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GLYPHOCRANGON FIMBRIATA, A NEW SPECIES OF CARIDEAN SHRIMP (CRUSTACEA: DECAPODA: GLYPHOCRANGONIDAE) FROM SIO GUYOT, MID-PACIFIC MOUNTAINS

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Abstract.—A new species of caridean shrimp, *Glyphocrangon fimbriata*, is described and figured on the basis of one female and one male specimen collected from Sio Guyot, Mid-Pacific Mountains, at depths of 1300–1312 m. The species resembles *G. sicaria* Faxon, 1893, and *G. vicaria* Faxon, 1896, but differs from them in the anterior second (lateral) carina being anteriorly produced as a large tooth, and the dactyls of the posterior three pairs of pereopods bearing a setal fringe on the distal part. The discovery of the new species confirms the existence of glyphocrangonid shrimp in the northern hemisphere of the Mid-Pacific.

The Mid-Pacific Mountains between the Mariana Islands and the Hawaiian Islands rise 2000 to 4000 m from the abyssal ocean floor at depths of 5000 to 6000 m. The tops of several guyots of the Mountains are covered with ocean sediments (e.g., Karig et al. 1970, Nemoto & Kroenke 1985). In spite of the possibility that there are particular benthic communities endemic to the guyots, only a few studies on the fauna have been done (e.g., Wilson et al. 1985). During January to March 1993, the Ocean Research Institute, University of Tokyo, conducted the KH-93-1 cruise of the R/V *Hakuho-Maru* to investigate the benthic fauna associated with these guyots. The material obtained from Sio Guyot (18°18′N, 171°06′E) using ORE type beam trawl, contained two specimens of a new species of glyphocrangonid shrimp, described and illustrated below. The type specimens are deposited in the Natural History Museum and Institute, Chiba (CBM). The abbreviation CL indicates the postorbital carapace length. The terminology for the carinae and spines on the carapace follows Holthuis (1971) and Chace (1984).

Glyphocrangon fimbriata, new species
Figs. 1–3

Material examined.—Holotype: CBM-ZC 214, ovig. female (CL 22.5 mm), Sio Guyot, Mid-Pacific Mountains, 18°16.05′N-18°15.87′N, 171°20.99′E-171°22.01′E, 1300–1312 m, KH-93-1 (R/V *Hakuho-Maru*), sta 7, 31 Jan 1993, ORE type beam trawl of 4 m span. Paratype: CBM-ZC 215, 1 male (CL 15.5 mm), collected with holotype.

Description.—Body (Fig. 1) moderately robust. Integument firm, without pubescence.

Rostrum (Fig. 1) strongly upturned anteriorly, overreaching anterior margin of scaphocerite (0.56 times as long as carapace in holotype and 0.72 times as long in paratype); dorsolateral margins with 2 pairs of subequal teeth, anterior pair situated at about level of proximal ⅓ of rostrum and posterior pair at level of posterior margin of orbit; dorsal surface concave, not septate, with median carina extending from apex of rostrum to level of anterior pair of lateral teeth; dorsolateral and ventrolateral mar-

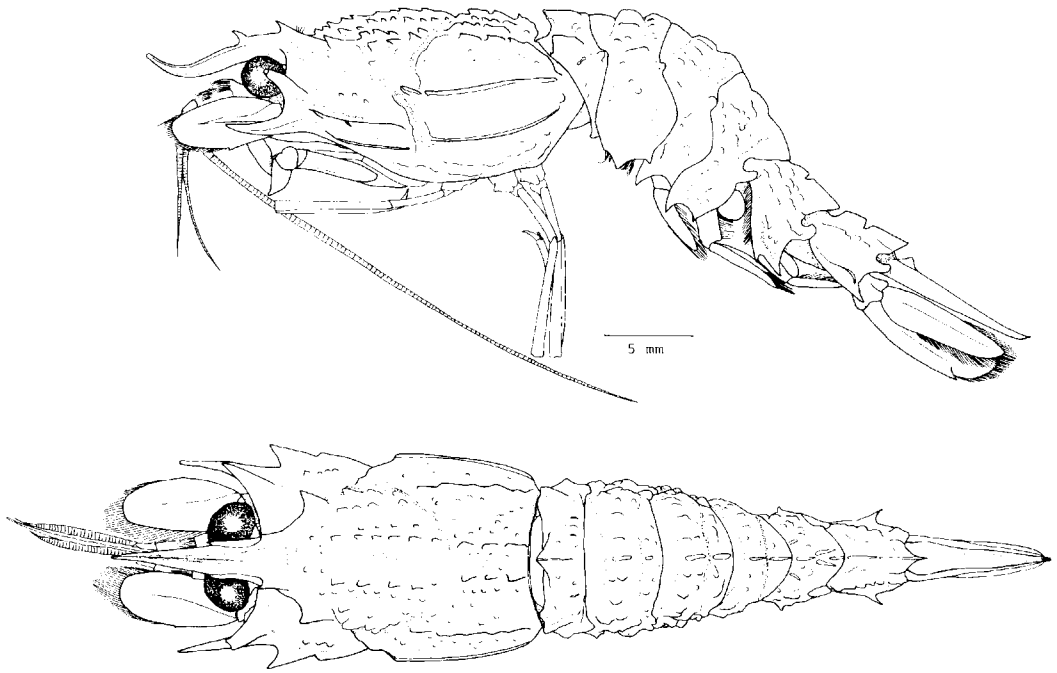

Fig. 1. *Glyphocrangon fimbriata*, new species. Holotype, ovig. female (CL 22.5 mm), entire animal in lateral view (top) and dorsal view (bottom).

gins sharply ridged; ventral surface flattened, with median carina in distal part.

Carapace (Fig. 1) with first (submedian) carina composed of forwardly directed, small, rather acute tubercles, 5–8 anterior to cervical groove, 3 posterior to that; median area between submedian carinae smooth except for few tubercles in anterior area, anteriormost situated medially or submedially. Anterior second (intermediate) carina composed of 3 tubercles and strong triangular tooth continuous with dorsolateral carina of rostrum; posterior second (intermediate) carina not entire, margin faintly eroded. Anterior third (antennal) carina not continuous with antennal spine, reduced to row of 3–5 small tubercles; posterior third (antennal) carina entire except for extremely anterior portion interrupted, not forming lobe or tooth anteriorly. Anterior fourth (lateral) carina not continuous with antennal spine, separated in 2 sections by distinct notch at about midlength of carina, anterior section forming moderately large tooth not reaching level of posterior margin of orbit, posterior section terminating anteriorly in blunt tooth; posterior fourth (lateral) carina entire. Anterior fifth (sublateral) carina prominent; posterior fifth (sublateral) carina less distinct, interrupted posteriorly in few parts. Sixth (submarginal) carina less distinct, separated into some sections. Space between anterior first and second carinae with 2 rows of tubercles; space between posterior first and second carinae with row of tubercles close to first carina, and scattered tubercles; spaces between posterior parts of second, third and fourth carinae smooth except for few small tubercles. Antennal spines unarmed marginally, more than ¾ as long as, and diverging more than branchiostegal spines. Branchiostegal spines overreaching level of proximal segment of antennular peduncle, very slightly divergent.

Abdomen (Fig. 1) with teeth and tubercles low, blunt, or rounded. First somite with

some longitudinally elongate tubercles along posterior margin and 1 strong tubercle slightly produced beyond anterolateral margin of tergum; median carina thick, with sharply ridged dorsal margin, overhanging anterior section of first somite. Median carina on each somite posterior to first divided into anterior and posterior sections by blunt notch in second to fourth somites and V-shaped incision in fifth and sixth somites. Fifth somite with posteriorly divergent submedian carina on posterior half. Posterior margins of fourth to sixth somites convexly produced. Pleuron of first somite tapering anteroventrally to blunt point, and those of second to fifth somites with 2 ventral teeth; teeth on second somite directed ventrally, anterior tooth slightly larger than posterior tooth; teeth on third to fifth somites directed posteroventrally, anterior tooth distinctly stronger than posterior tooth in third and fourth somites, and weaker than posterior one in fifth somite. Sixth somite with posteriorly divergent dorsal margin; pleuron with strong posteroventral tooth directed posteriorly. Telson (Fig. 1) elongate triangular, gradually tapering to sharp point, 0.65 times as long as carapace, posterior part upturned; dorsolateral margin sharply ridged; dorsal surface concave, with strong, acute median tubercle proximally.

Thoracic sternite deeply depressed, unarmed. Abdominal sternites unarmed.

Eye (Fig. 1) moderately large, with pigmented cornea.

Antennule (Fig. 2A) with peduncle falling slightly short of anterior margin of scaphocerite; proximal segment with stylocerite showing as rounded lobe; distal 2 segments, combined, subequal in length to proximal segment, intermediate segment obscured by long setae dorsally. Antennular flagella (Fig. 1) distinctly longer than peduncle.

Scaphocerite (Fig. 2B) ovate, 0.5 times as long as carapace and 1.65 times as long as broad, with small lateral tooth slightly posterior to level of midlength, lateral margin proximal to lateral tooth bearing short setae. Carpocerite falling somewhat short of distal margin of blade.

Mouthparts as usual in genus (Fig. 2C–G). Third maxilliped (Fig. 3A–C) quite stout, not reaching beyond anterior margin of scaphocerite; distal 2 segments (Fig. 3B, C) with strong spines on ventromesial margin and mesial face, mesial face concealed by long setae; ultimate segment terminating in curved, sharply pointed apex; exopod with articulated distal lash.

First pereopod (Fig. 3D) incompletely subchelate; palm (Fig. 3E) narrowed distally in dorsal view, with tufts of stout setae mesially; carpus short, bearing setae dorsomesially; ischium with broad laminar expansion ventrally, distal margin bluntly pointed. Second pereopods with right member of pair (Fig. 3F) slightly longer and with more carpal articles than left (right with 26 in holotype, 27 in paratype; left with 21 in holotype, 23 in paratype); chela of each (Fig. 3G) barely as long as distalmost article of carpus, with palm somewhat flattened; fixed finger short, terminating in strong corneous spine; dactyl broad, terminating in 2 unequal corneous spines; ischium distinctly longer than merus, ventral margin somewhat expanded. Third pereopod (Fig. 3H) with dactyl slightly flattened, simple, 0.3 times as long as propodus, dorsolateral and dorsomesial margins of distal ⅔ with row of setae curved backward (Fig. 3I); carpus 0.7 times as long as propodus. Fourth pereopod (Fig. 3J) with dactyl similar to that of third pereopod, distal ⅓ with marginal setae (Fig. 3K); propodus with setae on dorsodistal margin and with row of scattered setae on dorsal and lateral surface; carpus 0.7 times as long as propodus, with short setae on extensor surface. Fifth pereopod (Fig. 3L) with dactyl almost similar to that of fourth pereopod, with dorsolateral marginal setae on distal ⅓ (Fig. 3M); propodus with setae on dorsodistal margin, lateral and dorsal surfaces nearly naked; carpus 0.7 times as long as propodus, without setae.

Branchial formula shown in Table 1.

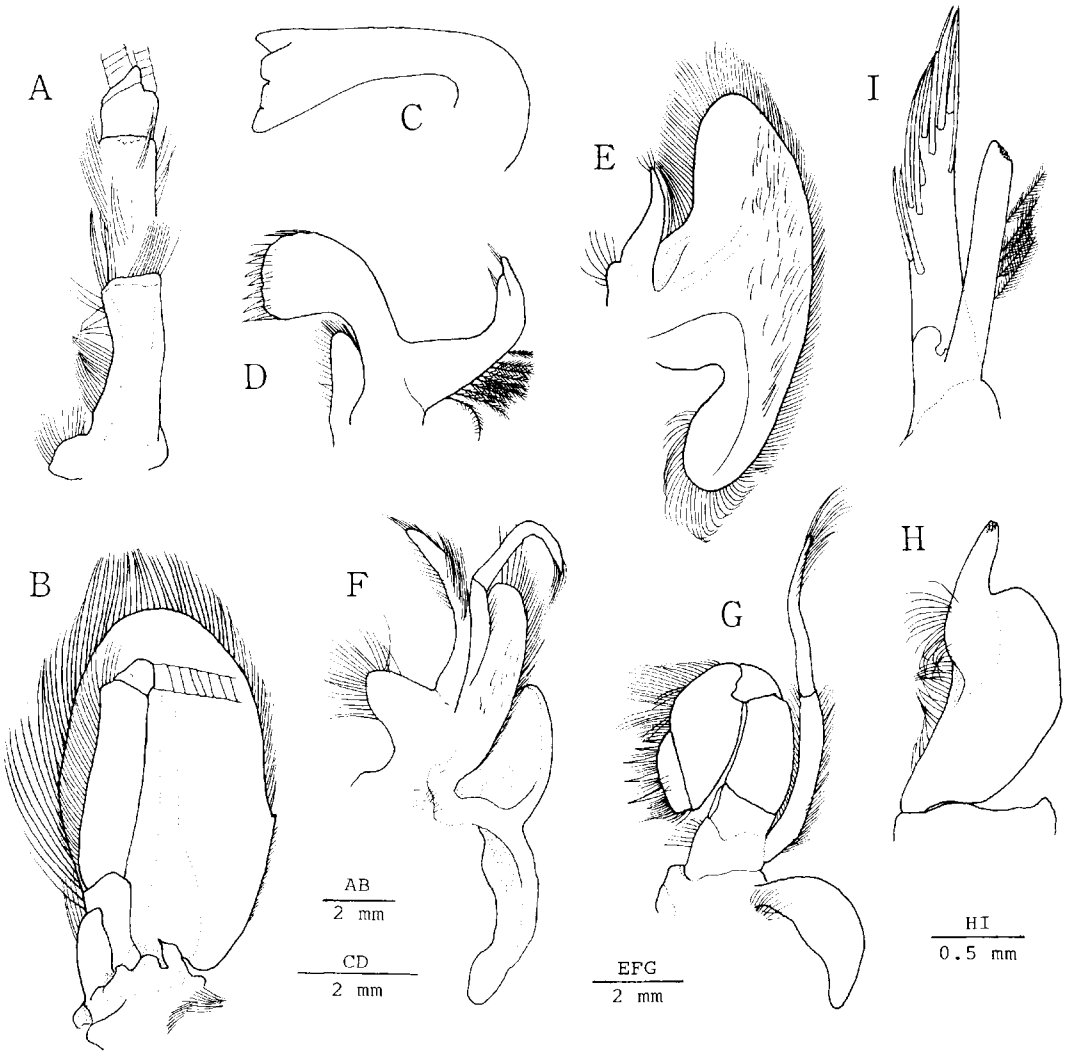

Fig. 2. *Glyphocrangon fimbriata*, new species. Cephalic, abdominal appendages, and mouthparts (left side). A–G, holotype, ovig. female (CL 22.5 mm); H, I, paratype, male (CL 15.5 mm). A, antennule, dorsal; B, antenna, ventral; C, mandible; D, maxillule; E, maxilla; F, first maxilliped; G, second maxilliped; H, endopod of male first pleopod; I, appendix masculina and appendix interna of male second pleopod.

Male first pleopod with endopod (Fig. 2H) slightly less than half length of exopod, mesial margin deeply concave; appendix interna well developed, defined mesially by wide U-shaped sinus. Male second pleopod with appendix masculina somewhat longer than appendix interna, bearing more than 20 long spines (Fig. 3I). Uropod (Fig. 1) not reaching posterior end of telson; exopod equal in length to endopod, with faint transverse suture, lateral margin convex, terminating posteriorly in acute tooth.

Eggs large, ovate, 3.3 × 2.4 mm, 26 in number.

Coloration (preserved in 10% buffered formalin).—Body entirely pale orange, distal part of rostrum and telson, and margins of carinae darker. Cornea of eye light brown. Eggs reddish yellow.

Habitat.—Sio Guyot is an exceptionally

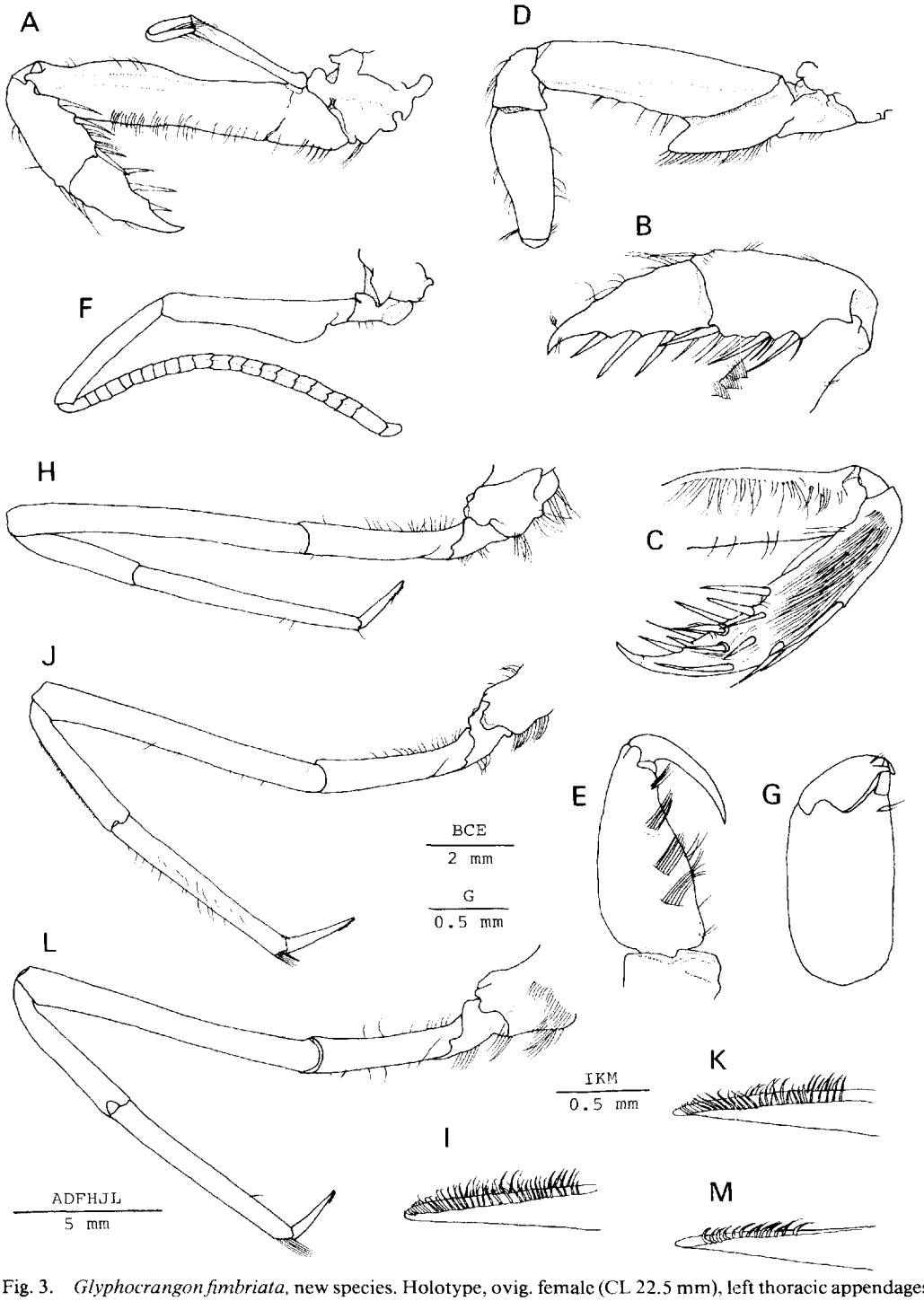

Fig. 3. *Glyphocrangon fimbriata*, new species. Holotype, ovig. female (CL 22.5 mm), left thoracic appendages. A, third maxilliped, lateral; B, same, distal two segments and distal part of antepenultimate segment, lateral; C, same, mesial; D, first pereopod, lateral; E, same, chela, dorsal; F, second pereopod, lateral; G, same, chela, dorsal; H, third pereopod, lateral; I, same, distal part of dactyl, lateral; J, fourth pereopod, lateral; K, same, distal part of dactyl, lateral; L, fifth pereopod, lateral; M, same, distal part of dactyl.

Table 1.—*Glyphocrangon fimbriata*, new species. Branchial formula.

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	–	–	–	1	1	1	1	1
Arthrobranchs	–	–	2	1	1	1	1	–
Podobranchs	–	–	–	–	–	–	–	–
Epipods	1	1	–	–	–	–	–	–
Exopods	1	1	1	–	–	–	–	–

large guyot situated at the western edge of the Mid-Pacific Mountains. The summit is divided into two flat-topped areas covered with pelagic sediment (Nemoto & Kroenke 1985); the northern summit, 2820 km^2, is greater than the area of the Island of Oahu, Hawaiian Islands, at sea level, and the southern summit is 230 km^2. The sampling station where the types of the new species were collected is situated in the middle of the northern summit.

The silt attached to the end of the trawl was preserved with 10% buffered formalin for sediment analysis. The ignition loss of the silt, which was ashed for two hours in a muffle furnace at 500°C (Kuwabara 1987), was 2.1%. The median particle diameter of the grain-size distribution is 5ϕ. The seawater four meters above the bottom had a temperature of 3.33°C, a salinity of 34.56‰ and oxygen concentration of 1.80 ml/l; measurements were made by CTD (Sea-Bird Electronics, Inc.: Model SBE 911 plus) with rosette samplers (Niskin-type 121).

Etymology.—The Latin *fimbriata* (fringed) refers to the characteristic fringe of setae on dactyl of the third to fifth pereopods.

Distribution.—Known only from Sio Guyot; at depths of 1300–1312 m.

Remarks.—Chace (1984) reviewed the genus *Glyphocrangon* and provided a key to the 38 species then recognized. Following Chace's key, the present new species appears close to *Glyphocrangon sicaria* Faxon, 1893, and *G. vicaria* Faxon, 1896, both known from the eastern Pacific. The anterior second lateral carina on the carapace produced anteriorly as a strong tooth and the dactyls of the posterior three pairs of pereopods bearing marginal setae in the distal part distinguish immediately the new species from both *G. sicaria* and *G. vicaria*. Other than these characters, *G. fimbriata* differs from *G. sicaria* in the absence of rows of granules on each intercarinal space on the carapace between the posterior second and third lateral carinae and between the posterior third and fourth lateral carinae, and in having the antennal spine less divergent than the branchiostegal spine. Faxon (1895) (under the name of *Glyphocrangon nobilis*) and Wicksten (1979) mentioned that *G. vicaria* possesses transverse corrugations on the dorsal surface of the rostrum, which are lacking in the new species.

Subsequent to Chace's (1984) work, Kensley et al. (1987) described three species from eastern Australia, *G. holthuisi, G. lowryi,* and *G. navacastellum,* and Burukovsky (1990) further added one species, *G. waginii,* from the Sala-Y-Gomez Ridge, eastern Pacific. These four species do not show close affinity with the new species.

The biogeographical distribution of the previously known species of *Glyphocrangon* has been also reviewed by Chace (1984). The genus is well represented in the Indian Ocean and the Philippine region in the western Pacific. Regarding the Mid-Pacific in the northern hemisphere, however, only one unidentified species of the genus has been recorded from Agassiz Guyot (17°51'N, 178°25'E) by Wilson et al. (1985). It remains uncertain, however, whether the new species is conspecific with the species recorded

by Wilson et al. (1985). Further studies on each guyot of this poorly studied area are needed to prove the affinities and biogeographic distribution of the present new species.

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