

RAYMUNIDA, NEW GENUS (DECAPODA: ANOMURA: GALATHEIDAE) FROM THE INDIAN AND PACIFIC OCEANS

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ABSTRACT

A new galatheid genus, *Raymunida*, is established for two known species, *Munida elegantissima* de Man, 1902, and *M. bellior* Miyake and Baba, 1967, and one new species, *R. cagnetei* from the Marquesas Islands (French Polynesia, Pacific Ocean). This new genus is easily distinguished from the genus *Munida* Leach, 1820, and other galatheid genera by the following combination of characters: (1) the presence of epipods on first, second, and third pereopods; (2) one spine on the frontal margin between supraocular and anterolateral spines; (3) one distal spine on the flexor margin of the carpus of the third maxilliped; (4) the merus of the second pereopod clearly more slender than those of third and fourth pereopods; and (5) the presence of several long marginal spines on the endopod of the uropods. *Raymunida cagnetei*, new species and type species of the genus, is clearly distinguishable from the other species of the genus by the colour pattern, the presence of long setae on the carapace and abdomen, the length of the propodus of the walking legs, and the number of striae on the abdominal somites.

The genus *Munida* Leach, 1820, is actually represented by more than 140 species (e.g., Baba, 1988; Macpherson, 1994, 1999). Among these species, *M. elegantissima* de Man, 1902, and *M. bellior* Miyake and Baba, 1967, are characterized by the presence of epipods on the first, second, and third pereopods. The epipods are always absent in other species of *Munida*, although they are present in some species of other genera of the family Galatheididae (e.g., *Allogalathea* Baba, 1969a; *Allomunida* Baba, 1988; *Fennerogalathea* Baba, 1988; *Galathea* Fabricius, 1793, *Munidopsis* Whiteaves, 1874). In addition to the presence of epipods on the pereopods, these species have additional and constant characters not present in other species of *Munida* that suggest the existence of a different group of species, as has been pointed out by several authors (e.g., Baba and de Saint Laurent, 1996; Macpherson, 1996). The two species have been cited from numerous localities in the Pacific and Indian oceans: *M. elegantissima* de Man, 1902, from the Eastern Indian Ocean, Malay Archipelago, Indonesia, Philippines, Japan, Western and Eastern Australia, New Caledonia, Bellona Island, Vanuatu, and Futuna Island, between 20 and 440 m and *M. bellior* Miyake and Baba, 1967, from Japan, Philippines, Loyalty, Chesterfield and Futuna Islands, between 80 and 330 m (Baba, 1988, 1989; Macpherson, 1994, 1996, 1999).

In the present study, a new genus, *Raymunida*, is proposed based on the clearly distinct morphological characters of *M. elegantissima*, *M. bellior*, and an unidentified species collected from the Marquesas Archipelago, French Polynesia, during the cruise MUSORSTOM 9 (Richer de Forges *et al.*, 1999).

MATERIALS AND METHODS

The terminology used in this study follows previous papers (e.g., Macpherson and de Saint Laurent, 1991; Macpherson, 1994; Baba and de Saint Laurent, 1996). Measurements given are of carapace length excluding rostrum (CL). The types of the new species have been deposited in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN) and the National Museum of Natural History, Washington, D.C. (NMNH). The color pattern of the new species has been described from color slides of specimens obtained during the cruise by P. Laboute.

The specimens identified as *M. elegantissima* and *M. bellior*, and considered in the present study, are the material described in the following papers: John Murray Expedition (Tirmizi, 1966), Albatross Expedition (Baba, 1988), and MUSORSTOM Expeditions (Macpherson, 1994, 1996, 1999). The specimens of the new species were collected in the Marquesas Islands during the cruise MUSORSTOM 9 (see below).

SYSTEMATICS

Family Galatheididae Samouelle, 1819

Raymunida, new genus

Diagnosis.—Carapace with transverse striae, usually granulated and ciliated. Few secondary striae between main striae. Rostral

spine spiniform, clearly overreaching supraocular spines; supraocular spines spiniform, well developed, overreaching end of corneae. Row of epigastric spines always present. Pair of parahepatic, anterior branchial and postcervical spines usually present. Frontal margins straight, slightly oblique, with 1 small spine between supraocular and anterolateral spines. Anterolateral spine strong, situated on anterolateral angle of carapace. Branchial margins with 4 spines. Abdominal tergites without spines. Telson subdivision incomplete; endopod of uropods with marginal spinules and 1 or 2 long spines. Third thoracic sternite with lateral process; fourth thoracic sternite with anterior margin wide, moderately concave; sixth and seventh sternites without granules or carinae. Eyes large, corneae dilated, maximum corneal width about one-third distance between anterolateral spines. Antennular basal segment with 2 distal spines, distolateral clearly longer than distomesial; 2 additional well-developed spines on lateral margin, subdistal spine stronger than proximal spine. Antennal basal segment with distomesial spine long; second, third, and fourth segments well developed, second segment with moderately long distal spines. Antennal flagellum longer than chelipeds. Merus of third maxilliped with 2 strong marginal spines on flexor border; carpus with distal spine on flexor margin. Chelipeds and walking legs slender, elongate. Merus of first walking leg more slender than merus of second and third walking legs. Chelae of fifth pereopods more setose in male than in female and fingers longer than hand, flexor face with long, sparse simple setae; in male, movable finger with dense set of setae on proximal part. Male gonopods present on first and second abdominal somite. Epipods present on first to third pereopods.

Type-Species.—*Raymunida cagnetiei*, n. sp., by present designation.

Etymology.—The generic name is dedicated to Ray B. Manning, in acknowledgement of his friendship and his effort in the improvement of crustacean taxonomy. Gender: masculine.

Remarks.—The new genus is easily distinguished from other galatheid genera, as well as from other species of the genus *Munida*, by the following combination of characters: (1) presence of epipods on first, second, and

third pereopods; (2) one spine on frontal margin between supraocular and anterolateral spines; (3) one distal spine on flexor margin of carpus of third maxilliped; (4) merus of second pereopod more slender than those of third and fourth pereopods; and (5) presence of several long marginal spines on endopod of uropods.

Raymunida cagnetiei, new species

Figs. 1, 2

Type Series.—Marquesas Islands. MUSORSTOM 9: Stn 1156, 7°59.0'S, 140°43.3'W, 23.08.1997, 80 m: 1 male 4.5 mm; 1 ovigerous female 5.6 mm.—Stn 1158, 7°58.7'S, 140°43.9'W, 23.08.1997, 109–110 m: 1 male 2.9 mm; 1 female 3.2 mm.—Stn 1170, 8°45.1'S, 140°13.1'W, 25.08.1997, 104–109 m: 1 male 6.2 mm; 3 ovigerous females 4.8–5.7 mm; 2 juveniles 2.3 and 2.5 mm.—Stn 1177, 8°45.1'S, 140°14.1'W, 25.08.1997, 108–112 m: 14 males 5.0–7.9 mm; 11 ovigerous females 4.8–13.2 mm; 4 females 3.0–4.0 mm.—Stn 1178, 8°46.1'S, 140°14.5'W, 25.08.1997, 74–75 m: 1 male 6.2 mm.—Stn 1203, 9°52.7'S, 139°02.2'W, 28.08.1997, 60–61 m: 4 males 3.3–6.6 mm; 1 female 4.2 mm.—Stn 1264, 9°21.3'S, 140°07.7'W, 03.09.1997, 53–57 m: 5 males 4.0 to 5.8 mm; 1 juvenile 3.2 mm.

Holotype.—The ovigerous female (CL = 13.2 mm) from Station 1177 has been selected as holotype; the other specimens are paratypes.

Etymology.—The name *cagnetiei* refers to the Marques of Cañete, who gives the name to the Marquesas Islands.

Description.—Carapace as long as wide. Transverse striae mostly interrupted, with dense, very short, not iridescent setae and some long, iridescent uniramous setae. Few secondary striae between main striae. Main transverse striae on posterior part of carapace not interrupted in cardiac region. Intestinal region without striae. Gastric region with row of 4–6 pairs of epigastric spines, pair just behind supraocular spines usually largest. One parahepatic, 1 branchial anterior, and 1 postcervical spine on each side. Frontal margins slightly oblique, with 1 small spine between supraocular spine and anterolateral spine. Lateral margins feebly convex. Anterolateral spine well developed, situated at anterolateral angle, not reaching level of sinus between rostral and supraocular spines. Second marginal spine anterior of the cervical groove clearly smaller than preceding one. Branchial margins with 4 spines on each side, usually decreasing in size posteriorly.

Rostrum spiniform, about half as long as remaining carapace, horizontal or directed

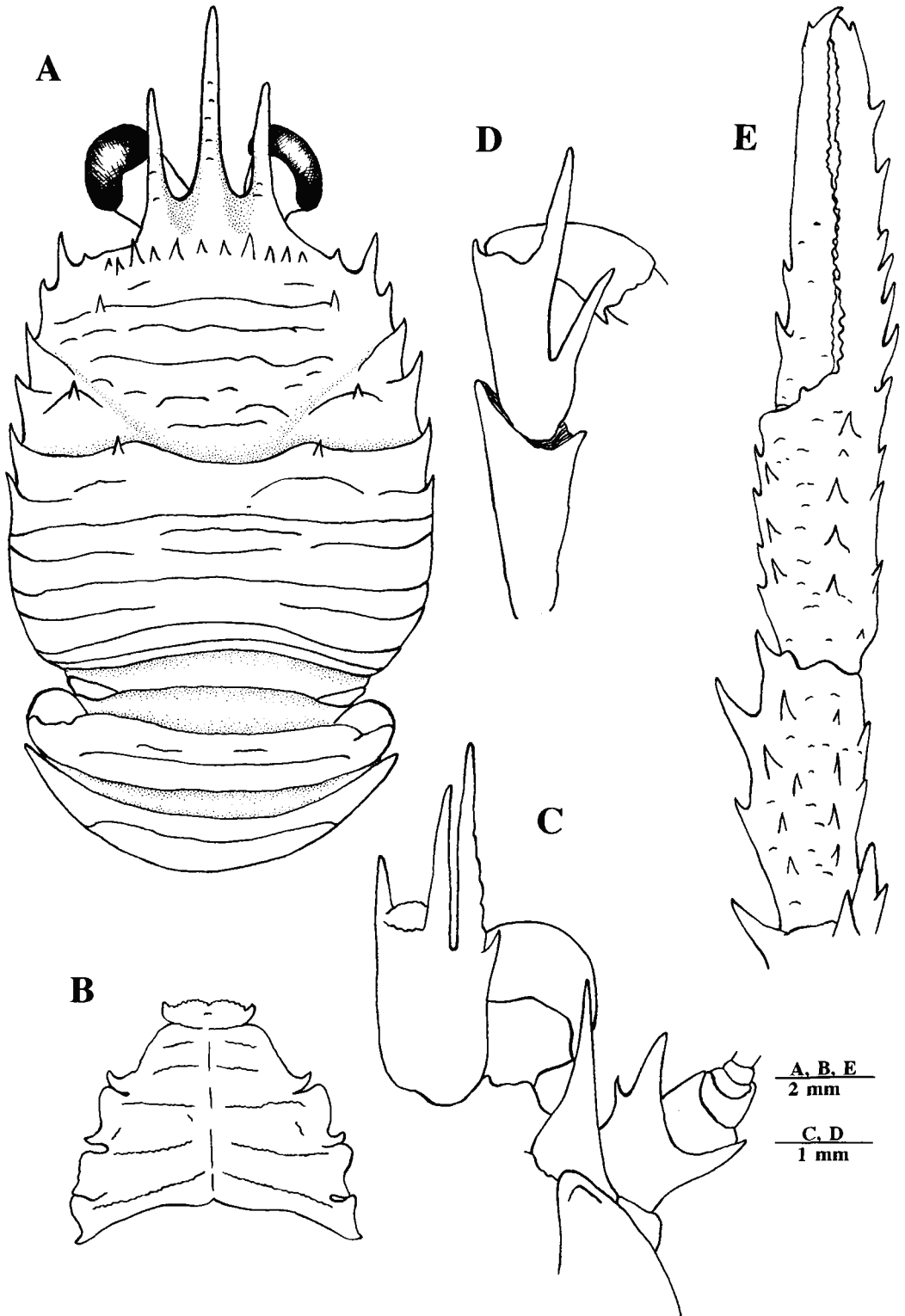
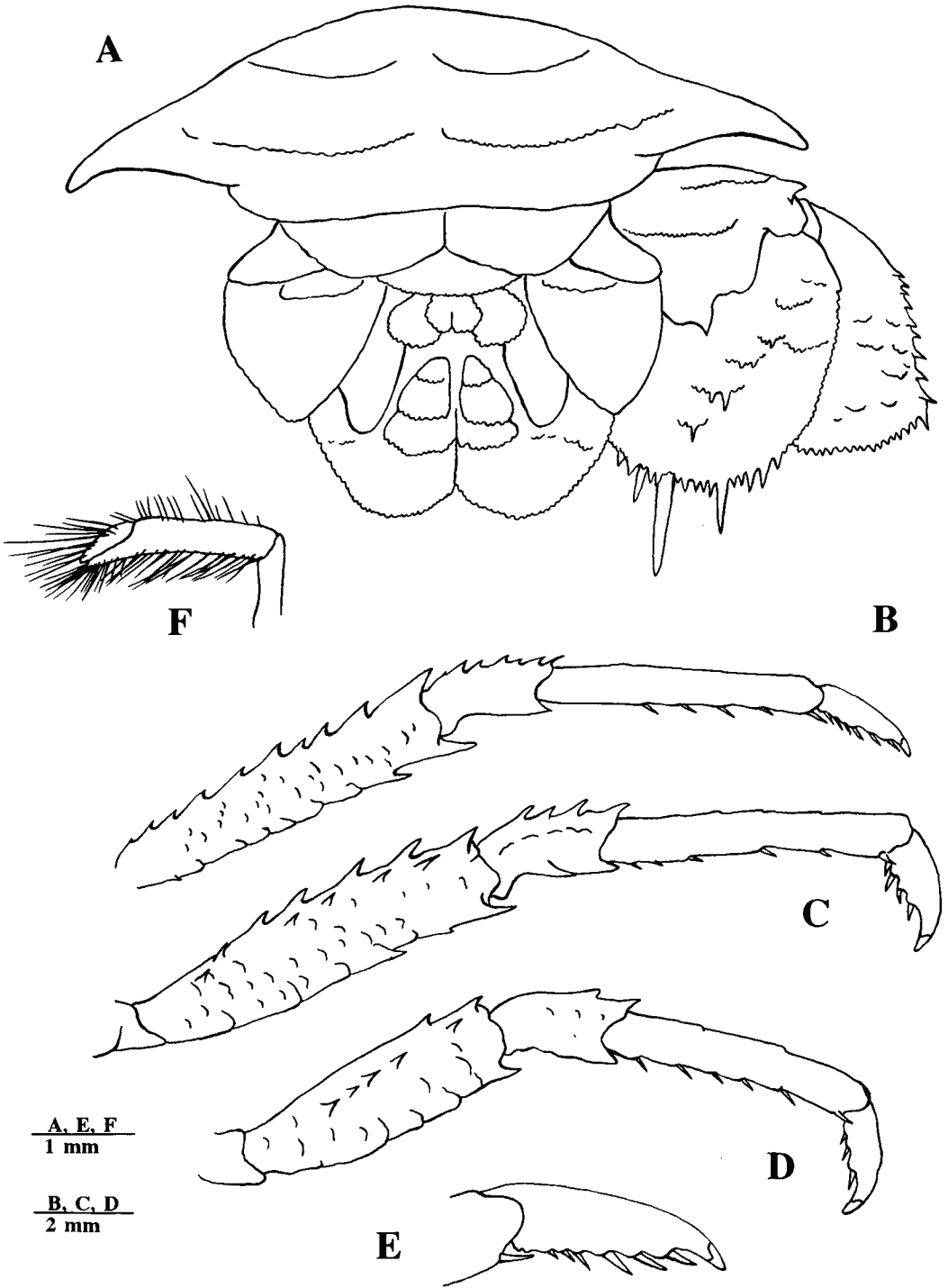


Fig. 1. *Raymunida cagnetei*, new species. Holotype, ovigerous female (CL = 13.2 mm). A, carapace and abdomen, dorsal view; B, sternal plastron; C, ventral view of cephalic region, showing antennular and antennal peduncles; D, right third maxilliped showing ischium, merus, and carpus, lateral view; E, right cheliped showing carpus, propodus, and chela, dorsal view. (Setae not illustrated).



A, E, F
1 mm

B, C, D
2 mm

Fig. 2. *Raymunida cagnei*, new species. Holotype, ovigerous female (CL = 13.2 mm). A, telson and right uropods, dorsal view; B, right first walking leg, lateral view; C, right second walking leg, lateral view; D, right third walking leg, lateral view; E, dactylus of first walking leg, lateral view; F, left fifth pereiopod, distal segments, lateral view, of male paratype (CL = 4.7 mm). (Setae not illustrated, except in F).

slightly downwardly. Supraocular spines horizontal, parallel or slightly divergent, overreaching midlength of rostrum and end of corneae.

Fourth thoracic sternite with few short granulated striae; lateral surface of fifth to seventh sternites smooth, without striae, granules or carinae. Anterior part of fourth sternite slightly narrower than third. Transverse ridges between fifth, sixth, and seventh sternites obtuse, feebly granulated.

Abdominal tergites with some long, iridescent uniramous setae; unarmed on anterior border. Second and third tergites with 1 main continuous transverse stria occasionally preceded by 2 small median scales. Fourth abdominal tergite with 1 main transverse continuous stria. Endopod of uropods with numerous marginal spinules, one spine very long, clearly overreaching telson.

Eyes moderately large, maximum corneal diameter about one-third distance between bases of anterolateral spines.

Basal segment of antennule (distal spines excluded), about one-quarter carapace length, elongate, not overreaching corneae, with 2 distal spines, mesial spine clearly shorter than lateral spine; 2 spines on lateral margin, proximal one short, located at midlength of segment, distal one very long, overreaching distolateral spine.

First segment of antennal peduncle with 1 distal spine on mesial margin, slightly overreaching antennal peduncle; second segment with 2 long distal spines and 1 additional small spine on mesial border, mesial distal spine slightly longer than lateral spine, overreaching third antennal segment, although not overreaching antennal peduncle; penultimate segment unarmed.

Ischium of third maxilliped about 1.5 times length of merus measured along dorsal margin; merus with 2 strong spines on flexor margin, distal longer than proximal; extensor margin with small distal spine.

Chelipeds subequal, scarcely squamous, with numerous long, iridescent uniramous setae. Palm slightly less than two-thirds finger length. Merus and carpus armed with several spines on dorsal margin and several spines scattered on mesial and ventral sides. Palm with several spines scattered on mesial and dorsal sides and 1 row of dorsolateral spines, continuing along fixed finger. Fingers distally curving and crossing, ending in sharp point;

movable finger with 2 spines near base and 1 spine near tip; fixed finger with 2 additional spines near tip; cutting edges with small teeth of different sizes.

Second pereopod about 2 times carapace length; merus shorter than carapace, about 5 times as long as high, about 3 times carpus length and about 1.33 times propodus length; propodus less than 0.67 times carapace length, about 7 times as long as high and twice dactylus length. Merus with spines along dorsal border, increasing in size distally, ventral margin with few distal spines. Carpus with some dorsal spines and 1 distoventral spine. Propodus with 4–6 movable ventral spines. Dactylus short, with dorsal margin convex, curving distally, ventral border indented, with 5 or 6 movable spinules along entire ventral margin. Third pereopod slightly longer than second; merus about 4 times as long as high. Fourth pereopod shorter than second and third; merus 0.75 times length of that of second pereopod.

Color.—Ground color of carapace and abdomen red; with numerous yellow and reddish very small spots on carapace and abdominal segments; wide white band along each branchial margin of carapace; white band on lateral margin of first to third abdominal somites. Rostrum, supraocular and anterolateral spines red. Chelipeds and walking legs red; distal part of merus and carpus of chelipeds dark red; distal part of palm and proximal part of fingers white.

Remarks.—The genus *Raymunida* is actually represented by three species: *R. elegantissima* (de Man), *R. bellior* (Miyake and Baba), and *R. cagnetei*, n. sp. *Raymunida bellior* may be easily differentiated from the other two species by the absence of long setae on the carapace and the presence of plumose setae on the chelipeds. A comparison of the new species with specimens of *R. elegantissima* from different localities (see material mentioned in Materials and Methods) shows that they can be distinguished by small but constant aspects. The ambulatory legs are clearly longer in *R. elegantissima* than in *R. cagnetei*, the propodus being more than two-thirds the carapace length in *R. elegantissima* and less than two-thirds in the new species. The second abdominal somite has one main transverse stria and one additional stria near the anterior margin in *R. elegantissima*, whereas

in the new species the additional stria is absent, and only two small scales may be present medially. The color pattern of *R. cagnetei*, observed in all specimens examined, is also quite different from that attributed to *R. elegantissima*: body reddish with white transverse stripes on the carapace (Baba, 1969b, but see Macpherson, 1994); and *R. bellior*: body reddish brown (Miyake and Baba, 1967; Macpherson, 1996).

The systematic position of some specimens of *R. elegantissima* and *R. bellior* from different localities is, however, controversial, as has been pointed out in previous papers (Macpherson, 1994, 1996). Some morphological and color differences between specimens from different localities suggest the existence of several additional forms or species. However, with the exception of the new species, the small number of individuals collected in each locality (usually 1 or 2) makes difficult an easy analysis of the character variability. For these reasons, a study of these specimens comparing DNA sequences from portions of mitochondrial genes, actually in progress, is strongly recommended in order to add complementary characters and clarify the taxonomic position of the different specimens.

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LITERATURE CITED

Baba, K. 1969a. Four new genera with their representatives and six new species of Galatheidae in the collection of the Zoological Laboratory, Kyushu University, with redefinition of the genus *Galathea*.—OHMU, Occasional Papers of Zoological Laboratory Faculty of Agriculture, Kyushu University 2: 1–32.
 ———. 1969b. New addition to the galatheid fauna of Japan (Crustacea, Anomura).—OHMU, Occasional Papers of Zoological Laboratory Faculty of Agriculture, Kyushu University 2: 33–40.
 ———. 1988. Chirostyliid and Galatheids Crustaceans (Decapoda: Anomura) of the "Albatross" Philippine Expedition, 1907–1910.—Researches in Crustacea, Special Number 2: v + 203 pp.
 ———. 1989. Anomuran Crustaceans obtained by dredging from Oshima Strait, Amami-Oshima of the

Ryukyu Islands.—Memoirs of the National Science Museum, Tokyo 22: 127–134.
 ———, and M. de Saint Laurent. 1996. Crustacea Decapoda: revision of the genus *Bathymunida* Balss, 1914, and description of six new related genera (Galatheidae). Pp. 433–502 in A. Crosnier, ed. Résultats des Campagnes MUSORSTOM, Volume 15. Mémoires du Muséum national d'Histoire naturelle 168.
 Fabricius, J. C. 1793. Entomologia systematica emendata et aucta, secundum classes, ordines, genera, species, adjectis synonymis, locis, observationibus, descriptionibus.—Halfnia 2: viii + 519 pp.
 Macpherson, E. 1994. Crustacea Decapoda: Studies on the genus *Munida* Leach, 1820 (Galatheidae) in New Caledonian and adjacent waters with descriptions of 56 new species. Pp. 421–569 in A. Crosnier, ed. Résultats des Campagnes MUSORSTOM, Volume 12. Mémoires du Muséum national d'Histoire naturelle 161.
 ———. 1996. Crustacea Decapoda: Species of the genera *Munida* Leach, 1820 and *Paramunida* Baba, 1988 (Galatheidae) from the seas around the Wallis and Futuna Islands. Pp. 387–421 in A. Crosnier, ed. Résultats des Campagnes MUSORSTOM, Volume 15. Mémoires du Muséum national d'Histoire naturelle 168.
 ———. 1999. Crustacea Decapoda: Species of the genera *Agononida* Baba and de Saint Laurent, 1996 and *Munida* Leach, 1820 (Galatheidae) collected during the MUSORSTOM 8 cruise in Vanuatu. Pp. 407–426 in A. Crosnier, ed. Résultats des Campagnes MUSORSTOM, Volume 20. Mémoires du Muséum national d'Histoire naturelle 180.
 ———, and M. de Saint Laurent. 1991. Galatheid crustaceans of the genus *Munida* Leach, 1818, from French Polynesia.—Bulletin du Muséum national d'Histoire naturelle (4), 13, sect. A, (3–4): 373–422.
 Man, J. G. de. 1902. Die von Herrn Professor Kükenthal im indischen Archipel gesammelten Dekapoden und Stomatopoden. Pp. 456–929, pls. 19–27 in Kükenthal, ergebnisse einer zoologischen. Forschungsreise in den Molukken und Borneo. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft 25.
 Miyake, S., and K. Baba. 1967. New and rare species of the family Galatheidae (Crustacea, Anomura) from the Sagami Bay in the collection of the Biological Laboratory, Imperial Household, Japan.—Journal of the Faculty of Agriculture, Kyushu University 14: 213–224.
 Richer de Forges, B., J. Poupin, and P. Laboute. 1999. La campagne MUSORSTOM 9 dans l'archipel des îles Marquises (Polynésie française). Compte rendu et liste des stations. Pp. 9–29 in A. Crosnier, ed. Résultats des Campagnes MUSORSTOM, Volume 20. Mémoires du Muséum national d'Histoire naturelle 180.
 Samouelle, G. 1819. The entomologist's useful compendium, or an introduction to the knowledge of British insects. London 496 pp.
 Tirmizi, N. M. 1966. Crustacea: Galatheidae.—The John Murray Expedition 1933–23, Scientific Reports 11: 167–234.
 Whiteaves, J. F. 1874. On recent deep-sea dredging operations in the Gulf of St. Lawrence.—American Journal of Science 7: 210–219.

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