

Crustacea Decapoda : On some species of Lithodidae from the Western Pacific

Enrique MACPHERSON

Instituto de Ciencias del Mar
Paseo Nacional s/n
08003 Barcelona
Spain

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ABSTRACT

Several species of lithodid crabs from the Western Pacific were studied. One new species (*Lithodes richeri*) from New Caledonia is described. The five other species (*Neolithodes*

vinogradovi, *Lithodes turritus*, *Paralomis seagranti*, *Paralomis haigae* and *Paralomis sp.*) are reported for the first time in the area and their taxonomic position is discussed.

RÉSUMÉ

Crustacea Decapoda : Sur quelques espèces de Lithodidae du Pacifique occidental.

Cette note concerne plusieurs espèces de Lithodidae capturées au large des Philippines et de la Nouvelle-Calédonie. L'une d'entre elles, *Lithodes richeri*, pêchée en Nouvelle-Calédonie, est nouvelle ; elle est proche de l'espèce japonaise *L. longispina* Sakai, mais s'en différencie facilement par la

longueur du rostre, la spinulation de la carapace et des pattes ambulatoires. Les autres espèces : *Neolithodes vinogradovi* Macpherson, *Lithodes turritus* Ortmann, *Paralomis seagranti* Eldredge et *P. haigae* Eldredge sont citées pour la première fois de cette région. Les caractères permettant de distinguer *P. haigae* de *P. dofleini* Balss, espèce la plus proche, sont discutés.

The family Lithodidae is very well represented in the Pacific Ocean, where there are about 60 species belonging to 14 genera. Several new species have been described during the last decade, pointing up the gaps in our knowledge of this group (e.g. DAWSON & YALDWYN, 1985; MACPHERSON, 1988a).

The present paper is based on samples collected by the Institut français de Recherche scientifique pour le Développement en Coopération (ORSTOM) and the Muséum national d'Histoire naturelle, Paris (see RICHER DE FORGES, this volume, p. 9-54), and provides additional information about this family, including the description of a new *Lithodes* species.

The types of the new species and the other material reported upon are in the collections of the Muséum national d'Histoire naturelle (MNHN). Measurements given (CL × MW) refer to the carapace length (CL) excluding rostrum and the maximum carapace width (MW) excluding marginal spines.

Neolithodes vinogradovi Macpherson, 1988

Fig. 2a

Neolithodes vinogradovi Macpherson, 1988a : 46, fig. 19, pl. 8.

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn CP 72, 22°10' S, 167°33' E, 2100-2110 m, 04.09.1985 : 1 ♀ 105 × 91 mm (MNHN-pg 4264).

BIOGEOCAL : stn CP 265, 21°04.09' S, 167°00.4' E, 1760-1870 m, 18.04.1987 : 1 ♂ 6.6 × 5.3 mm (MNHN-pg 4444). — Stn CP 273, 21°01.53' S, 166°57.41' E, 1920-2040 m, 20.04.1987 : 1 ♂ 10 × 8 mm (MNHN-pg 4443).

REMARKS. — The original description of this species was made from a single large male specimen (109 × 113 mm) from the Eastern Indian Ocean (31°50.4' S, 87°22.2' E, 1600 m). Specific characters (e.g., spinulation of the carapace and pereopods) are similar in all the specimens examined and agree with those of the holotype. Even so, several small differences have been found. The large female (105 × 91 mm) from New Caledonia has more secondary spines than the holotype. The walking legs of this female, as in most lithodids, are shorter and stouter than those of the male ; the third walking

leg is 2.5 times carapace length, compared with 3.5 times in the male holotype. Furthermore, the merus is 5.7 times longer than broad (7 in the male holotype) and nearly twice carpus length. The propodus is 7 times as long as broad (9 in the male holotype).

Neolithodes vinogradovi belongs to the group of species in which the carapace, cheliped, and walking leg surfaces have no spinules or spiniform granules in addition to the main spines (MACPHERSON, 1988a).

The closest species geographically is *N. brodiei* Dawson & Yaldwyn, 1970. However, this species belongs to the group bearing numerous spinules in between the main spines.

The closest species of the genus taxonomically is *N. grimaldii* (A. Milne Edwards & Bouvier, 1894) from the North Atlantic. Both species are readily differentiated by the size of the spines on the carapace, chelipeds, and walking legs. *N. vinogradovi* has very long, slender spines, whereas *N. grimaldii* has distinctly shorter, more robust spines. Furthermore, the secondary spines on the carapace are longer in *N. vinogradovi* than in *N. grimaldii*. Such spines continue to be present on the two large *N. vinogradovi* specimens examined, whereas they have completely disappeared in similar sizes of *N. grimaldii*.

This species was previously reported from the eastern Indian Ocean. Its known range is now extended to the Coral Sea.

Lithodes turritus Ortmann, 1892

Lithodes turritus Ortmann, 1892 : 321, pl. 12, fig. 26. — BALSS, 1913 : 73, figs 42-45, pl. 11. — SAKAI, 1971 : 10, 32, fig. 2a, b ; pl. 4, fig. 1 ; pl. 11, fig. 1 ; 1976 : 693, fig. 376 a, b, pl. 240, pl. 243, fig. 1. — BABA, 1986 : 211, 306, fig. 156. — MACPHERSON, 1988a : 49 ; 1988b : 124.

MATERIAL EXAMINED. — **Philippines.** MUS-ORSTOM 3 : stn CP 116, 12°32' N, 120°47' E, 804-812 m, 03.05.1985 : 1 ♂ 110 × 107 mm (MNHN-pg 4263).

REMARKS. — The specimen agrees closely with the descriptions and figures provided by the various authors. *L. turritus* is close both geographically and taxonomically to *L. longispina* Sakai, 1971, from Japan and the Midway Islands

(see below for the material of this species examined), but they are readily differentiated by a number of characters :

- (a) Anterior projection of rostrum practically horizontal in *L. turritus* ; proximal half directed sharply upwards in *L. longispina*.
- (b) Cardiac region with one pair of spines and an anterior pair of granules in *L. longispina* ; two pairs of well-developed spines in *L. turritus*.
- (c) Dorsal surfaces of walking legs bearing many small spines in *L. longispina* ; articles rather smooth, with a few scattered spines, in *L. turritus*.
- (d) Differing counts of long spines on the margins of the carapace ; each branchial margin with two long spines and 4-5 very small spines in *L. longispina*, 4-5 well-developed spines and 3-4 small spines in *L. turritus*.
- (e) Spines on carapace longer in *L. longispina* than in *L. turritus* ; this difference is very clear in adults but more difficult to discern in juveniles.

Lithodes turritus has been recorded from Japan and the East China Sea at depths of 300-800 m. This new record extend its distribution range to the Philippine Islands.

Lithodes richeri sp. nov.

Figs 1 a, 2 b

MATERIAL EXAMINED. — **New Caledonia** : trap, outside the coral reef : 4 ♂ 64 × 58 mm to 102 × 102 mm (MNHN-pg 4269 to 4272).

TYPES. — One male (81 × 89 mm) has been selected as holotype (MNHN-pg 4269). The other specimens (MNHN-pg 4270 to 4272) are paratypes.

DESCRIPTION (Holotype). — Carapace pyriform, slightly longer than broad. Regions well-defined. Gastric region convex, more prominent than the cardiac and branchial regions. Two pairs of gastric spines, all the same size. Cardiac region weakly convex, as prominent as the branchial regions and separated from the gastric region by a deep furrow. One pair of cardiac spines as long as the gastric spines and two rounded granules between the spines and the

gastro-cardiac furrow. Each branchial region with two spines and two acute granules : anteriormost spine strong, directed slightly anterolaterally ; a second, slightly smaller spine at a level slightly posterior to the cardiac spines ; two acute granules posterior to this spine. Intestinal region not distinctly separated from other regions, with two spines as long as the gastric and cardiac spines. Numerous small, rounded granules scattered on the dorsal surface of the carapace.

Rostrum with a very long, bifid anterior projection (sensu DAWSON & YALDWYN, 1985), 0.9 times carapace length, directed sharply upwards though terminal portion slightly more horizontal. Two dorsal spines of moderate size. One strong, curved basal spine.

Outer orbital spine short, not reaching the end of the eyes. Anterolateral spine longer than the outer orbital spine. Hepatic spine long, the longest spine on the carapace. Each branchial margin with one strong spine, slightly longer than the anterolateral spine, situated at the level of the cardiac spines. Two small spines between this spine and the hepatic spine. Remainder of branchial border bearing 9-10 small spines or acute granules.

Second abdominal segment with two spines on median plate and several granules on outer borders.

Eyestalks smooth, without granules.

Basal segment of antennal peduncle with one small spine on outer border. Second segment with one short spine reaching to the midpoint of the penultimate antennal segment.

Right cheliped stouter than the left, the two similar in length. Merus armed with several spines, stronger on terminal border. Carpus with four strong dorsal spines, two longer than the others. Several spines scattered on outer and ventral surfaces. Hand with two rows of small spines. Several tufts of hairs on fingers.

Walking legs slender and depressed. Second pair (P3) slightly longer than first (P2) and third (P4) pairs.

Third leg more than three times carapace length. Basis-ischium bearing several spines on terminal border ; merus longer than carapace, some eight times longer than broad and twice carpus length. A row of 8-9 spines on anterior border, terminal spine the longest. Several small spines scattered on dorsal surface and posterior

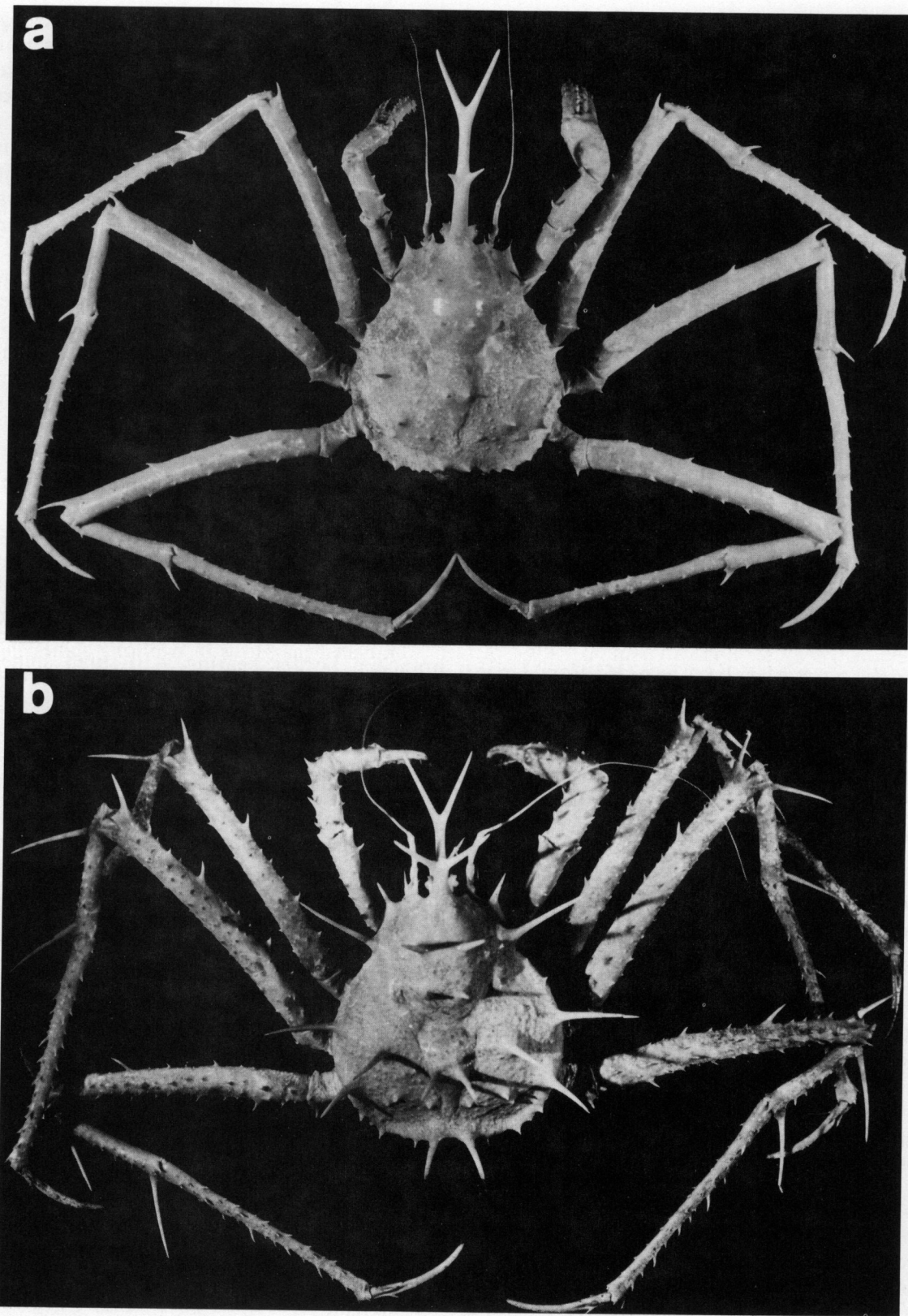


FIG. 1. — Dorsal view : a, *Lithodes richeri* sp. nov., holotype, ♂, CL = 81 mm, New Caledonia, (MNHN-Pg 4269) ; b, *Lithodes longispina* Sakai, 1971, ♂, CL = 106 mm, Tokushima, Japan, (MNHN-Pg 4441).

margin. Carpus with 4-5 spines on anterior edge. Dorsal surface with a small, proximal spine and a much longer spine on terminal portion. Posterior border smooth. Propodus almost 10 times as long as broad and 0.7 times merus length. A row of small spines on both the anterior and posterior margins. Several small spines scattered on dorsal surface. Ventral surfaces of merus, carpus, and propodus smooth. Dactylus 0.6 times propodus length, weakly curved and circular in cross-section, with spines on proximal portion. Anterior edge with 1-2 spinules.

VARIATIONS. — Carapace length in the specimens examined ranged between 64 and 102 mm. The only differences were observed in the size of the spines, which are longer in smaller specimens. Moreover, in the smallest specimen (64 × 58 mm) the anterior projection of the rostrum is slightly longer than the rest of the carapace, whereas in the other specimens it is slightly shorter.

REMARKS. — Six species of the genus *Lithodes* are found in the Western Pacific: *L. murrayi* Henderson, 1888, *L. turritus* Ortmann, 1892, *L. aequispina* Benedict, 1894, *L. couesi* Benedict, 1894, *L. longispina* Sakai, 1971, and *L. nintokuuae* Sakai, 1978 (DAWSON & YALDWYN, 1985; MACPHERSON, 1988a).

However, neither these species nor the other species of the genus possess the characteristic long anterior projection of the rostrum and carapace or the armature of the pereopods.

The present species appears to be most closely related to *L. longispina* Sakai, 1971 (Fig. 1b) from Japan and the Midway Island. The examination of several specimens of *L. longispina* (1 ♀ 50 × 47 mm, 2 ♂ 106 × 98 mm, 147 × 139 mm) from Tokushima, 850-1110 m, Japan, (K. SAKAI leg., MNHN-pg 4441, 4446, see SAKAI, 1987) shows that these two species present a number of important differences that enable them to be readily distinguished. Because the size of the *L. longispina* specimens examined is similar to that of the *L. richeri* specimens, it has been possible to analyse the differences between the two over a broad range of sizes. Such differences comprise:

(a) Anterior projection of rostrum distinctly longer in *L. richeri* than in *L. longispina*. In the smallest specimen of *L. richeri* examined (64 × 58 mm), the ratio anterior projection/

carapace is 1.1, whereas in a specimen of *L. longispina* of similar size (50 × 47 mm) it is 0.7. Furthermore, in the specimen of this new species measuring 102 × 102 mm, the ratio is 0.9, while in an *L. longispina* specimen measuring 106 × 98 mm it is 0.5.

- (b) Considerably different spinulation of walking legs. In *L. longispina* dorsal surfaces of articles covered with many small spines. These spines small but distinct, turning into granules in the largest specimen examined. Dorsal surfaces of articles smooth, with some scattered spines, in *L. richeri*. In addition, two long, subequal spines on dorsal border of carpus in *L. longispina*; these spines shorter and differing in size in *L. richeri*.
- (c) Quite different spinulation of the carapace. In *L. richeri* hepatic spine and largest spines on branchial margin and dorsal surface well-developed but short, not only in the larger specimens but also in the smallest specimens as well. In contrast, hepatic spine as long as anterior projection of rostrum in the smallest specimen of *L. longispina*. Furthermore, each branchial margin with two long spines slightly shorter than the hepatic spines, two intestinal spines similar to these in size, and two long spines dorsally. The size of these spines, as in most lithodids, decreases with growth. However, all these spines clearly longer in the largest specimen of *L. longispina* examined (see SAKAI, 1987, for illustration) than in the largest specimen of *L. richeri*.

ETYMOLOGY. — This species is dedicated to Dr Bertrand RICHER DE FORGES OF ORSTOM, who collected most of this interesting material.

Paralomis seagranti Eldredge, 1976

Paralomis seagranti Eldredge, 1976: 309, figs 1, 2 c. — TAKEDA *et al.*, 1984: 29 (in list). — DAWSON & YALDWYN, 1985: 103 (in list). — MACPHERSON, 1988a: 76 (in list).

MATERIAL EXAMINED. — Kiribati: trap, 750 m, April 1987: 1 ♂ 75 × 81 mm (MNHN-pg 4265).

REMARKS. — The specimen agrees quite well with the description and figures provided by

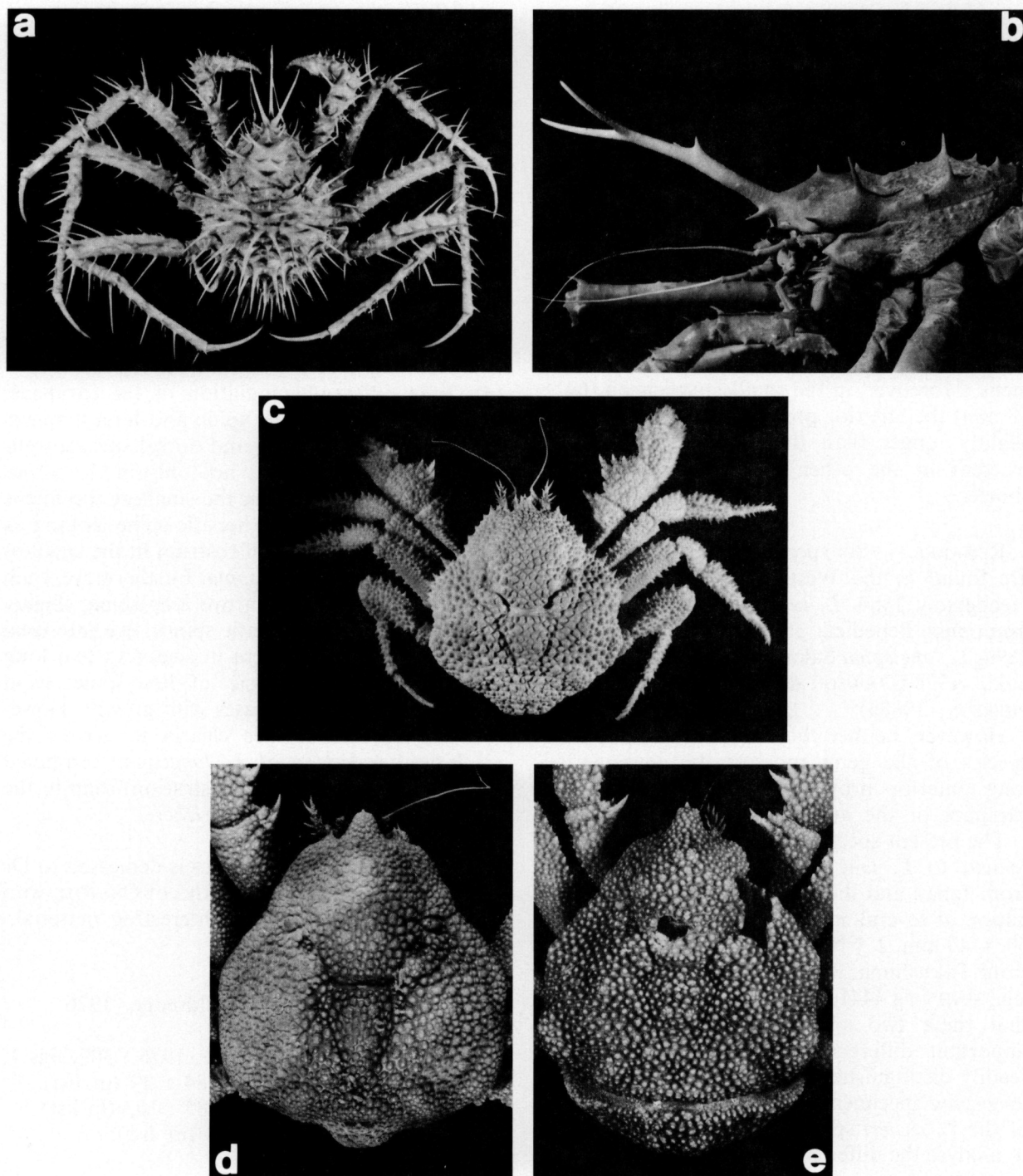


FIG. 2. — a, *Neolithodes vinogradovi* Macpherson, 1988, ♀, CL = 105 mm, New Caledonia, (MNHN-Pg 4264), dorsal view ; b, *Lithodes richeri* sp. nov., holotype, ♂, CL = 81 mm, New Caledonia, (MNHN-Pg 4269), lateral view ; c, *Paralomis* sp., ♀ ov., CL = 71 mm, New Caledonia, (MNHN-Pg 4278), dorsal view ; d, *Paralomis haigae* Eldredge, 1976, ♂, CL = 70 mm, Samoa Is., (MNHN-Pg 4274), carapace, dorsal view ; e, *Paralomis dofleini* Balss, 1911, type, ♀ ov., CL = 64 mm, Sagami Bay, Japan, (MM 357/1), carapace, dorsal view.

ELDREDGE (1976). The most readily distinguishable character of this species is the presence of numerous long setae on the chelipeds, walking legs, and lateral margins of the carapace. No other known member of the genus possesses this peculiar feature.

Until now the only record of this species was from the type locality (Guam Island, 250-620 m). This new occurrence extends its distribution range eastwards.

Paralomis haigae Eldredge, 1976

Figs 2 d, 3 a, b

Paralomis haigae Eldredge, 1976 : 312, figs 2 a, b, d. — TAKEDA *et al.*, 1984 : 29 (in list). — DAWSON & YALDWYN, 1985 : 103 (in list). — MACPHERSON, 1988a : 76 (in list).

MATERIAL EXAMINED. — **New Caledonia** : trap, external side of the reef : 2 ♂ 49 × 53 and 74 × 80 mm (MNHN-pg 4275, 4276) ; 1 ♀ 80 × 85 mm (MNHN-pg 4273).

Samoa Islands : trap, Alepata Point, 500 m, 19.11.1977 : 1 ♂ 70 × 73 mm ; 1 ♀ ov. 48 × 49 mm (MNHN-pg 4274).

REMARKS. — The specimens studied agree quite well with the description and illustrations provided by ELDREDGE (1976). As that author indicated, the closest species of the genus is *P. dofleini* Balss, 1911, from Japan (Figs 2 e, 3 c, d). Examination of the type material for this species (Sagami Bay, 1 ♀ ov. 64 × 66 mm, Munich Museum, MM 357/1) and additional specimens from nearby areas (Yasuda, 1 ♂ 97 × 101 mm, Munich Museum, MM 347/1 ; Sagami Bay, 1 ♂ 97 × 99 mm, Senckenberg Museum, Frankfurt, SMF 9147) shows both species to be clearly distinct. However, because there may be a certain amount of variability in the differences pointed out by ELDREDGE (1976) (protuberances on the rostrum and spinulation of the scaphocerite), other differences are suggested.

There may be either one or two protuberances on the upper portion of the rostrum in either *P. haigae* or *P. dofleini*, and for this reason this difference is difficult to apply. Furthermore, the number of spines on the scaphocerite is similar in both species. In *P. dofleini* the scaphocerite has 5-7 spines on the outer border and 5-6 smaller spines on the inner margin, whereas in *P. haigae* the scaphocerite bears 5-6 and 5-8 spines, respectively, at these locations. Both species have several small spines on the dorsal surface. The

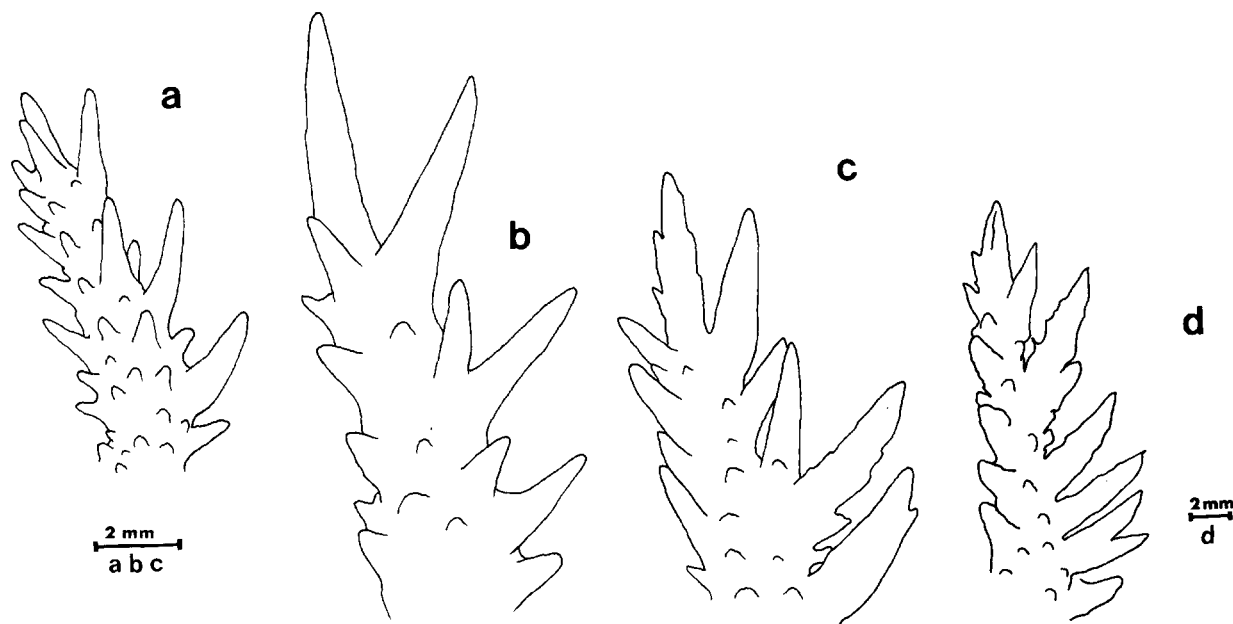


FIG. 3. — Right scaphocerite, dorsal view : a-b, *Paralomis haigae* Eldredge, 1976 : a, ♂, CL = 49 mm, New Caledonia (MNHN-pg 4275) ; b, ♀, CL = 80 mm, New Caledonia (MNHN-pg 4273) ; c-d, *Paralomis dofleini* Balss, 1911 : c, type, ♀ ov., CL = 64 mm, Sagami Bay, Japan (MM, 357/1) ; d, ♂, CL = 97 mm, Sagami Bay, Japan, (SMF 9147).

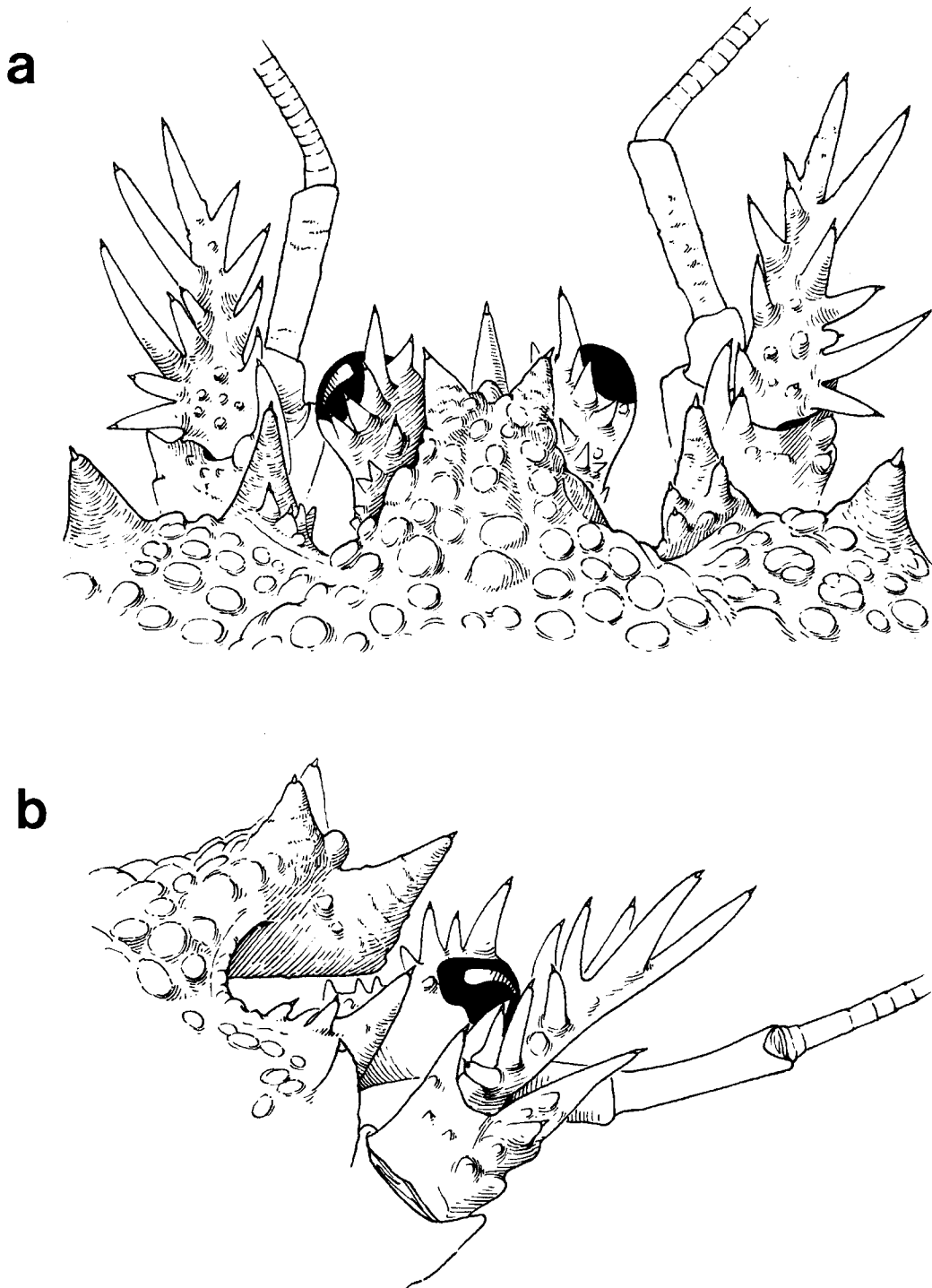


FIG. 4. — *Paralomis* sp., ♀ ov., CL = 71 mm, New Caledonia (MNHN-pg 4278). Anterior part of the carapace : a, dorsal view ; b, lateral view.

number of spines on the scaphocerite of *P. dofleini* (7) indicated by SAKAI (1971, 1976) and used by ELDREDGE (1976) to distinguish both species is probably a mistake. This low number of spines did not coincide with the counts obtained for any of the specimens examined (see also BABA, 1986).

On the basis of the material examined, the main differences between the two species reside in the granulation of the carapace, abdomen, and pereopods and the dorsal protuberances on the carapace. In *P. dofleini* the granules are clearly prominent and acute, whereas in *P. haigae* they are low and blunt. Furthermore, the protuberances on the dorsal surface and margins of the carapace, especially those on the branchial regions, noticeably more prominent in *P. dofleini* than in *P. haigae*.

This new occurrence extends the distribution range of this species from the type locality (Guam Island) southwards to New Caledonia

and the Samoa Islands. Depths between 400 and 500 m.

Paralomis sp.

Figs 2 c, 4

MATERIAL EXAMINED. — New Caledonia : trap, seaward side of the reef : 3 ♀ 62 × 60 to 72 × 72 mm (MP-Pg 4275 and 4279); 1 ♀ ov. 71 × 72 mm (MP-Pg 4278).

REMARKS. — This species, which appears to be indistinguishable from one occurring off New Zealand, is presently being studied by W. R. WEBBER and E. W. DAWSON at the National Museum of New Zealand.

It would appear to be a new species closely related to *Paralomis granulosa* (Jacquinot, 1847) from off Chile and Argentina.

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REFERENCES

- BABA, K., 1986. — In : Baba, K., K. I. Hayashi & M. Toriyama, Decapod Crustaceans from Continental Shelf and Slope around Japan. The Intensive Research of Unexploited Fishery Resources on Continental Slopes. Japan Fish. Res. Conserv. Ass. Tokyo, edit., 1-336 p., figs 1-22, figs 1-176. (Japanese and English text).
- BALSS, H., 1911. — Neue Paguriden aus den Ausbeuten der deutschen Tiefsee-Expedition « Valdivia » und der japanischen Expedition Prof. Doflein's. *Zool. Anz.*, **38** : 1-9, figs 1-17.
- BALSS, H., 1913. — Ostasiatische Dekapoden 1. Die Gala-theiden und Paguriden. In : Beiträge zur Naturgeschichte Ostasiens, herausgegeben von Dr F. Doflein. *Abh. Bayer. Akad. Wiss., Math. Phys. Kl.*, Suppl. 2, **9** : I-IV, 1-85, figs 1-56, pls 1-2.
- DAWSON, E. W. & J. C. YALDWYN, 1985. — King crabs of the world or the world of king crabs : an overview of identity and distribution — with illustrated diagnostic keys to the genera of the Lithodidae and to the species of *Lithodes*. In : *Proc. Int. King Crab Symp.*, Anchorage, Alaska : 69-106.
- ELDREDGE, L. G., 1976. — Two new species of lithodid (Anomura, Paguridea, Lithodidae) crabs from Guam. *Micronesica*, **12** (2) : 309-315, figs 1-2.
- MACPHERSON, E., 1988a. — A revision of the family Lithodidae Samouelle, 1819 (Crustacea, Decapoda, Anomura) from the Atlantic Ocean. *Monogr. Zool. Mar.*, **2** : 1-153, figs 1-53, pls 1-28.
- MACPHERSON, E., 1988b. — Lithodid crabs (Crustacea, Decapoda, Lithodidae) from Madagascar and La Réunion

- (SW Indian Ocean) with description of two new species. *Bull. Mus. natn. Hist. nat., Paris*, (4), 10, Sect. A (1) : 117-133, pls 1-3.
- ORTMANN, A., 1892. — Die Decapoden-Krebse des Strassburger Museums. IV. Theil, Die Abtheilungen Galatheidea und Paguridea. *Zool. Jb. (Syst.)*, 6, 241-326, pls 11-12.
- SAKAI, K., 1987. — Biogeographical records of five species of the family Lithodidae from the abyssal valley off Gamoda-Misaki, Tokushima, Japan. *Res. Crust.*, (16) : 19-24, fig. 1, pls 1-3.
- SAKAI, T., 1971. — Illustrations of 15 species of crabs of the family Lithodidae, two of which are new to science. *Res. Crust.*, (4-5) : 1-49, figs 1-3, pls 1-21, maps 1-3.
- SAKAI, T., 1976. — Crabs of Japan and the adjacent seas. Tokyo, Kodansha Ltd., 3 vol. : i-xxix, 1-773, figs 1-379 (English); 1-461 (Japanese); 1-16, pls 1-251 (plates).
- SAKAI, T., 1978. — Decapod Crustacea from the Emperor Seamount Chain. *Res. Crust.*, (8) (Supl.) : 1-39, figs 1-24, pls 1-4.
- TAKEDA, M., K. HIRAMOTO & Y. SUZUKI, 1984. — Additional material of *Paralomis cristata* Takeda et Ohta (Crustacea, Decapoda) from Suruga Bay, Japan. *Bull. Biogeogr. Soc. Japan*, 39 (5) : 27-31, figs 1-2.