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New and rare species of the family Galatheidae (Crustacea, Anomura) from the Sagami Bay in the collection of the Biological Laboratory, Imperial Household, Japan[1)]

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The present paper contains descriptions of new and rare species of the family Galatheidae in the collection of the decapod Crustacea from the Sagami Bay, made by His Majesty the Emperor of Japan. Some well-known species are also included in the collection but excluded herein. Three new and one rare species, viz. ***Galathea imperialis*** sp. nov., ***Munida bellior*** sp. nov., ***Munidopsis granulata*** sp. nov. and ***M. camelus*** (Ortmann), are treated herewith. The first species is different from the other members of the genus ***Galathea*** in general features of the carapace. It is, however, inserted into this genus for the present. Of the last species additional details are provided.

We are greatly indebted to the staff members in the Biological Laboratory, Imperial Household, for giving us the facilities to this study. We must be also thankful to Dr. Fenner A. Chace, Jr. of the U. S. National Museum for valuable suggestions on the presence or absence of epipods in the deep-sea forms.

Galathea imperialis sp. nov.

(Figs. 1, 2)

Description of holotype. Carapace longer than broad, oblong in shape; transverse striae obscure, but three striae, i.e. anterior, middle and posterior ones slightly in evidence. Carapace sparsely furnished with long coarse setae; cervical groove distinct; no spines on gastric region.

Rostrum flat and triangular; lateral margin unarmed. Outer orbital angle not formed. Anterolateral spine prominent. Lateral margin of carapace with a spine immediately behind the cervical groove and with a spine on middle.

Basal segment of antennule armed with two spines on outer distal

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margin, and the inner distal angle with a thin short spine. First segment of antennal peduncle with a spine on lower distal end; second segment with an inner distal marginal and an outer distal marginal spine; third segment without spine.

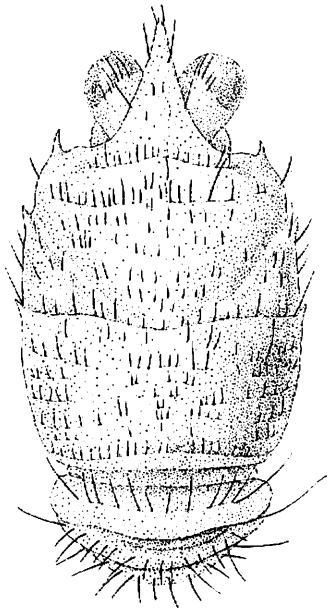

Fig. 1. *Galathea imperialis* sp. nov., holotype, ovigerous female, in dorsal view, ×11.

Ischium of third maxilliped shorter than merus, the inner distal margin with a prominent spine; merus with a sharp spine on inner median margin, and the outer margin with a distal spine; outer margin of carpus not spinose.

Chelipeds about twice as long as carapace, and thickly furnished with long coarse setae chiefly on wrist, palm and fingers. Movable finger a little longer than palm, and armed with a spine on proximal outer margin. Fingers not gapped. Palm with a row of four strong spines on inner margin but without spines on upper surface; acute spines also placed along the outer margin of palm and immovable finger. Wrist with three spines on each of the inner and outer margins, the median of the inner marginal spines being the largest; its dorsal surface with a longitudinal row of small spines rather close to outer margin.

Ambulatory legs smooth, devoid of scales, and sparsely furnished with long setae. Merus of first ambulatory leg with seven outer marginal spines; carpus with three outer marginal spines; inner margin of propodus with six conical slender spines; dactylus weakly serrated on inner margin, bearing large setae at the bases of serrated teeth. Second ambulatory leg similar to the first in shape; merus with six spines on outer margin, and its distal margin not spined; carpus with a distal outer marginal spine; propodus with three spines on inner margin. Third ambulatory leg with three spines on outer meral margin; carpus smooth.

Sternum of third thoracic somite widened, its lateral angle slightly protruded anteriorly.

Chelipeds and ambulatory legs lacking epipods.

Measurements in holotype (in mm):

Length of carapace including rostrum	5.7
Breadth of carapace	3.4

Length of cheliped	12.7
Length of wrist	2.0
Length of palm	2.5
Breadth of palm	1.6
Length of movable finger	2.7

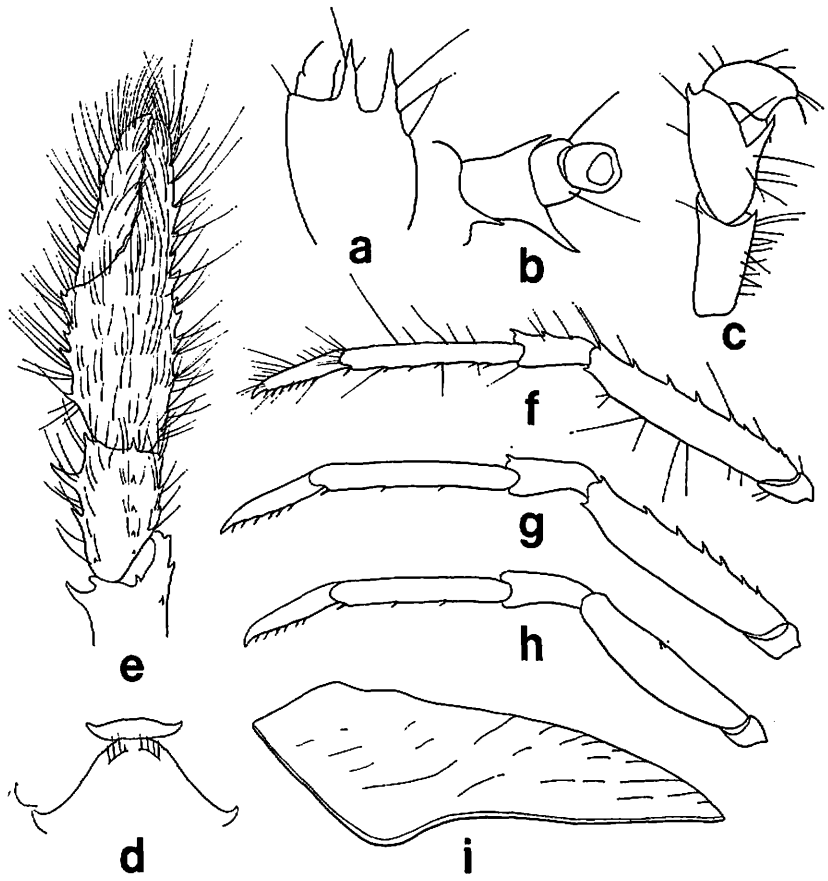

Fig. 2. *Galathea imperialis* sp. nov., holotype.
a, Basal segment of left antennule, ×25 ; b, left antennal peduncle, ×25 ; c, endopod of left third maxilliped, ×18 ; d, anterior part of sternal segments, ×18 ; e, right cheliped, ×9 ; f, left first ambulatory leg, ×9 ; g, left second ambulatory leg, ×9 ; h, left third ambulatory leg, ×9 ; i, left pterygostomial flap, ×18.

Remarks. This species shows a strong alliance to *Galathea laevirostris* Balss in the shape of the rostrum but differs in having anterolateral spines. This represents apparently an intermediate form between the genera *Galathea* and *Munidopsis* in the facts that the carapace is robust

and the rostrum lacks lateral teeth, but the eyes are well developed. This is, however, equipped with a flagellum on the exopod of the first maxilliped which has been mentioned as one of the characteristics of the Galatheinae. On the position of this species in the Galatheinae, we refer it with considerable hesitation to *Galathea* for the above mentioned facts and another one that the sternal segment of the third thoracic somite is different from those of *Galathea*. It is however hazardous to attempt a division of genera at present when any natural distinction is not made clear.

Types. Holotype, ovigerous female, BLIH No. 205a; paratypes, two ovigerous females, BLIH No. 205b, c; 2 miles off the westsouth-by-west of Jogashima Islet, Sagami Bay, 160–230 m deep, Mar. 19, 1958.

Munida bellior sp. nov.

(Figs. 3, 4)

Description of holotype. Rostrum straight and horizontal, being twice as long as supraorbital spine. Carapace nearly as long as broad excluding rostrum; dorsal surface rather smooth; lateral margin armed with two spines on hepatic region, and with four behind it, two on anterior branchial region and the other two on posterior branchial region; cervical groove distinct; a transverse row of ten spines present on anterior part of gastric region; one pair of spines placed on both edges of the first transverse ridge; four spines also placed behind the bifurcation of cervical groove.

Abdominal segments without spines on transverse ridge. Endopod of uropod with tubercular teeth on posterior margin.

Basal segment of antennular peduncle with a small inner distal marginal spine, and with two developed and a small outer marginal spine. Anterior prolongation of first segment of antennal peduncle long, its tip reaching nearly to the tip of the rostrum; both inner and outer distal angles of second segment sharply spined.

Ischium of third maxilliped slightly longer than merus, bearing a spine on distal angle of inner margin; merus with two inner marginal spines and without outer marginal spine; carpus with a prominent spine on inner distal margin.

Chelipeds less than twice as long as carapace in dorsal view, and furnished with long setae; setae on each joint excepting finger fairly plumose; four spines arranged in a longitudinal line on proximal half of outer margin of movable finger; cutting margin minutely dentate; outer margin of immovable finger and palm with ten spines. Palm with two longitudinal rows of spines on inner margin, and with a longitudinal row of small spines on dorsal surface; a spine also present on anterior edge of palm. Wrist with three outer marginal spines and

five inner marginal spines, and its dorsal surface with two longitudinal rows of spines. Arm also spinous, the inner marginal spines very large.

Fig. 3. *Munida bellior* sp. nov., holotype, male, in dorsal view, ×2.8.

Ambulatory legs devoid of long setae. Meri of all the legs broadest at middle and narrowest at distal portion; merus of first ambulatory leg with a row of six small spines on outer (upper) margin, and with a row of nine small spines lying on dorsal surface close to outer marginal row of spines; inner (lower) proximal margin with two small spines; carpus with four outer marginal spines; propodus with four long spines on inner margin and also with a small spine ventrally near the inner distal marginal spine; short plumose setae lined up on dorsal and ventral surfaces close to outer margin of dactylus; inner margin of dactylus serrated, bearing eight broad setae. Armature of second ambulatory leg almost equal to the first in all respects. Merus of third ambulatory leg with a longitudinal row of spines on outer margin

and two rows on dorsal surface ; carpus with three spines on outer margin.

Colour in formalin. Whole body coloured with simple reddish brown. Carapace covered with reddish brown on anterior half, and with a broad V-shaped band of reddish brown placed on posterior half. Abdomen wholly reddish brown. Third maxilliped entirely reddish brown. Proximal and distal portions of each joint of cheliped more emphasized with a reddish brown colour than other portions of itself ; fingers light seashell pink. Merus of each ambulatory leg with three bands of reddish brown, one middle and the other two on both ends ; carpus with a single band of reddish brown at proximal portion ; propodus with two ; dactylus entirely reddish brown.

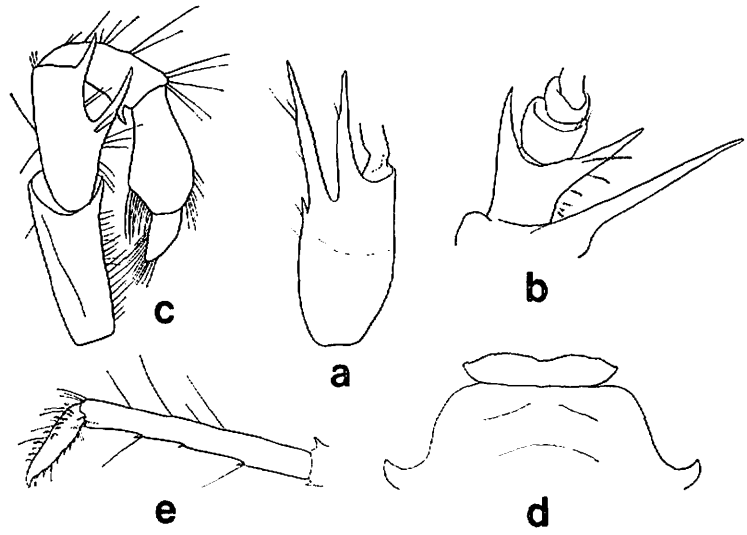

Fig. 4. *Munida bellior* sp. nov., holotype.
a, Basal segment of right antennule, ×12 ; b, right antennal peduncle, ×12 ; c, endopod of right third maxilliped, ×12 ; d, anterior part of sternal segments, ×12 ; e, distal segments of right first ambulatory leg, ×5.

Measurements in holotype (in mm) :

Length of carapace including rostrum	12.7
Breadth of carapace	8.3
Length of rostrum	3.9
Length of supraorbital spine	1.9
Length of cheliped	30.5
Length of wrist	5.2
Length of palm	5.3
Breadth of palm	2.0
Length of movable finger	8.0

Remarks. At first glance this species is distinguished from the others by having a few spines on the inner margin of the propodus of the ambulatory leg and by the colour pattern of the same leg. The presence of an inner carpal marginal spine of the third maxilliped is the marked character to be distinguished from the other members of this genus. One of the paratypes, which may be a young, is small measuring 5.1 mm from the tip of the rostrum to the posterior margin of the carapace. In this specimen the inner carpal marginal spine of the third maxilliped is so small as is unable to be recognized.

Types. Holotype, male, BLIH No. 183, off the south of Jogashima Islet, Sagami Bay, 80-90 m deep, July 25, 1957. Paratypes: one male, BLIH No. 206, 2.2 miles off the westsouth-by-west of Jogashima Islet, Sagami Bay, 100-130 m deep, Mar. 19, 1958. one male, BLIH No. 465, off the southwest of Jogashima Islet, Sagami Bay, 102-190 m deep, July 12, 1962.

Munidopsis granulata sp. nov.

(Figs. 5, 6)

Description of holotype. Carapace slightly longer than broad, exclusive of rostrum. Rostrum triangular, not flat; its surface swollen and granulate; a spine situated at anterolateral angle of carapace. Deep grooves divided the dorsal surface into several regions which are seen as lumps as will be well understood with reference to Fig. 5.

Dorsal surface of each abdominal segment deeply grooved transversely, but not granulate.

Eyes small and devoid of spines and pigments.

Basal segment of antennule stocky and armed with three spines on distal margin, and with two small spines on inner distal margin; spines not sharpened. First segment of antennal peduncle devoid of spines; second and third segments with a spine on each of the inner and outer distal margins.

Ischium of third maxilliped armed on outer margin with three spines, the distal extremely developed; its inner distal angle with a small spine; merus with three outer marginal spines and with two inner marginal spines; carpus with four spines on outer margin.

Chelipeds rather slender, subcylindrical and about twice as long as carapace; the surface devoid of setae; fingers not gapped; movable finger slightly shorter than immovable finger; arm, wrist and palm granulate. Merus of first ambulatory leg with six outer marginal spines; carpus, propodus and dactylus smooth on all over the surface and furnished with few setae on outer margin; Dactylus slender and sickle-shaped. Second and third ambulatory legs very similar to the first

in shape. Pterygostomial flap granulate.

Chelipeds and ambulatory legs lacking epipods.

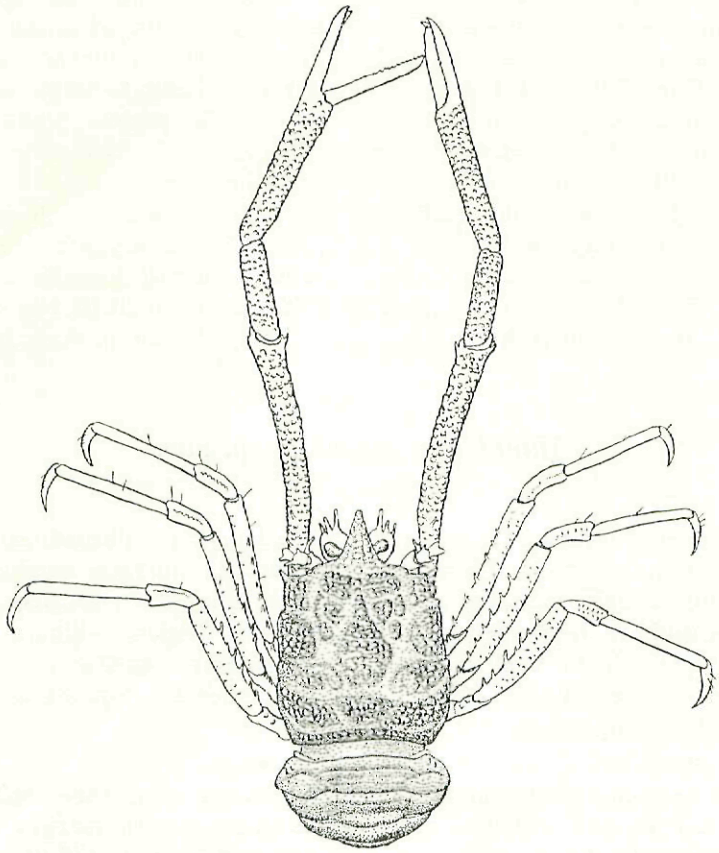

Fig. 5. *Munidopsis granulata* sp. nov., holotype, female, in dorsal view, ×3.8.

Measurements in holotype (in mm):

Length of carapace including rostrum	7.9
Breadth of carapace	5.7
Length of rostrum	1.8
Length of cheliped	22.4
Length of wrist	3.2
Length of palm	5.6
Breadth of palm	1.1
Length of movable finger	3.8

Remarks. This species is allied to *Munidopsis townsendi* Benedict at first glance from which it is distinguished by the shape of the third maxilliped and by the absence of tubercles on the abdominal segments.

Types. Holotype, female, BLIH No. 153, off Nagai, Sagami Bay, 110-200 m deep, Dec. 3, 1956.

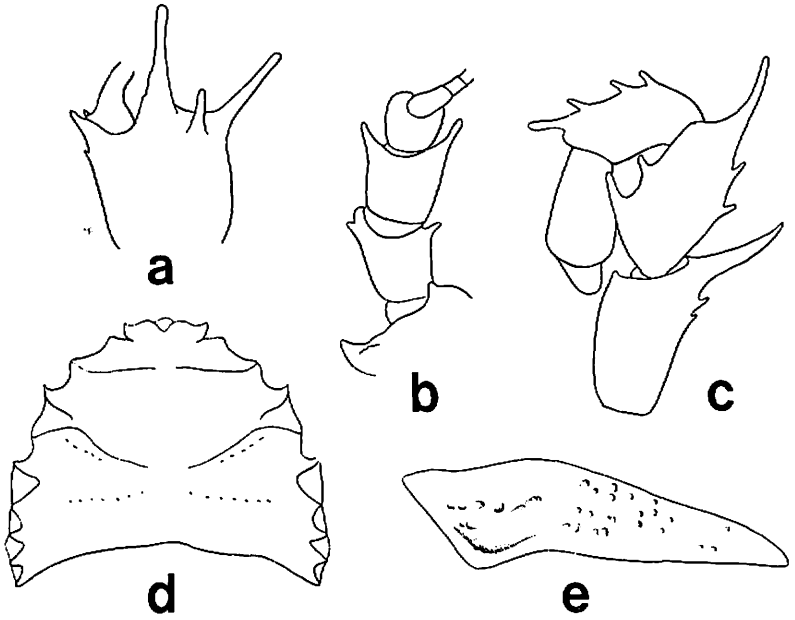

Fig. 6. *Munidopsis granulata* sp. nov., holotype.
a, Basal segment of left antennule, ×20; b, left antennal peduncle, ×20; c, endopod of left third maxilliped, ×20; d, sternal segments, ×10; e, left pterygostomial flap, ×10.

Munidopsis camelus (Ortmann)
(Figs. 7, 8)

Galacantha camelus Ortmann, 1892, p. 252, pl. 11, fig. 14 - Sagami Bay.

Carapace longer than broad excluding rostrum; dorsal surface thickly furnished with short setae. Rostrum rather long, bearing near its apex a marginal tooth on each side; dorsal surface bluntly carinated longitudinally. A large spine present immediately outside of the eye.

Lateral margin of carapace with four strong spines, except one forming outer orbital angle; one pair of spines placed behind eyes; a longitudinal row of three spines situated in front of cervical groove; one pair of small spines present behind the bifurcation of cervical groove, and a large spine behind it; three spines placed on transverse ridge in front of posterior margin, one middle, and the other two lateral; a pair of spines also present on each of the second and third abdominal segments.

Basal segment of antennule with two spines on outer margin, the distal strong. First segment of antennal peduncle with both of the inner and outer marginal spines, the inner one rather slender and long; second segment with an outer distal marginal spine.

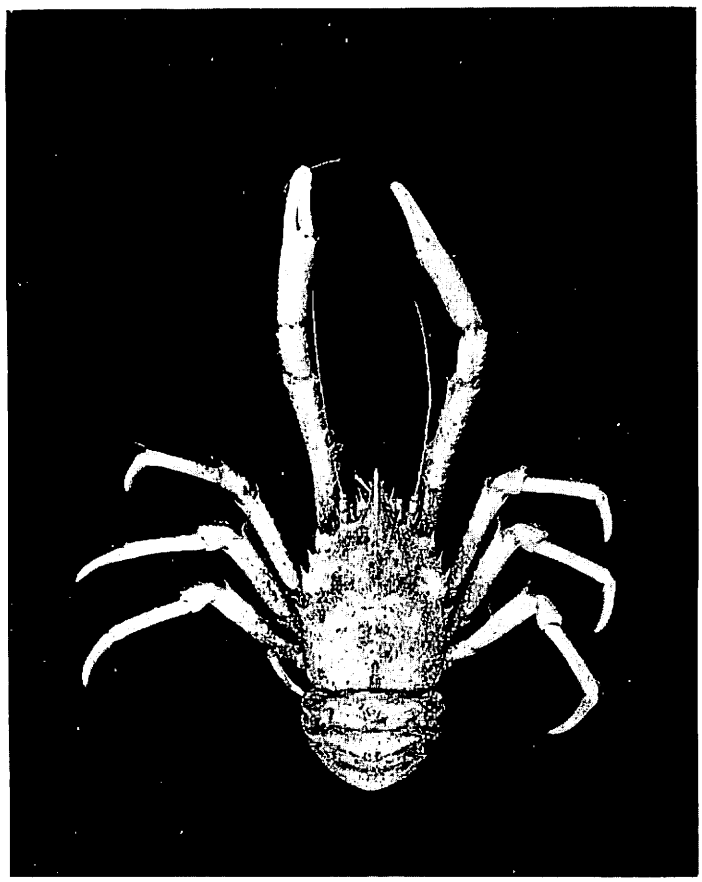

Fig. 7. *Munidopsis camelus* (Ortmann), in dorsal view, ×0.8.

Merus of third maxilliped longer than ischium, bearing a strong outer distal marginal spine and two inner distal marginal spines; the proximal inner marginal spine strong; carpus smooth on outer margin.

Chelipeds thickly furnished with short setae, and with long setae particularly on inner margin; movable finger as long as palm; cutting margin minutely dentate; palm with small tubercular teeth on dorsal surface; wrist with two longitudinal rows of small spines on dorsal surface; arm spinous, the spines rather large.

Ambulatory legs robust, bearing long plumose setae on outer margin.

Merus of first ambulatory leg with ten minute spines; each of the inner and outer distal margins developed to form a strong spine; carpus with five minute spines on outer margin; its dorsal surface with a longitudinal robust stria; propodus without spines on both margins; dactylus sickle-shaped with 15 closely placed denticles on inner margin. Second and third ambulatory legs similar to the first in shape but rather weak in armature.

Chelipeds and first two pairs of ambulatory legs with epipods.

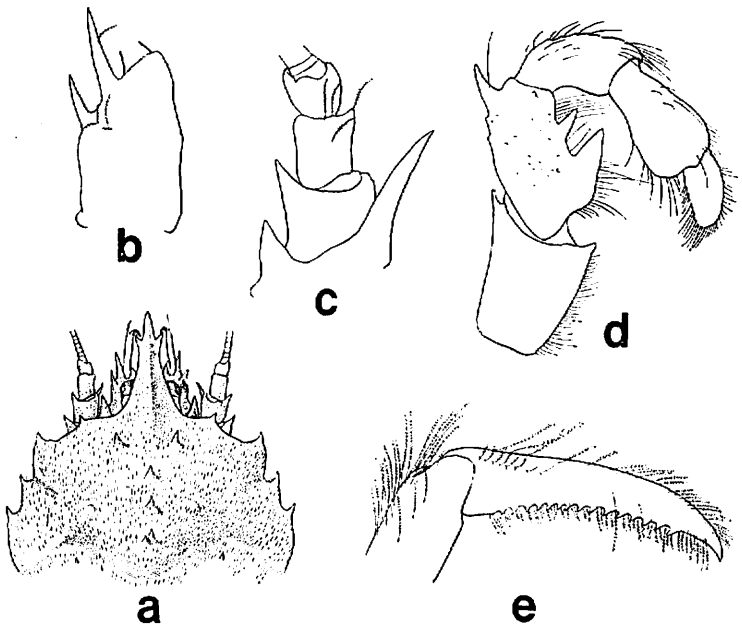

Fig. 8. *Munidopsis camelus* (Ortmann).

a, Anterior part of carapace, ×1.6; b, basal segment of right antennule, ×5; c, right antennal peduncle, ×5; d, right third maxilliped, ×4; e, dactylus of first ambulatory leg, ×5.

Material examined.

One ovigerous female, BLIH No. 3, near Hayama, Minami-Amadaiba, Sagami Bay, 500 m deep, Aug. 21, 1935.

One male and one female, BLIH No. 496, 2 km off the south of Kamegi, Sagami Bay, 200-270 m deep, Feb. 11, 1963.

Measurements. The male measures 9.8 mm, and the ovigerous female 35.1 mm, from the tip of the rostrum to the posterior margin of the carapace.

Remarks. The specimens before us show a slight difference from the original description in having three spines near the posterior margin

of the carapace. It must be worthy of redescription that immediately outside of the eye there is a spine which is distinctly seen from a dorsal aspect and is not described by Ortmann.

The Munidopsinae which is characterized by the absence of a flagellum on the exopod of the first maxilliped, includes the unwieldy *Munidopsis* group and was obscure in distinction of genera before the Chace's proposal. Chace (1942) examined numerous species in order to attempt a natural grouping and concluded that even the genus *Galacantha* had to be merged with *Munidopsis*. As far as the generic position is concerned, it was thought advisable to follow the Chace's excellent work for the present.

This is the first subsequent record.

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