on each. Walking legs, oval in cross section, with numerous tubercles; length 1.36–1.64 carapace length. Anterior and posterior margins of propodus with short spines, each with long setae; 4 black-tipped pointed spines, with setae, on each dactylus. Female abdomen asymmetrical, covered with tubercles, margin without spines, long setae just under margin. First female abdominal segment surface like that of carapace marked with two evenly spaced depressions and two elevations. Male abdomen symmetrical, otherwise similar to female but without fringe of marginal setae.

**COLOR ALIVE:** Dorsal surface of carapace evenly light pinkish orange; setae light yellow.

**COLOR PRESERVED:** Light pinkish tan.

**MATERIAL EXAMINED:** 1 female (holotype-BPBM), 1 male (paratype, and allotype—BPBM), off Adelup Point, Guam, 400 m, 14 May 1975, collected in shrimp trap (No. 31) with 534 *Heterocarpus ensifer*, 2 *Parapagurus* sp.; 1 female, off Neye Is., Guam, 730 m, 10 December 1975, collected in shrimp trap (No. 63) with *Heterocarpus laevigatus*; 1 female, 3 females, 1 female, 1 male, Agana Bay, 500 m, 12 January 1976, collected in 24-hour shrimp trap study (Nos. 69, 70, 71, 72, respectively) with *Heterocarpus laevigatus* and *H. ensifer*. All specimens should be considered paratypes.

**MEASUREMENTS** (in mm): The measurements for the [holotype], paratype (allotype), and for largest and smallest measurements for remaining paratypes: carapace width [93.5], (95), 88–56; carapace length including rostrum [97], (95), 91–59.5; rostrum [11], (10), 11–6; eyestalk [6.5], (7), 8–5; antennal acicle [14], (15), 12.5–5; antennal flagellum [58], (102), 75–58; right cheliped merus [31.5], (50), 32–23; carpus [29], (35), 29–17; propodus [58], (74), 61–37; dactylus [31], (44), 39–15; right third walking leg merus [46], (53), 47–28.5; carpus [29.5], (31), 31–22.5; propodus [37], (43), 40.5–22.5; dactylus [26.5 broken], (39), 30–13.5.

**REMARKS:** This new species most closely resembles *P. doffeini* Balss (1911), *P. aspera* Faxon (1893), *P. papillata* (Benedict, 1895), and *P. inca* Haig, (1974). *P.*

*aspera* differs from *P. haigae* by its having the lateral carapace spines and the indistinctly tripartite, multispinous rostrum. *P. papillata* and *P. inca* have very spinous walking legs. *P. dofleini* is most similar and shares with *P. haigae* the absence of anterolateral spines and of the gastric spine, and the presence of similar carapace tubercles each with a circlet of short setae (Balss, 1911, 1913). *P. haigae* differs by having an antennal acicle with as many as nineteen spines, whereas *P. dofleini* has fewer, seven according to Sakai (1971). The carapace region is very well defined, and two, paired, low verruciform tubercles are present in the area of the gastric spine. Sakai (1971) describes a cluster of tubercles for his specimens of *P. dofleini* and at the same time provides a color and a black-and-white photograph of his specimens. The rostrum of *P. haigae* appears to be different from *P. dofleini* as Balss' (1911) description indicates the rostrum's having two protuberances on the upper portion. The rostrum of *P. haigae* possess only one.

Because of the combination of features described here, it would appear that these Guam specimens represent a new species *Paralomis haigae* named in gratitude for Janet Haig's continued interest in lithodid crabs and for her enthusiastic support of this study.

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