

Chirostylid and Galatheid Crustaceans (Decapoda: Anomura) from active thermal vent areas in the southwest Pacific*

KEIJI BABA¹ and MICHÈLE DE SAINT LAURENT²

¹Faculty of Education, Kumamoto University, 2-40-1 Kurokami, Kumamoto, 860, Japan.

²Muséum National d'Histoire Naturelle, Laboratoire de Zoologie (Arthropodes), 61, rue de Buffon, 75231 Paris Cedex 05, France.

SUMMARY: Five species of galatheidean crustaceans are reported from active thermal vent areas in the southwest Pacific back arc basins: *Uroptychus bicavus* sp. nov. and *U. thermalis* sp. nov., both from the North Fiji Basin; *Munida magniantennulata* Baba and Türkay, 1992, from the Lau Basin, *Munidopsis lauensis* sp. nov. from the Lau and North Fiji Basins, and *M. starmer* sp. nov. from the North Fiji Basin.

Key words: Galatheidean crustaceans, thermal vents, *Uroptychus bicavus*, *U. thermalis*, *Munida magniantennulata*, *Munidopsis lauensis*, *M. starmer*.

RESUMEN: CRUSTÁCEOS CHIROSTYLIDOS Y GALATEIDOS (DECAPODA: ANOMURA) DE LAS SURGENCIAS TERMALES DEL PACÍFICO SUROCCIDENTAL. — En este trabajo se describen cinco especies de crustáceos galateidos recolectados en las surgencias termales localizadas en las cubetas de detrás de los arcos del Pacífico suroeste. *Uroptychus bicavus* sp. nov. y *U. thermalis* sp. nov. proceden de la cubeta del norte de las islas Fiji. *Munida magniantennulata* Baba and Türkay, 1992, proceden de la cubeta Lau, *Munidopsis lauensis* sp. nov. se recolectó en las dos cubetas anteriores mientras que *M. starmer* sp. nov. procede de la cubeta del norte de las Fiji.

Palabras clave: Crustáceos galateidos, surgencias termales, *Uroptychus bicavus*, *U. thermalis*, *Munida magniantennulata*, *Munidopsis lauensis*, *M. starmer*.

INTRODUCTION

Recent dives to the active hydrothermal vent areas in the southwestern Pacific (Lau and North Fiji Basins) have been undertaken in 1987-1989 by the French BIOLAU 89 (Biologie-Bassin de Lau) and the French-Japanese STARMER (under the joint auspices of the Science and Technology Agency, Japan, and the Institut Français pour l'Exploitation de la Mer, France) cruises, with the aid of the submersible «Nautile» (AUZENDE *et al.*, 1989). The galatheid

crustaceans (Chirostylidae and Galatheidae) collected are reported here.

So far, four new species of Galatheidae (three of *Munidopsis*, and one of *Munida*) have been described from hydrothermal vent areas: *Munidopsis lentigo* Williams and Van Dover, 1983, from the East Pacific Rise south of Baja California, 2600 m; *M. alvisca* Williams, 1988, from Guayamas Basin and from the Juan de Fuca and Explorer Ridges in the eastern Pacific, 1812-2008 m; *M. marianica* Williams and Baba, 1990, from the Mariana back arc basin, in the western Pacific, 3620-3727 m; and *Munida magniantennulata* Baba and Türkay, 1992, from the Lau Basin, 1806-2003 m. *Munidopsis subsquamosa* Hender-

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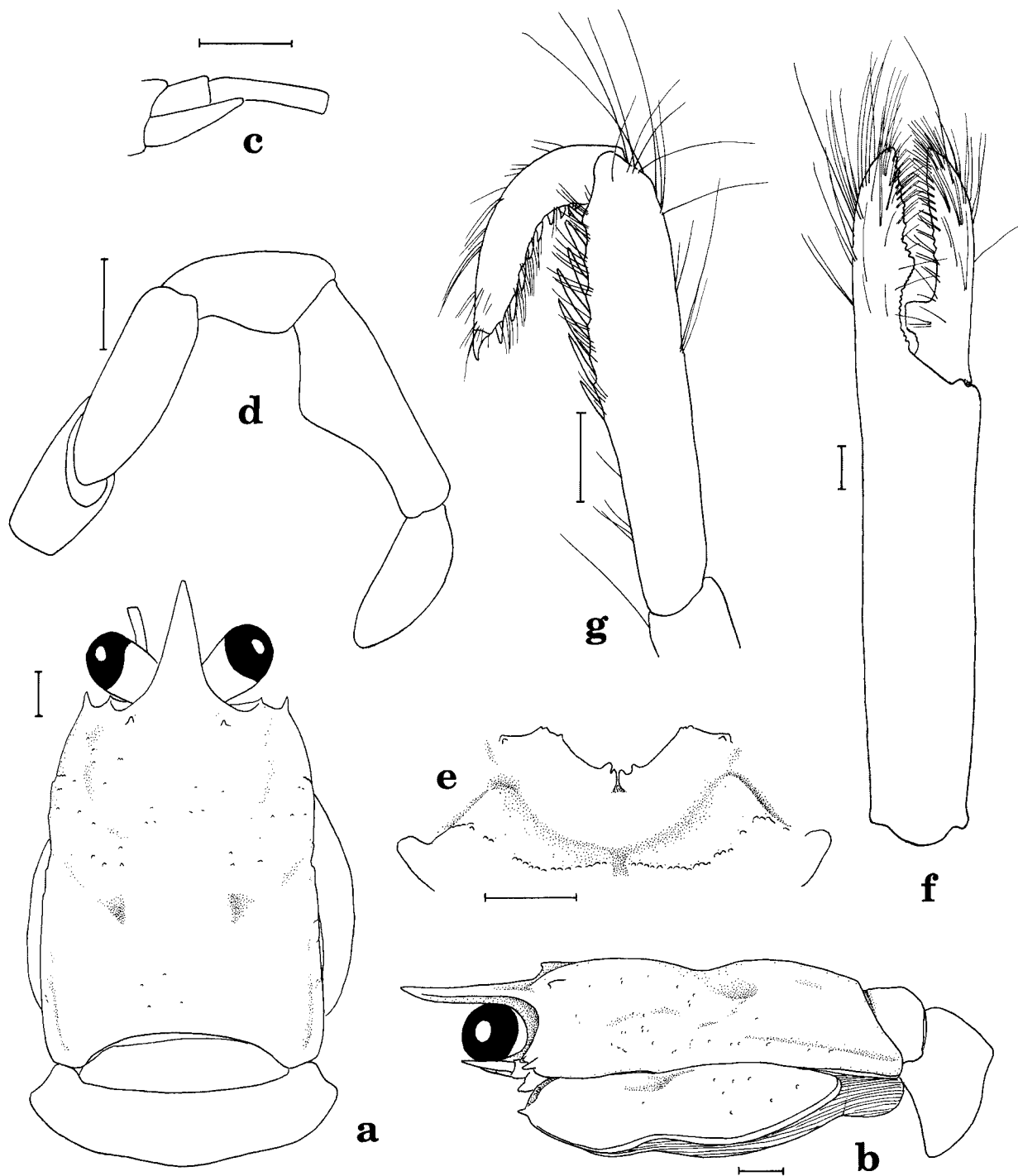


FIG. 1. — *Uroptychus bicavus* sp. nov., male holotype taken at Dive 18 from STARMER II Sta. 14 (MNHN Ga 2350): a, dorsal view, appendages omitted; b, same, posterior part of abdomen omitted, lateral view; c, left antennal peduncle, ventral view; d, endopod of right third maxilliped, setae omitted, lateral view; e, anterior part of thoracic sternum; f, distal segments of left cheliped, dorsal view; g, distal segments of left first walking leg, lateral view. Scales = 1 mm.

son, 1885, which was originally described from waters off Izu Island, Japan (HENDERSON, 1885), has also been recorded from the vent sites at the Galapagos Rift, 13° N, and 21° N in the eastern Pacific (VAN DOVER *et al.*, 1985); however, the true identity of the

vent specimens of that species still remains unresolved and is now being studied by J. W. AMBLER and K. BABA (unpublished). A study by one of us (KB) of the "Cidaris I" collection (Australia) reveals that *Munida magniantennulata* is known from a non-vent

area off the Central Queensland Shelf (BABA, unpublished). None of the chirostylids have been known from the vent areas.

The collection contains 28 specimens, divided among five species (two new species of Chirostylidae, and two new and one previously known species of Galatheidae). There is another small, incomplete specimen belonging to *Munidopsis* (Galatheidae) that was taken by the STARMER II at Sta. 14 (Kaiyo 87) — active chimney “White Lady”, 18° 50' S, 173° 29' W, Dive 16; it is unidentifiable and excluded from this report.

The material examined is deposited in the collection of the Muséum National d'Histoire Naturelle, Paris (MNHN). Part will be in the collection of the National Science Museum, Tokyo (NSMT). Measurements of the specimens shown under “Material”, indicate the postorbital carapace length.

Family CHIROSTYLIDAE

Uroptychus bicavus sp. nov.

(Fig. 1)

Material. — STARMER II Sta. 14 (Kaiyo 87) — North Fiji Basin, site active chimney “White Lady”, 18° 50' S, 173° 29' W, Dive 18, 2750 m, 13 Jul. 1989, Y. Nojiri observer: 1 ♂ 7.5 mm, holotype, MNHN Ga 2350.

Description. — Carapace, exclusive of rostrum, distinctly longer than broad, slightly widened posteriorly. Dorsal surface with median depression bordering anterior gastric and posterior cardiac regions, bearing scattered very small tubercles, particularly on anterior half. Rostrum less than half as long as postorbital carapace length, moderately broad triangular, slightly upturned apically. Gastric region inflated, with 2 anterior short spines directly behind each eye. Deep excavation lateral to anterior cardiac region. Lateral limit of orbit moderately angled, ending in small spine. Lateral margins divided into anterior and posterior halves by weak constriction somewhat anterior to midlength, anterior half weakly convex, with faint oblique denticulate ridge at midlength, posterior half nearly straight and very slightly divergent, with accompanying dorsal groove more distinct posteriorly. Anterolateral spine small, directed forward but slightly ventrad and laterad.

Pterygostomian flap with scattered small tubercles on posterior portion, anteriorly ending in small spine.

Abdomen glabrous, without dorsal ridges.

Eyestalks moderately broad, overreaching midlength of, but falling short of end of, rostrum; cornea

moderately dilated, length more than half that of remaining eyestalk.

Antennal peduncle unarmed, ultimate segment 3 times as long as penultimate one when measured along mesial margin, antennal scale as broad as penultimate segment, ending in proximal third of ultimate one.

Endopod of third maxilliped relatively long, distal 2 segments (dactylus + propodus) about as long as remaining segments combined; ischium with about 9 denticles on proximal three-fourths of mesial ridge; merus and carpus unarmed.

Third thoracic sternite half as broad as following sternite, moderately depressed, anterior margin deeply concave with median narrow notch flanked by 2 pairs of spines; anterolaterally with small spine on each side of surface. Fourth thoracic sternite relatively short, anterolateral margin about half as broad as preceding sternite, ventral surface with transverse line of tubercles.

Right cheliped missing. Left cheliped about 5 times as long as carapace (excluding rostrum), merus and carpus subcylindrical, chela somewhat depressed, all segments unarmed and nearly glabrous but fingers setose. Palm with subparallel lateral and mesial margins, 4 times as long as broad, shorter than (0.85 times as long as), and slightly broader than, carpus. Fingers slightly more than half length of palm, relatively broad, distally rounded, intermeshing each other with small teeth when closed; opposable margins tuberculate, nearly straight in distal half, with large proximal process of movable finger opposed to concave margin of fixed finger.

All walking legs detached from body; sparsely setose dorsally on merus, propodus and dactylus, thickly so along flexor margins of propodus and dactylus. Merus shorter than carpus and propodus combined. Propodus about 6 times as long as broad, slightly longer than carpus, bearing 7 or 8 slender movable spines on distal half of flexor margin (distal 2 paired, one of them mesial in position and hardly visible in lateral view). Dactylus slightly more than half length of propodus, strongly curved at point one-fourth from proximal end, bearing 10 moderately inclined spines obscured by dense setae, ultimate (distal) one largest, forming claw, penultimate one equidistant between ultimate and antepenultimate ones.

Etymology. — The specific name is a noun in apposition from the Latin *bi* (prefix meaning two) plus *cavus* (hollow), referring to the pair of excavations on the anterior cardiac region, characteristic of the species.

Remarks. — The presence of a pair of anterior gastric spines links this species to *U. nigricapillis* Alcock, 1901; however, the new species is distinctive in the carapace that is sparsely tuberculate in the anterior half and that has a deep excavation on either side of the anterior cardiac region, and in spination of the walking leg dactylus (in *U. nigricapillis*, the penultimate spine is close to the ultimate and subterminal in position). The gastric spines are also known to occur in some of the Madagascar specimens of *U. vandamae* Baba, 1988 (BABA, 1990: 949), which, however, is characterized by the smooth, dorsally nonexcavated carapace and two groups of spines on the walking leg dactylus, to mention the obvious distinctive differences.

Uroptychus thermalis sp. nov.
(Fig. 2)

Material. — STARMER I Sta. 4 (Kaiyo 87) — Site active chimney “White Lady”, 16° 59.50' S, 173° 55.47' W, 12-19 Jun. 1989, 2000 m: 1 ♂ 8.4 mm, holotype, MNHN Ga 2351.

Description. — Carapace, exclusive of rostrum, 1.15 times as long as greatest width. Dorsal surface with scattered short granulate ridges. Rostrum relatively broad triangular, less than half as long as postorbital carapace length, weakly curving dorsad distally, dorsal surface finely tuberculate. Lateral limit of orbit angled, without spine. Lateral margins divergent posteriorly, not smoothly but somewhat irregularly convex, bearing distinct inflation at about one-third from anterior end. Gastric region inflated, separated from cardiac region by deep concavity. Small depression on each side of anterior cardiac region. Branchial region with small scale-like tuberculate ridges along lateral margin, posterolaterally ridged. Anterolateral spine small.

Pterygostomian flap smooth, anteriorly ending in very small spine.

Abdomen smooth, glabrous, not ridged.

Eyestalk relatively short and broad, ending in distal one-third point from tip of rostrum, cornea slightly dilated, nearly as long as remaining eyestalk.

Antennal peduncle unarmed, relatively slender, ultimate segment 2.5 times as long as penultimate one when measured in mesial line; antennal scale nearly as broad as, and overreaching end of penultimate segment, ending in proximal tenth of ultimate segment.

Endopod of third maxilliped slender, lacking spines on merus and carpus, distal 2 segments (dacty-

lus + propodus) about as long as remaining segments combined. Carpus relatively long. Merus with subparallel dorsal and flexor margins. Ischium with 10-12 obsolescent denticles on mesial ridge.

Third thoracic sternite moderately depressed, relatively broad (about half as broad as following sternite), anterior margin concave, with median notch flanked by median spines, surface with small low blunt spine near anterolateral end. Fourth thoracic sternite with anterolateral margin relatively narrow with 1 or 2 blunt processes, ventral surface with transverse (posteriorly convex) line of tubercles.

Cheliped 6 times as long as postorbital carapace length, relatively slender, granulose on merus and carpus, smooth on palm and fingers. Merus with distomesial spine, 0.68 times as long as, and nearly equally broad as carpus. Carpus 1.3 times as long as palm. Palm about 5 times as long as broad, 1.6 times as long as dactylus, distinctly wider than carpus. Fingers slightly gaping, not crossing distally, ornamented with relatively short setae; movable finger moderately curved, ending in very small papilla-like spine, opposable margin with 2 molar-like processes on proximal half, distal one situated about at midlength, longer than proximal one, conical; proximal process truncate, ending in tuberculate face; opposable margin of fixed finger with single conical process slightly proximal to level of opposite distal spine.

Walking legs relatively slender. Meri unarmed, glabrous, successively diminishing in size from second to fourth pereopods. Carpi glabrous, unarmed, nearly as long as propodus on first leg (P2), shorter on second and third legs (P3, P4). Propodi widened medially, with flexor margin straight on proximal half, distal half subprehensile with dactylus bearing 2 groups of slender spines (5 proximal and 1 distal on first walking leg, 4 proximal and 1 distal on second and third). Dactyli gradually narrowing toward subterminal tooth and then strongly narrowed distally, ending in somewhat larger terminal tooth. Prehensile margins formed by propodus and dactylus largely gaping and setose.

Etymology. — The Latin *thermalis* (adjective, of warm springs) refers to the active thermal vents areas from which the species has been taken.

Remarks. — The dactylus of the walking legs bearing only two distal spines (one terminal, and the other subterminal), one of the characteristics of this species, is also possessed by *U. sternospinosus* Tirmizi, 1964, from the Maldives, *U. pilosus* Baba, 1981, from Japan, and *U. bispinatus* Baba, 1988, from the Philippines. The new species is most closely related

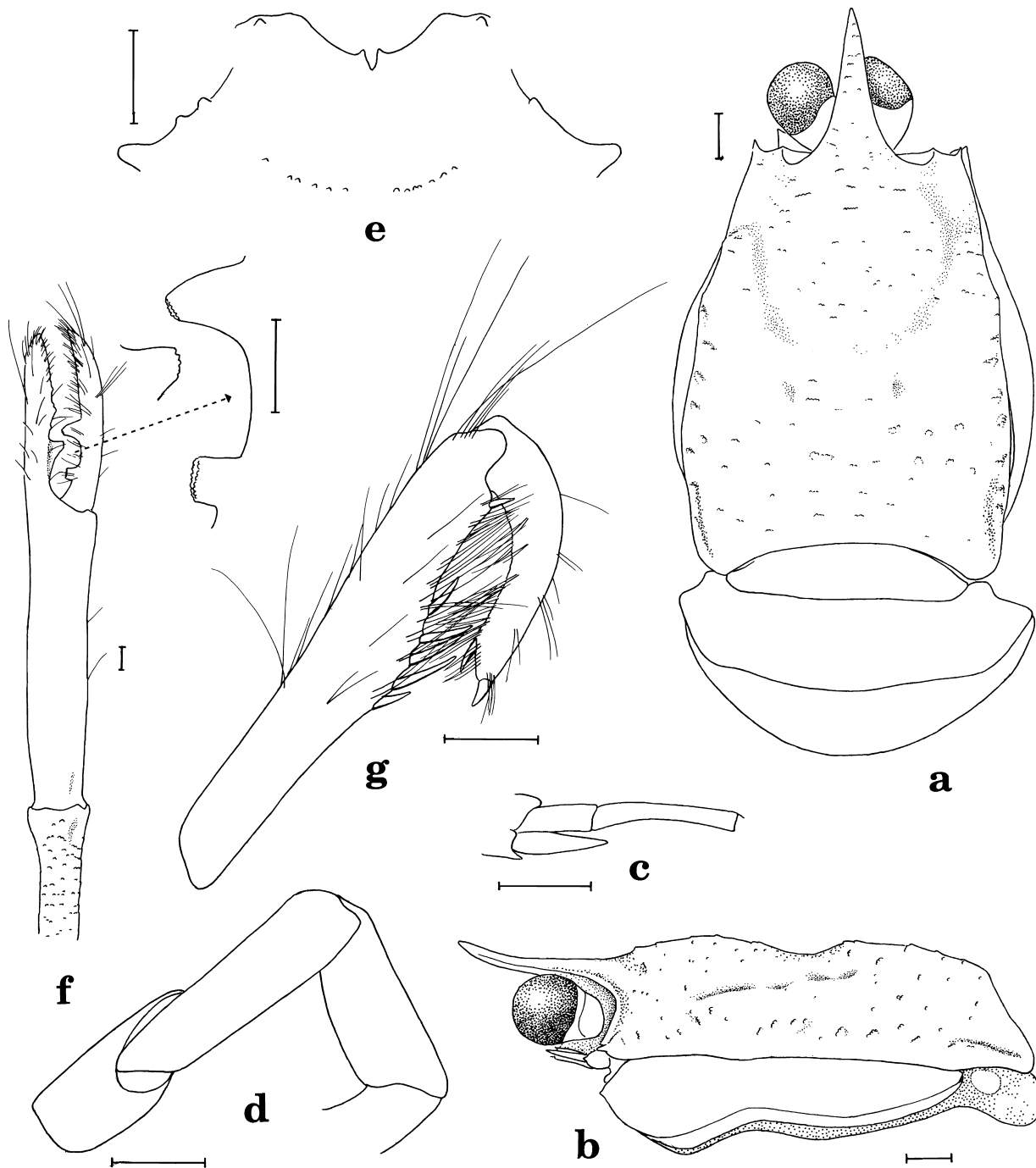


FIG. 2. — *Uroptychus thermalis* sp. nov., male holotype from STARMER I Sta 4-3 (MNHN Ga 2351): a, dorsal view, appendages omitted; b, cephalothorax, lateral view; c, left antennal peduncle, ventral view; d, endopod of right third maxilliped, setae and distal two segments omitted, lateral view; e, anterior part of thoracic sternum; f, left cheliped, proximal segments omitted, dorsal view; g, distal two segments of right first walking leg, lateral view. Scales = 1 mm.

to *U. sternospinosus* also in having the short antennal scale and the granulate striae on the carapace. In the latter species, however, the third thoracic sternite has no spine on the anterior median margin, the gastric region bears a pair of well-developed spines di-

rectly behind the eyes, and the fourth thoracic sternite bears a prominent lateral process.

Uroptychus pilosus and *U. bispinatus* are rather remote from the new species. *Uroptychus pilosus* is characterized by the setose body and appendages,

elongate eyestalks, and the two distal dactylar spines of the walking legs being close to each other; *U. bispinatus* is distinguished from the new species by the smooth carapace and chelipeds, and the propodus of the walking legs bearing on the prehensile margin two prominent spines opposed to the dactylar end.

Family GALATHEIDAE

Munida magniantennulata Baba and Türkay, 1992

Munida magniantennulata BABA and TÜRKAY,
1992: 204, figs. 2, 3.

Material. — BIOLAU 89 Sta. 2, Vailili, North of Hine Hina, Lau Basin, 23°13' S, 176° 38' W, 1750 m. — BL08, 20 May 1989, observer D. Jollivet: 1 ♂ 8.6 mm, MNHN Ga 2352.

Remarks. — This is the third specimen from the active thermal vent areas in the Lau Basin, the two previous specimens having been collected by the German "Sonne" from the Valu-Fa-Ridge (BABA and TÜRKAY, 1992). The following features displayed by this specimen differ from those of the type, but may be regarded to fall within the limits of variation: the anterior transverse ridge and sparse coarse setae are distinct on the second and third abdominal tergites, the former bearing five small spines; the merus of the third maxilliped bears only one prominent spine on the midpoint of the mesial margin, lacking the two distal spines as in the types; the ventral distomesial angle of the basal segment of the antennal peduncle bears a more pronounced spine not reaching the end of the second antennal segment; the walking legs are very setose on the mesial face except for the dactylar segments, the merus on the first walking leg bearing a row of spines along the whole ventral margin; the telson bears a fringe of lateral marginal coarse setae which seems to represent a male character, as it is discernible in several but not all species of *Munidopsis* (BABA, 1988: 153, Figs. 59, 63) as well as in a number of *Munida* species (de SAINT LAURENT, unpublished).

The male gonopods are present on the first and second abdominal segments in this specimen. The absence of pleopods from the first abdominal segment in the male holotype (BABA and TÜRKAY, 1992) may in all probability be explained by the immature size. This species is characterized most obviously by the presence of the unusually large antennal basal segment and the well-swollen lateral hepatic region bearing a spine at midpoint.

Munidopsis lauensis sp. nov.

(Fig. 3)

Material. — BIOLAU 89 Sta. 1, Valufa Ridge, Hine Hina, Lau Basin, 22° 32' S, 176°43' W, 1750 m — BL 01, 13 May 1989, observer D. Dinet: 1 ♂ 7.8 mm, 1 ovig. ♀ 13.4 mm, 2 ♀ 6.4, 8.8 mm, MNHN Ga 2353. — BL02, 14 May 1989, observer A. M. Alayse: 3 ovig. ♀ 11.2, 10.0, 11.5 mm, MNHN Ga 2354. — BL03, 15 May 1989, observer G. Barbier: 1 ♂ 10.8 mm, holotype, MNHN Ga 1924; 1 ♀ 12.6 mm, NSMT; 1 ♂ 4.4 mm, 1 ♀ 5.1 mm, MNHN Ga 2355. — PL05, south of Hine Hina, 17 May 1989, observer A. Fiala: 1 ♂ 4.6 mm, MNHN Ga 2356.

STARMER II Sta. 4 (Kaiyo 87) — North Fiji Basin, site active chimney "White Lady", 16° 59.50' S, 173° 55.47' W, Dive 20, 2000 m, 15 Jul. 1989, S. Ohta, observer: 1 ♂ 9.7 mm, 1 ovig. ♀ 12.4 mm, 1 ♀ 8.5 mm, MNHN Ga 1925.

Types. — The larger male taken at BL03 (MNHN Ga 1924) is selected as the holotype, and the remainder are paratypes.

Description. — Carapace, excluding rostrum, 1.16-1.29 (average 1.24) times as long as broad, moderately arched from side to side, anterior and posterior bifurcations of cervical groove distinct, mid-cervical groove dividing carapace equally into anterior and posterior halves, anterior cardiac region with weak but distinct depression. Rostrum triangular, about one-third as long as remaining carapace; carinate dorsally, nearly straight or feebly upcurved in profile, lateral margin with fine serration often obscured. Frontal margin strongly oblique with usually acuminate (rarely very small) antennal spine directly lateral to eyestalk. Gastric region somewhat dilated, with transverse rugae occasionally feebly tuberculate, often obsolescent but 2 longer anterior rugae on epigastric region consistent. Anterior branchial region also with rugae, lateral margin with distinct anterior spine often followed by a few teeth. Posterior branchial region with interrupted rugae more pronounced than those on anterior branchial region, lateral margin with small, often obsolescent, anterior spine. Posterior margin weakly concave, preceded by slightly elevated submarginal ridge.

Pterygostomian flap with oblique rugosities more distinct posteriorly, anteriorly ending in rounded margin or in very small spine.

Abdomen unarmed; second to fourth segments with sparsely setiferous, rather rounded transverse ridge about at midlength, preceded by concave trough more distinct on second segment, weaker on third and fourth segments, posterior half of each ter-

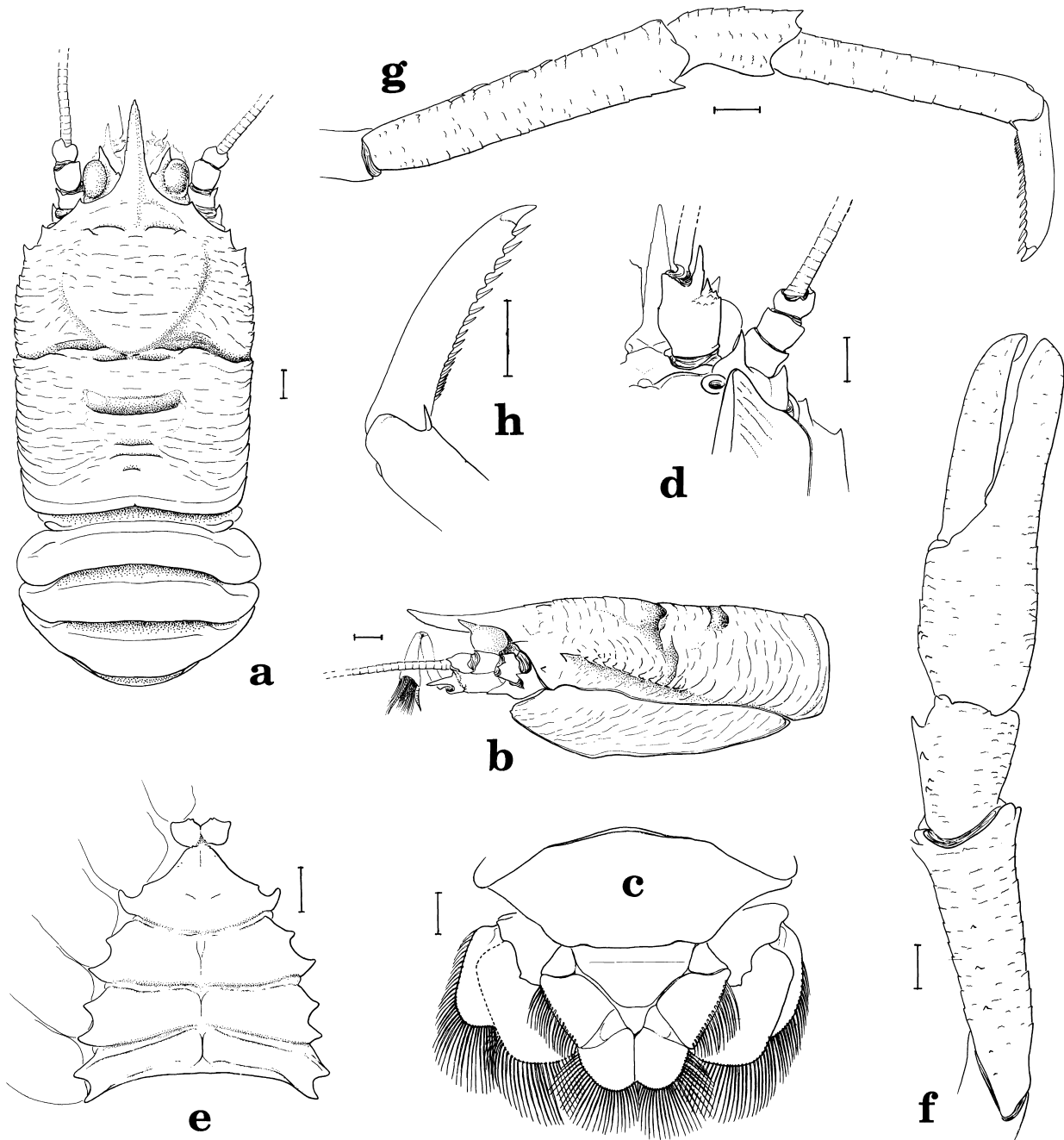


FIG. 3. — *Munidopsis lauensis* sp. nov., male holotype taken at BL03 from BIOLAU 89 Sta. 1 (MNHN Ga 1924): a, dorsal view, thoracic appendages omitted; b, cephalothorax, lateral view; c, sixth abdominal segment and tailfan; d, anterior part of cephalothorax, showing antennular and antennal peduncles, ventral view; e, thoracic sternum; f, right cheliped, dorsal view; g, right first walking leg, lateral view; h, dactylus of same, lateral view. Scales: 1 mm.

gite with medially interrupted shallow transverse furrow (rarely obsolescent on fourth segment); fifth and sixth segments smooth, tergite of latter without posterolateral flap. Telson composed of 10 plates, length-width ratio 0.84 ± 0.026 , $n = 12$; posterolateral margins strongly convergent posteriorly in larger specimens, with fringe of long coarse setae in male.

Eyes moderate in size; well exposed smoothly ovate cornea cupped within broad-based ocular peduncle extended anteriorly into acute spine bearing straight forward lateral margin and accompanied by smaller mesioventral spine; peduncle slightly movable (in small specimens, cornea relatively small and anterior spine directed obliquely laterad).

Basal segment of antennular peduncle, exclusive of spines, somewhat longer than broad, distolateral inflation bearing tubercular processes often developed into spines (especially middorsal one); distolateral spine well developed; crenulate scalloped ventrodorsal margin ending mesially in small but often prominent, slightly dorsal, spine. Antennal peduncle having basal segment with well-developed sharp distoventral and smaller distolateral spines; second segment with small distolateral spine, third and fourth segments unarmed.

Third maxilliped with relatively broad endopod. Ischium nearly or barely half as long as merus when measured in midlateral line, mesial ridge with 23-24 denticles. Basis with 1 mesial denticle. Merus with a few small spines (often obsolescent) on flexor margin, and another small spine at distodorsal margin. Dactylus ending in rounded distal margin with brush of setae, equally long as broad, distal end barely reaching proximal end of ischium when folded together with carpus and propodus on merus-ischium.

Sternite at base of third maxilliped relatively narrow, width slightly more than one-third that of following sternite; broader anteriorly than posteriorly, occasionally divided by mid-longitudinal groove into left and right parts; anterior margin bearing 2 lobes distinctly or indistinctly tuberculate, anterolateral angle ending in blunt but distinct process on each side.

Epipods absent from all pereopods.

Chelipeds 1.2-2.1 times as long as postorbital carapace length; with weakly developed, setose rugosities tending to be tuberculate in longitudinal lines; long plumose setae more dense ventrally along distomesial margin of merus, distal margin of carpus, and mesial margin of palm. Ischium with small distodorsal spine. Merus twice as long as carpus when measured in dorsal midline, bearing 3 terminal spines (mesial, ventral and lateral), mesial one rather pronounced, remainder occasionally very small. Carpus with short mesial marginal spine at widest portion about one-third from distal end, often with additional small spines dorsolaterally. Palm distinctly shorter than movable finger (dactylus), 1.2-1.5 times as long as broad, mesially with a few tubercles often pronounced into spiniform processes or obsolescent. Fingers directed somewhat laterad, spooned, opposite margins entire, closely fitted, lacking intermeshing teeth at tips.

Walking legs relatively long and slender; first walking leg reaching or overreaching end of cheliped; corresponding segments of respective legs of about same length, except for meri decreasing posteriorly. Merus mesially setose, with dorsal spines usually

small, often tuberculate; flexor margin also with obsolescent tubercular processes in addition to short but distinct distal spine. Carpus with distinct spine on distodorsal corner, dorsolaterally with feebly tuberculate low ridge parallel to dorsal margin. Propodus 1.5 times as long as dactylus, obliquely flattish dorsal surface bordered laterally by rounded longitudinal ridge often bearing row of scale-like tubercles, mesially by more sharp ridge; distodorsally and ventrally with sparse long coarse setae, ventrodorsally with pair of slender movable spines flanking distomedian groove. Dactylus somewhat uniformly broad, flexor (ventral) margin nearly straight, with 11-17 teeth decreasing in size proximally, each accompanied by seta-like spine; ultimate tooth and seta-like spine not remote from curved corneous terminal claw.

Ova $1.7 \times 1.8 - 2.0 \times 2.1$ mm in diameter.

Etymology. — The name indicates the locality of the new species.

Remarks. — The new species belongs to the *Orophorhynchus* group of ALCOCK (1901: 249) which is characterized by the chelipeds shorter than the body the first walking legs fully reaching the end of the cheliped and eye peduncles fixed or hardly movable, extending beyond the cornea with a mesial spine. It is most closely related to *Munidopsis ceratophthalmus* Alcock, 1901, from the Andaman Sea, in the unarmed dorsal surface of the carapace (particularly gastric region) and the absence of epipods on the pereopods, and in the spooned fingers of the chelipeds. However, in Alcock's species, the eyestalk is definitely fixed to the adjacent region, with no mobility, the eyespine is long and slender, more than half the length of the rostrum and its basal portion relatively narrow; the cheliped bears on the merus a distal ring of four spines and a longitudinal dorsal row of small spines, and the ischium bears a strong distomesial spine; the meri of the walking legs (especially the first and second) have a prominent distal spine on the flexor margin.

Munidopsis starmer sp. nov.

(Figs. 4, 5)

Material. — STARMER II Sta. 14 (Kaiyo 87) — North Fiji Basin, site active chimney "White Lady", 18° 50' S, 173° 29' W, Dive 18, 2750 m, 13 Jul. 1989, Y. Nojiri observer: 1 ♀ 31.4 mm, holotype, MNHN Ga 1926; 1 ♂ 26.7 mm, 3 ovig. ♀ 28.1-35.2 mm, 1 ♀ 33.3 mm, MNHN Ga 2362; 1 ♂ 28.5 mm, NSMT Cr 11267. — Dive 19: 1 ♀ 9.3 mm, MNHN Ga 2357. — Dive 20: 2 ♀ 24.7, 33.4 mm, MNHN Ga 2358.

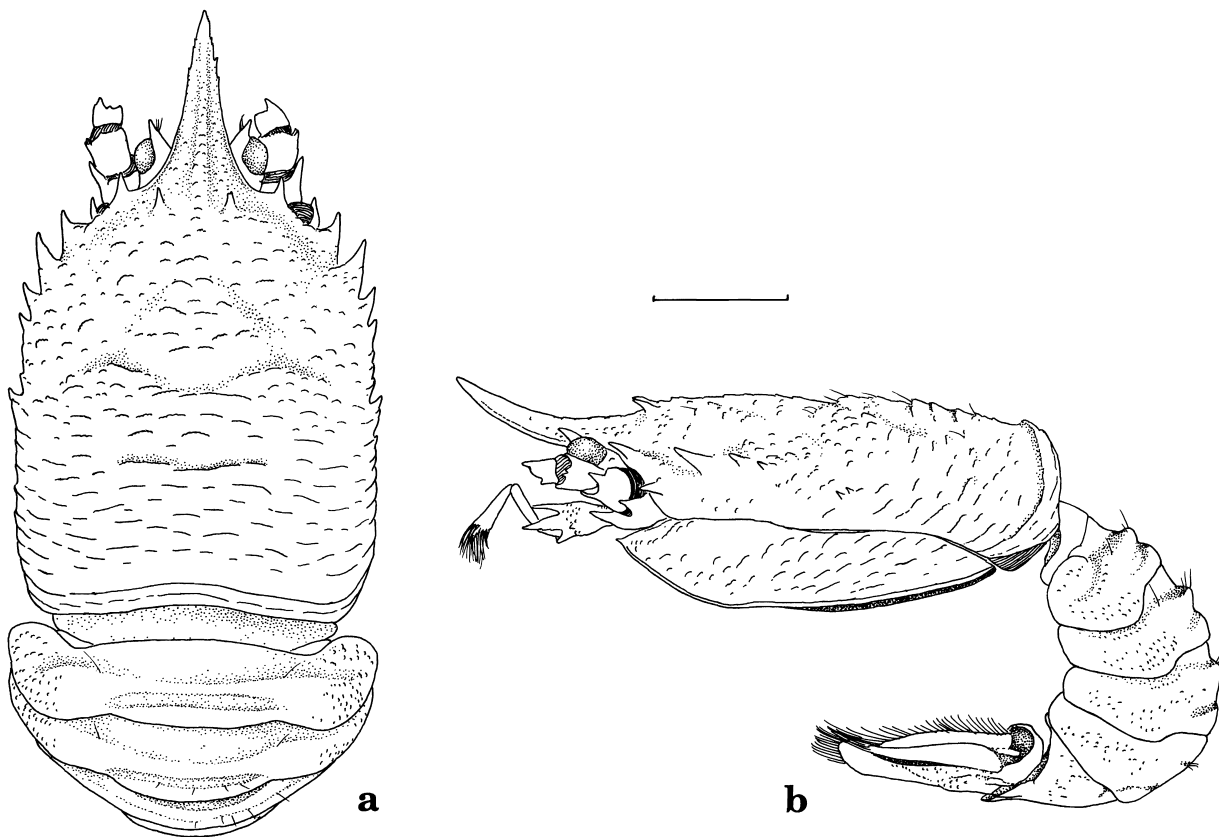


FIG. 4. — *Munidopsis starmer* sp. nov., non-ovigerous female holotype taken at Dive 18 from STARMER II Sta. 14 (MNHN Ga 1926): a, dorsal view, thoracic appendages omitted; b, lateral view. Scale = 10 mm.

Types. — The non-ovigerous female (31.4 mm) taken by Dive 18 (MNHN Ga 1926) is selected as the holotype, and the remainder are paratypes.

Description. — Carapace, exclusive of rostrum, 1.12-1.20 times as long as broad, moderately arched transversely, with distinct bifurcated cervical grooves. Rostrum horizontal or curving dorsad, barely half (0.35-0.40 times) as long as remaining carapace, moderately broad triangular, lateral margin with denticles (rarely obsolescent) at most on distal half, dorsal surface with tiny tubercles and sparse coarse setae, both rarely obsolescent; bearing dorsal carina merging into median tubercles on anterior gastric region. Strongly oblique frontal margin sweeping to antennal spine followed ventrally by oblique margin leading to distinct anterolateral spine, dorsally by granulate carina. Gastric region moderately inflated, with posterolateral depression on each side defining triangular subregion including meso-metagastric area, pair of epigastric spines followed by scale-like but tuberculate, elevated rugae bearing sparse short setae. Cardiac region with transverse moderate elevation preceded and flanked by distinct troughs. Anterior branchial region with scattered moderate-sized

dorsal tubercles, and 3 or 4 (rarely 2) successively diminishing lateral spines occasionally accompanying a few spinules ventral to them and/or another few between level of marginal spines and linea anomurica. Posterior branchial region with distinct anterolateral spine (often doubled) followed by interrupted, oblique and transverse elevated rugae, some of them with tendency to continue across cardiac region. Concave posterior margin preceded by narrow raised rim.

Pterygostomian flap with oblique interrupted rugae distinct posteriorly, obsolescent anteriorly, often with numerous tubercles on anterior lower portion, anterior margin angular, ending in small spine, anterodorsal margin tuberculate.

Abdomen unarmed; 2 transverse ridges with sparse short stiff setae on second, third and fourth segments, anterior ridge about at midlength on second segment, somewhat anterior on third and fourth, preceded by depression; posterior ridge expanding on tergite, preceded by concave trough; fifth and sixth segments without transverse depression, latter segment with protruded, rounded posterolateral flap somewhat raised posteriorly, distinctly overreaching

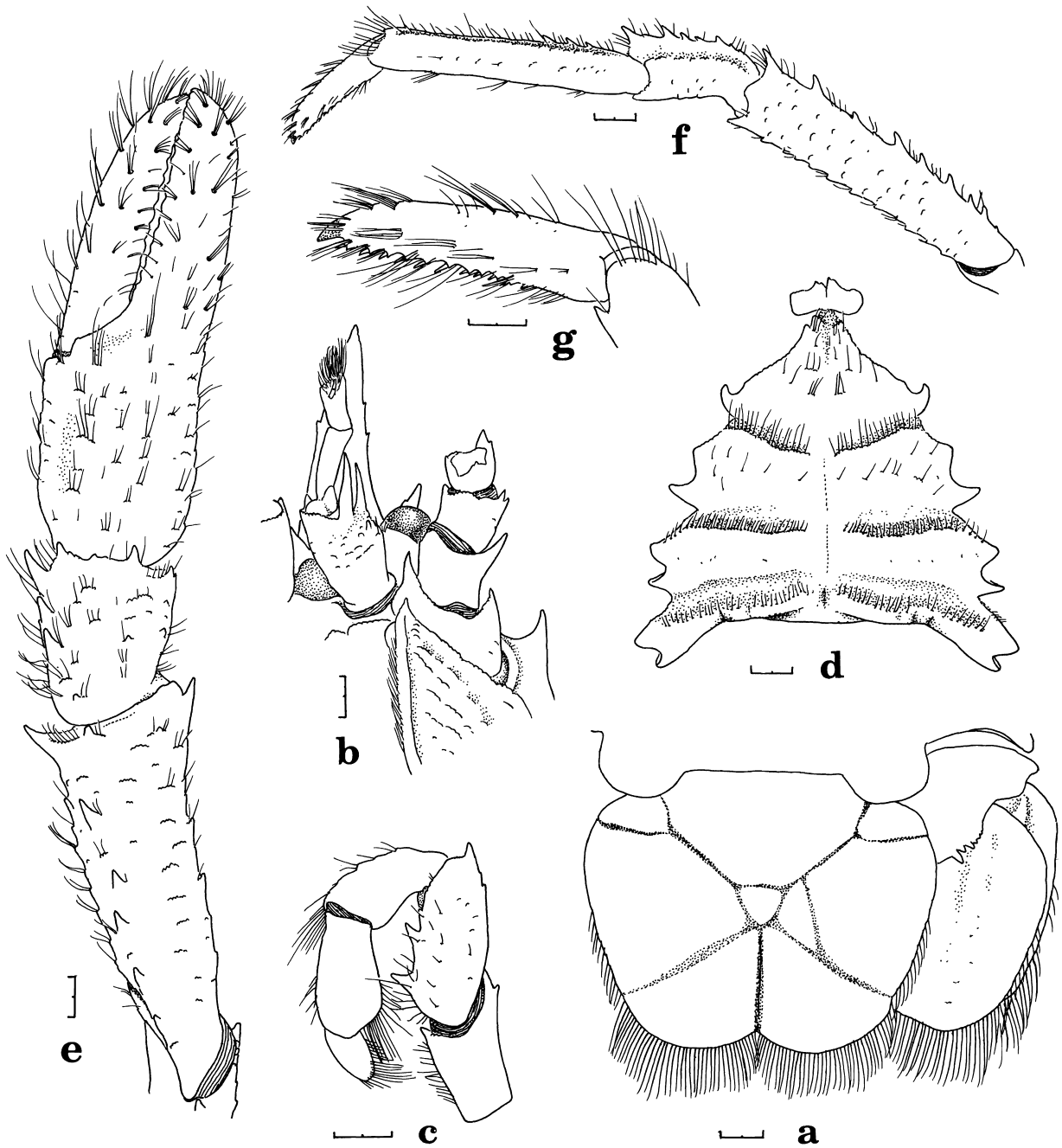


FIG. 5. — *Munidopsis starmer* sp. nov., non-ovigerous female holotype taken at Dive 18 from STARMER II Sta. 14 (MNHN Ga 1926): a, posterior portion of sixth abdominal segment and tailfan, left uropod omitted; b, anterior part of cephalothorax, showing antennular and antennal peduncles, ventral view; c, endopod of left third maxilliped, lateral view; d, thoracic sternum; e, right cheliped, dorsal view; f, left first walking leg, lateral view, g, dactylus of same, lateral view. Scales = 1 mm.

its posteromedian margin and overhanging anterior juncture between telson and protopod. Telson composed of 8 plates (rarely indistinctly 9 or 10), length-width ratio 0.79-0.84; in male, lateral margins strongly convergent posteriorly, midlateral plate fringed with long stiff setae in male.

Eyestalks of moderate size, slightly movable dorsoventrally; well-exposed, smoothly ovate cornea

cupped within broad-based ocular peduncle bearing sparse, obsolescent tubercles and extended into elongate mesiodorsal spine; spine directed somewhat laterad and obliquely dorsad at low angle, barely reaching midlength of rostrum.

Basal segment of antennular peduncle with minutely tuberculate dorsolateral carina distally continued into spine dorsal to larger distolateral spine; lat-

ter spine separated by groove bordering inflated lateral surface bearing small tubercles or spinules; distoventral margin scalloped, contiguous with small mesiodorsal spine. Antennal peduncle having first (basal) segment with both flat ventral process ending in acute spine and much smaller acute distolateral spine; second segment with short, stout distolateral spine, third segment with sinuous tuberculate distal margin often bearing small but distinct spine at distal corner, fourth segment with scalloped (often well produced) distal margin.

Third maxilliped having ischium about two-thirds as long as merus when measured in midlateral line, distodorsal and distoventral margins each with small spine, mesial crest with 22-25 corneous tipped spines somewhat diminishing in size distally. Basis with 2 spines in line with crest on ischium. Merus with 2 or 3 larger spines (often interspersed by small irregular sized spines or tubercles) on flexor (ventral) margin and small (often moderate-sized) spine on distodorsal margin. Distal 3 segments folded on ischium-merus; dactylus, exclusive of long setae, not reaching proximal end of ischium, relatively slender (twice as long as broad).

Third thoracic sternite well depressed mesially and posteriorly, about one-third as broad as fourth thoracic sternite, bearing 2 median anterior lobes finely crenulate, often well produced. Fourth thoracic sternite narrowed anteriorly, prominently raised (in ventral view) from level of preceding sternite, with anteromesial groove; anterolateral margin concave and finely crenulate; posterior surface somewhat excavated.

No epipods on pereopods.

Chelipeds 1.16-1.29 (average 1.24) times as long as carapace excluding rostrum, sparsely setose on surface, somewhat more so along mesial margin of merus and carpus, bearing numerous tuberculate, elevated scaliform ridges and rugosities. Ischium with mesial row of several spines on distal portion and 1 spine on distoventral margin. Merus with row of mesiodorsal spines, occasionally with another row on ventromesial margin, lateral margin with distinct distal spine followed by irregular tubercles and often by spines. Carpus with well-developed mesial spine somewhat proximal to juncture with palm, followed by a few spines slightly dorsal in position, distolateral and 2 distodorsal spines often distinct. Palm about 1.3 times as long as broad, shorter than movable finger, ventral surface less tuberculate, lacking distinct spine but often bearing pronounced tubercles on mesial margin. Fingers slightly gaping or straightly fitting to each other on opposable margins with very

low, broad, smooth elevations, bearing tufts of stiff setae; relatively broad, spooned, semicircular ends with fine low teeth not intermeshing, but that of fixed finger overlapping opposed one when closed.

Walking legs relatively long, first walking leg reaching end of cheliped; corresponding segments of respective legs nearly equal in length except for meri successively decreasing posteriorly. Merus with dorsal crest bearing row of spines decreasing proximally, ventrolateral margin with strong terminal spine followed by successively decreasing spines or tubercles, dorsolateral face with tuberculate, elevated ridges more pronounced lateroventrally, ventral face smooth in midline, mesially and laterally with row of tubercular, raised scales. Carpus with tuberculate dorsolateral ridge in parallel with row of dorsal marginal spines. Propodus more setose than proximal segments, especially on mesial face, about twice as long as dactylus, with 2 longitudinal tuberculate dorsal ridges, dorsomesial one often bearing a few spines, dorsolateral one in line with that of preceding segment; flexor margin lacking spines. Dactylus rather setose, relatively stout, ending in short, curved, corneous claw preceded by 13-19 successively decreasing (proximally) teeth on nearly straight flexor margin, each tooth bearing short stiff setae arising from its base.

Ova measuring 2.5-3.0 mm in diameter.

Etymology. — The species is named for the STARMER project by which the material was taken.

Remarks. — The small female paratype (cl = 9.3 mm) taken at Dive 19 has the rostrum with the marginal ridge more distinct and the carapace with less pronounced spinulation on the lateral margin. However, there is no other character to separate it from the remaining type series.

The new species strongly resembles *Munidopsis subsquamosa* Henderson, 1885, from Japan, in ornamentation of the body and the strong eyespine. Examination of the type of the latter species now deposited under BM 1888:33 in the Natural History Museum, London discloses that the known species is characterized by the presence of epipods on the cheliped, relatively short walking legs, wider telson (width-length ratio, 0.61-0.65, according to WILLIAMS and BABA, 1990), and the sixth abdominal segment having well-developed posterolateral lobes distinctly exceeding beyond the posteromedian margin, to mention the obvious differences from the new species.

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