

Ray
with all my
thanks for all
the help you
have been to my research
JW

**Two new species of *Microprosthema* from the Western Atlantic
(Crustacea: Decapoda: Stenopodidea)**

JOSEPH W. GOY and DARRYL L. FELDER†

Department of Biology, Texas A&M University,
College Station, Texas 77843, USA

† Department of Biology and Center for Crustacean Research,
University of Southwestern Louisiana, Lafayette, Louisiana 70504, USA

(Accepted 30 October 1987)

Two new species of shrimp in the genus *Microprosthema* are described and figured on the basis of materials collected recently from the tropical western Atlantic. Specimens of one, *Microprosthema manningi*, have been collected from Florida, Mexico, Belize and Old Providence Island. The other new species, *Microprosthema loensis*, was taken from a single site in the Florida Keys. *Microprosthema manningi* is closely related to the western Atlantic *M. semilaeve*, while *M. loensis* is closely related to the Indo-Pacific *M. scabricaudatum*. However, both new species can be distinguished by numerous morphological differences, as well as by coloration.

Collections over several years in the western Atlantic have provided some unique specimens that initially keyed to *Microprosthema semilaeve* but that varied from this species in coloration and spination. A specimen collected off Mexico in 1978 by one of us (DLF) had a yellow-green body coloration, which differed markedly from the characteristic red and white body coloration of *M. semilaeve*. While examining stenopodid material from the US National Museum of Natural History, Washington, DC and the University of Miami Marine Laboratory, Miami, Florida, one of us (JWG) found additional specimens morphologically similar to the Mexican specimen. Subsequently, while working together on a project to describe the decapod crustacean fauna of Looe Key, Florida, a single specimen of a *Microprosthema* was collected which differed both from *M. semilaeve* and the other specimens mentioned above. Specimens described herein represent type material of two new species of *Microprosthema* deposited in the National Museum of Natural History (USNM), University of Miami Marine Laboratory (UMML) and the University of Southwestern Louisiana Systematics Collection (USLZ).

***Microprosthema manningi* sp. nov.**

Figs 1-4

Material examined. CARIBBEAN: ISLA DE PROVIDENCIA (OLD PROVIDENCE ISLAND), approx. 13°25'N lat., 81°50'W long., sta. 30-38, shore, reef and tide pool collecting, W. L. Schmitt coll., 6 Aug. 1938, identified as *Stenopus semilaevis* by W. L. Schmitt, USNM 77865, male (Paratype); USNM 77866, male and female (Paratypes).

BELIZE: CARRIE BOW CAY, approx. 17°29'N lat., 88°10'W long., Stann Creek District, lagoon, in old conch shell, Apr. 1974, identified as *Microprosthema semilaeve*

by F. A. Chace, Jr. 1975, USNM 184497, female (Paratype); lagoon, depth 2–3 m, M. Carpenter coll., 21 Apr. 1975, identified as *M. semilaeve* by F. A. Chace, Jr. 1975, USNM 184511, male and female (Paratypes); near shore, in dead conch shell, R. B. Manning coll., 18 Apr. 1982, USNM 233998 female, ovigerous (Allotype), USNM 233997 male (Holotype); in dead conch shell, under dock behind cay, depth 1 m, D. L. Felder and R. B. Manning coll., 19 Apr. 1983, USLZ 2961, male (Paratype), voucher for color photo.

MEXICO: ISLA EN MEDIO, ESTADO DE VERACRUZ, lagoon NE of island, approx. 19°00'N lat., 96°00'W long., behind reef in hole in dead coral head, depth 1 m, sandy bottom, D. L. Felder *et al.* USL Tropical Field Exped. III-B coll., 20 June 1978, identified as '? *M. semilaeve*' by D. L. Felder, USLZ 2960, male (Paratype), voucher for color photo.

FLORIDA: KEY BISCAYNE, Bear Cut, approx. 25°50'N lat., 80°45'W long., G. Voss coll., 12 Mar. 1956, identified as *Stenopus semilaevis* by G. Voss, UMML 32: 989, male (Paratype).

Diagnosis. A moderately small stenopodidean shrimp, with subcylindrical, depressed body, with few spinous processes; carapace covered with numerous small spines and long simple setae, cervical groove indistinct; propodus of third pereiopod with distinct dorsal crista, numerous spinules along dorsal and ventral margins; surface of third pereiopod covered with minute scale-like structures, spinules on dorsal and ventral margins of carpus and merus; first and second pereiopods with scale-like structures on dorsal surface of carpus, spinules on dorsal and ventral margins of carpi and meri; first and third abdominal somites with anterior transverse ridge on dorsal surface; scaphocerite lobate with 6–10 very strong teeth on outer margin; scaphognathite of maxilla with anterior cleft on outer margin; mandible with fused, toothless, highly chitinized molar and incisor processes, middle segment of mandibular palp with three strong external spines; first maxilliped with 3-segmented endopodite; body coloration whitish or translucent off-white to yellow green, appendages whitish.

Description. HOLOTYPE: (male USNM 233997). Rostrum (Figs 1 A, B) short, deflexed slightly but extending beyond last segment of antennular peduncle, covered dorsally with long setae; dorsal margin with 5 strong spines, ventrally 1 spine, laterally without spines.

Carapace (Figs 1 A, B) covered with numerous anteriorly directed spinules, dorsally with numerous long setae; spinules slightly larger anterodorsally. Cervical groove indistinct. Large antennal, branchiostegal and hepatic spines present; 3 small pterygostomial spines present. Ventrolateral carapacial angle and branchiostegite rounded.

Abdomen (Fig. 1 A) broad, depressed, dorsally glabrous. First abdominal somite with anterior transverse ridge, dorsally with row of setae; pleura with anterior rounded tooth, posterior pleural margin rounded. Second somite with 3 tubercles on lateral margins of pleura, posterior pleural margin rounded. Third somite with strong anterior transverse ridge; 2 blunt lateral tubercles on pleura, rounded posterior pleural margin with 2 long setae. Last 3 abdominal somites ending with rounded pleura, 3 long lateral setae on pleural margins of fourth and fifth somites, 6 long lateral setae on margins of sixth somite. Posterior margin of last 3 abdominal somites each with 4 long setae. Each abdominal somite bearing strong ventral median spine; ventral surface of sixth somite glabrous.

Telson (Fig. 1 A) about as long as uropods, triangular. Dorsal surface with 2 longitudinal ridges, ending considerable distance before posterior margin, bearing 3

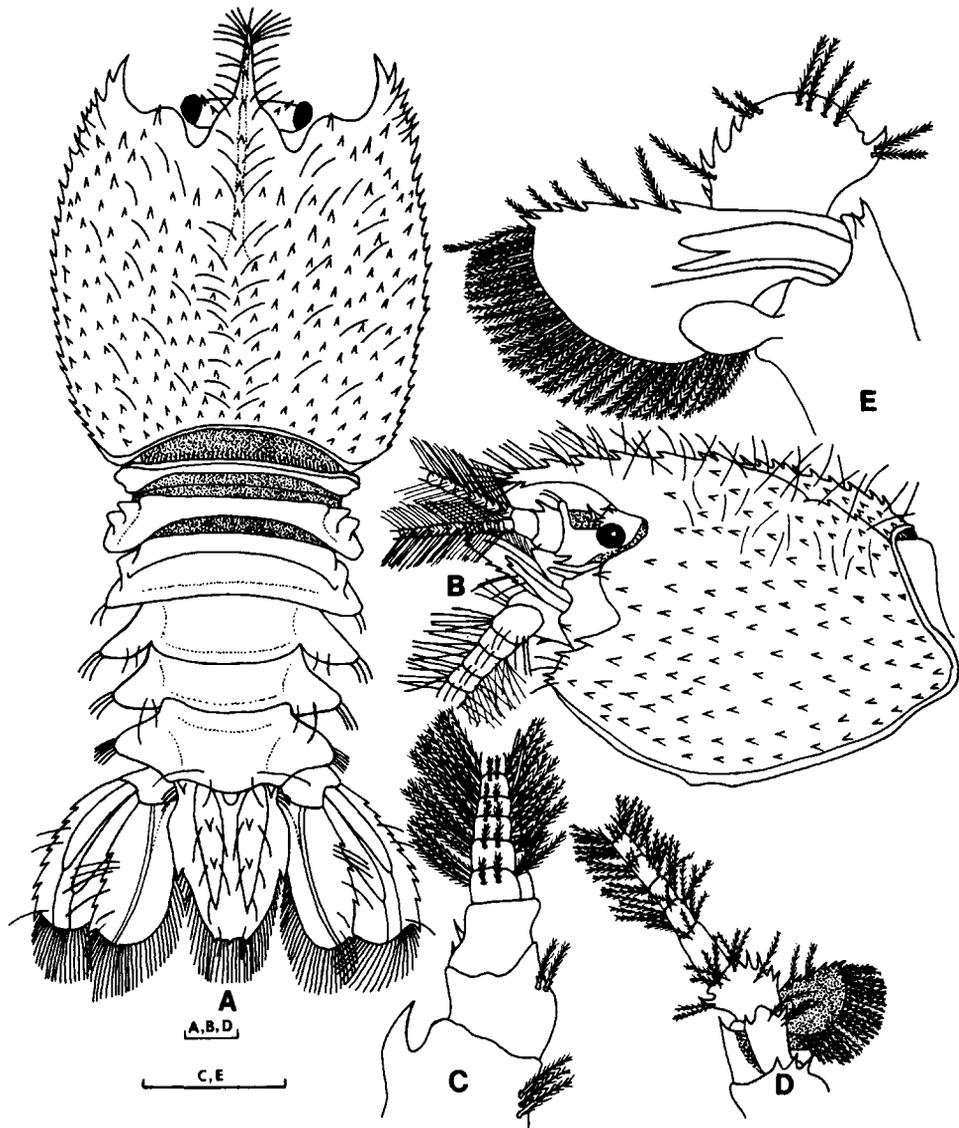


FIG. 1. *Microprosthema manningi*, holotype, male: A, Dorsal view; B, Carapace, lateral view; C, Antennule, dorsal view; D, Antenna and scaphocerite, ventral view; E, Antennal peduncle and scaphocerite, dorsal view. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

strong teeth and 5 long setae; 2 small anterior spines present at telson base, which laterally bears 3 short setae on each side. Lateral margin at each side provided with large median lateral spine; posterior margin with 3 small spines; posterior $\frac{1}{2}$ of telson fringed with plumose setae.

Uropods (Fig. 1 A) well developed, slightly exceeding tip of telson. Exopodite with outer margin slightly rounded, bearing 8 teeth, 3 long setae; inner margin semicircular fringed with plumose setae; dorsal surface with 2 distinct longitudinal ridges without spinules. Endopodite subovate, outer margin with 4 teeth; inner margin fringed with

plumose setae; dorsal surface with distinct unarmed median longitudinal ridge, 2 posterior setae.

Eyes (Fig. 1 A) well developed, cornea smaller, narrower than peduncle; facets, pigments distinct in cornea. Ophthalmic peduncle with 2 dorsal spinules.

Basal segment of antennular peduncle (Fig. 1 C) with distinct, sharply pointed, curved stylocerite. Basal, middle segments with some plumose setae, distal segment with 2 spinules. Both flagella short, provided with numerous long plumose setae; upper flagellum with 32 aesthetascs, 1 on articles 4-7, 2 on articles 8-9, and 4 on articles 10-15.

Antenna (Figs 1 D, E) with strong basal segment, outer margin ending in 2 acute spines, inner margin with distinct laminate process. Outer segments of antennal peduncle with some spines. Scaphocerite reaching slightly beyond tip of rostrum, lobate, narrow at base; outer margin slightly concave with 6 sharp, strong teeth, 4 short plumose setae; inner margin strongly convex, fringed with long plumose setae. Dorsal surface with distinct bifurcated and straight longitudinal carinae, ventral surface glabrous. Antennal flagellum well developed, extending slightly beyond abdominal somites, covered with numerous long plumose setae.

Epistome (Fig. 2 A) suboval anteriorly with 4 stout submedian spines, 4 smaller median spines. Labrum normally developed. Paragnath bilobed with lobes separated by median fissure. Thoracic sternites narrow with no sub-median spinules on segments 4-5, 2 on segments 6-8.

Mandible (Figs 2 B, C) robust with short, fused molar and incisor processes, without teeth but highly chitinized. Palp well developed, 3-segmented. Proximal segment glabrous; middle segment with 3 strong external spines, few plumose setae; distal segment fringed with plumose setae.

Maxillule (Fig. 2 D) with slender undivided endopodite bearing lateral plumose seta, 5 distal plumose setae. Proximal endite moderately broad, somewhat truncated distally with 11 compound spinose setae, 9 plumose setae distally. Distal endite narrow with 9 plumose setae.

Maxilla (Fig. 2 E) with setose coxal and basal endites. Endopodite long, slender, exceeding anterior margin of scaphognathite, 24 long plumose setae laterally and distally. Scaphognathite long, narrow, fringed with numerous plumose setae; anterior cleft on outer margin with 3 plumose setae.

First maxilliped (Fig. 2 F) with 3-segmented endopodite; proximal segment long with 9 long plumose setae laterally, 2 short plumose setae on inner margin; middle segment short, ovate, with 12 long plumose setae; distal segment small, rounded, unarmed. Basipodite large, rounded anteriorly, with straight outer border bearing dense fringe of long plumose setae; coxopodite bilobed, with each lobe bearing numerous short plumose setae. Exopodite well developed, bearing 5 proximal and 26 distal long plumose setae. Large epipod with moderately slender proximal and distal lobes.

Second maxilliped (Fig. 2 G) with 4-segmented endopodite. Dactylus suboval, twice as long as broad, with dense fringe of setae along distodorsal margin. Propodus half size of dactylus, densely setose on dorsal margin. Carpus short, slightly longer than propodus with 5 long simple setae at distodorsal angle, shorter simple seta mesially. Merus almost 2.0 times length of dactylus, with straight inner border bearing 3 short simple setae distally; outer border straight with numerous long simple setae. Ischium and basis fused with setose border; coxa lobate with dense fringe of setae. Exopodite long, slender, undivided with distal 1/3 bearing 31 long plumose setae, 2 long plumose proximal setae. Basipodite with 3 long plumose setae.

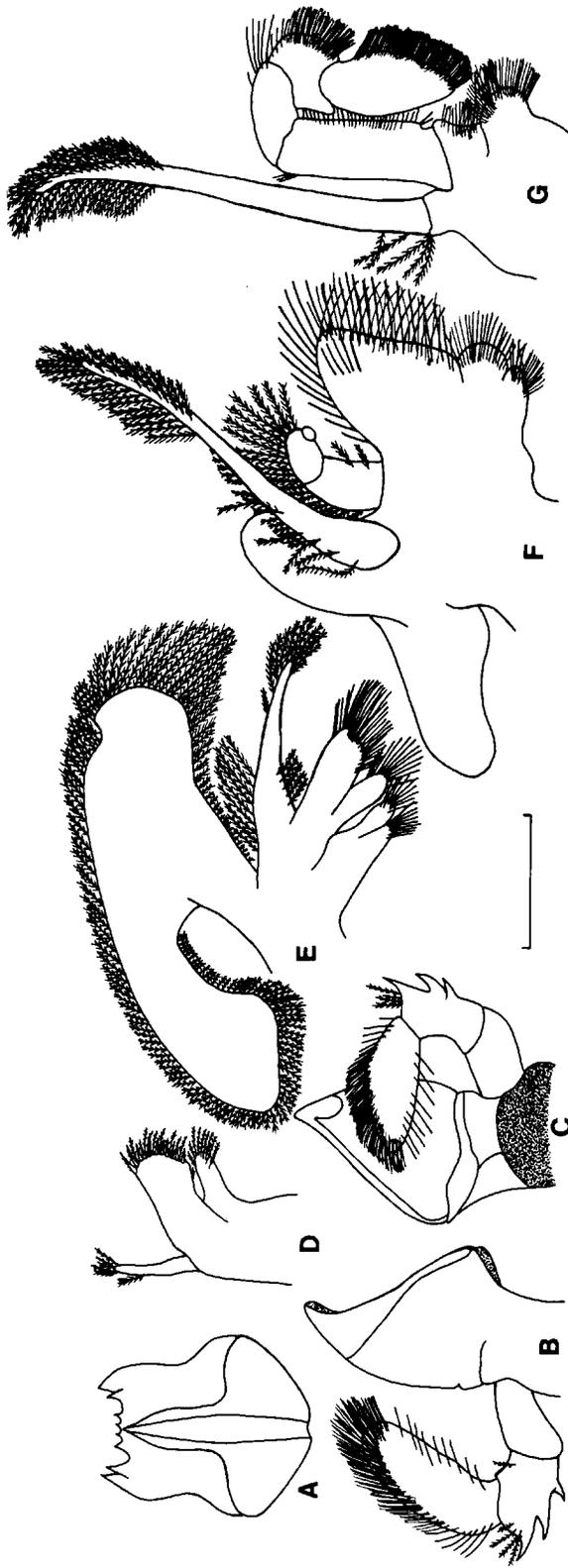


FIG. 2. *Microprosthem manningi*, holotype, male: A, Epistome and labrum, ventral view; B, Mandible, dorsal view; C, Mandible, ventral view; D, Maxilla; E, Maxilla; F, First maxilliped; G, Second maxilliped. Scale bar represents 1.0 mm. Setales not shown on all setae for clarity.

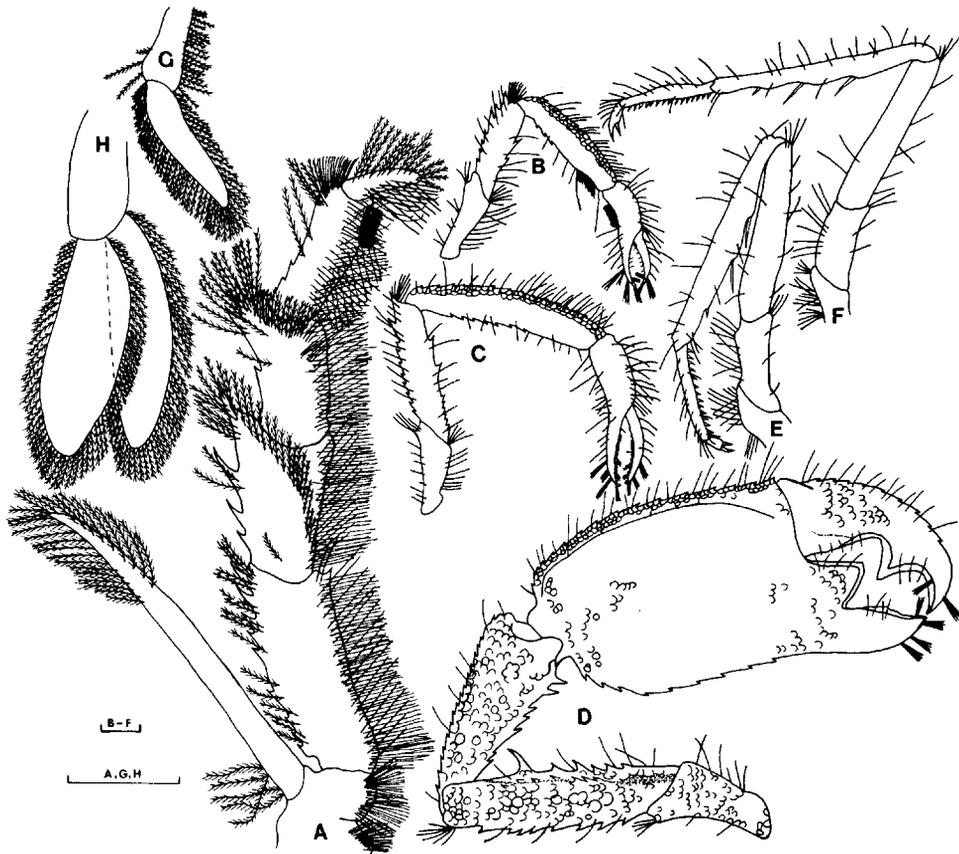


FIG. 3. *Microprosthema manningi*, holotype, male: A, Third maxilliped; B, First pereiopod; C, Second pereiopod; D, Third pereiopod; E, Fourth pereiopod; F, Fifth pereiopod; G, First pleopod; H, Second pleopod. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

Third maxilliped (Fig. 3 A) endopodite strongly developed, 5-segmented. Dactylus slender with dense fringe of setae. Propodus more than 2.0 times dactylar length, with numerous simple and plumose setae, setiferous organ distally on inner margin, 2 spinules on outer margin. Carpus 2.0 times dactylar length, with numerous simple and plumose setae, 3 sharp spines on outer margin. Merus slightly longer than carpus, robust, with 4 sharp spines on outer margin, numerous simple and plumose setae distomesially and on margins. Ischium robust, 2.0 times meral length, with 9 spines, 16 plumose setae on outer margin; distal spine, numerous simple setae on inner margin. Basis short, rounded, with fringe of simple setae. Coxa short, with fringe of simple setae. Exopodite long, slender, reaching middle of merus, with distal 1/3 bearing 26 long plumose setae, 5 proximal long plumose setae.

First pereiopod (Fig. 3 B) small, slender, reaching past scaphocerite. Fingers slightly compressed, with hooked tips ending in rounded tooth; cutting edge indistinct; bearing small tufts of long setae. Dactylus 0.5 times length of propodus, few long setae dorsally. Propodus dorsally, ventrally with numerous long setae. Distoventral part of carpus and proximoventral part of propodus provided with setiferous organ, long seta at each end of carpal part of organ. Carpus longest segment, about 1.5 times propodal length; dorsally with scale-like structures, 4 proximal spinules, numerous long setae; ventrally

3 proximal spinules, few long setae. Merus about 0.8 times carpal length; dorsally with 7 spines, few long setae, setal fringe at distal extremity; ventrally with 2 spines, few long setae. Ischium about equal to meral length, with few long dorsal, ventral setae. Basis and coxa unarmed.

Second pereiopod (Fig. 3 C) similarly built as first, including setation, but longer. No setiferous organ present. Cutting edges of fingers with 12 short, stout teeth, tips blunt. Carpus longest segment, 1.5 times longer than propodus; dorsally with scale-like structures, 14 spines; ventrally with 7 spines. Merus about equal to propodal length, with 10 dorsal spines, 9 ventral spines. Ischium about 0.5 propodal length, with distodorsal spine. Basis and coxa unarmed.

Third pereiopod (Fig. 3 D) robust; largest, strongest of pereiopods, reaching with entire carpus beyond scaphocerite, covered with scale-like structures. Fingers with sharp hooked crossing tips, distally bearing small tufts of long setae. Dactylus with 9 dorsal spines, few long setae; cutting edge with large triangular tooth midway along strong chitinous ridge. Cutting edge of propodus with chitinous ridge bearing large proximal tooth, 3-4 small distal teeth. Palm of chela longest segment with distinct dorsal crista bearing 16 small spines, numerous long setae; ventral margin with 9 small spines. Carpus about 0.7 times length of propodus, narrowing proximally; dorsal margin with 16 small spines, few long setae; large rounded tubercle at distal margin; ventral margin with 7 spines. Merus slightly longer than carpus; dorsal margin with 8 spines, few long setae; ventromesial row of 7 small spines; ventral margin with 6 large spines, few long setae. Ischium short, unarmed except for few long setae. Basis and coxa short with few long setae.

Fourth and fifth pereiopods (Figs 3 E, F) long, slender, propodus and carpus undivided. Dactyli biunguiculate with unguis long, slightly curved, separated from dactylar corpus on fourth pereiopod; not clearly separated on fifth pereiopod; accessory spine straight, almost equal length of unguis. Propodi with ventral row of 13-15 movable spines, dorsally with few short and long setae. Carpi longest segments, with 2 long, 1 short ventral movable spines, few long setae. Meri about 0.8 carpal length, with few long setae. Ischia, bases, coxae short, unarmed except for few long setae.

First pleopod (Fig. 3 G) uniramous, second (Fig. 3 H) to fifth biramous, all lacking appendices. First pleopod smallest, with exopodite about 2.0 times length of basipodite, margins with dense fringe of plumose setae. Rami of second pleopod 2.0 times length of basipodite, margins of rami fringed with plumose setae. Third and fifth pleopods generally similar, third largest of all pleopods, decreasing in size posteriorly.

Branchial formula:

	Maxillipeds			Pereiopods				
	I	II	III	I	II	III	IV	V
Pleurobranchs	—	—	1	1	1	1	1	1
Arthrobranchs	1	1	2	2	2	2	2	—
Podobranchs	—	1	—	—	—	—	—	—
Epipods	1	1	1	1	1	1	1	—
Exopods	1	1	1	—	—	—	—	—

Measurements: Measurements of the holotype are included in Table 1 and compared with other specimens examined.

ALLOTYPE: (ovigerous female, USNM 233998). Sexual differences from the holotype include broader, unarmed thoracic sternites; more rounded pleura of the abdominal

Table 1. Meristic and spination data in *Microprosthema manningi* (measurements in mm).

	USNM ♂ 233997 (holotype)	USNM ♂ 77865	USNM ♂ 77866a	USNM ♂ 77866b	USNM ♂ 184496	USNM ♀ 184497	USNM ♂ 184511a	USNM ♀ 184511b	UMML ♂ 32:989	USZL ♂ 2960	USZL ♂ 2961
Lengths											
Total	16.3	19.7	13.7	12.5	16.5	14.2	19.5	17.2	20.0	15.7	18.0
Rostral carapace	7.7	8.7	5.6	5.6	7.8	7.0	7.4	8.0	7.8	6.4	7.4
Postorbital carapace	6.2	6.3	3.5	3.6	5.6	4.8	5.2	6.1	5.3	4.8	4.7
Chela of 3rd pereopod	9.4	8.6	6.6	—	7.0	8.1	7.1	6.7	9.9	6.6	8.6
3rd Pereopod	20.8	19.1	16.0	—	16.9	19.0	17.0	17.6	22.0	17.9	24.6
Appendage spination											
Scaphocerite outer margin	6	7-10	7	6	6	6	6	7-8	6	6	5-7
Third maxilliped											
Ischial outer margin	9	7	6	8	8	6	13	7	7	5	6
Meral outer margin	4	4	4	4	4	4	5	4	4-5	4	4-5
Carpal outer margin	3	4	2	2	2	2	1	3	2-3	1	2
Propodal outer margin	2	3	1	1	0	0	0	0	1	0	0
First pereopod											
Dorsal merus	7	8	4	6	6	7	—	6	6	5	6
Ventral merus	2	1	2	2	1	2	—	3	1	4	2
Dorsal carpus	4	6	3	7	7	6	—	7	7	12	8
Ventral carpus	3	3	0	0	0	3	—	1	1	2	0
Second pereopod											
Dorsal merus	10	7	6	8	7	—	—	7	7	6	10
Ventral merus	9	3	2	3	3	—	—	3	2	2	8
Dorsal carpus	14	12	8	10	7	—	—	10	10	7	9
Ventrus carpus	7	8	1	2	3	—	—	3	5	4	0
Third pereopod											
Dorsal merus	8	13	6	—	6	9	8	6	11	5	8
Ventral merus	6	9	4	—	5	5	6	5	8	5	7
Dorsal carpus	16	16	8	—	11	14	18	12	15	9	4
Ventral carpus	7	11	5	—	9	10	13	10	9	7	7
Dorsal propodus	16	26	21	—	24	22	32	30	22	24	34
Ventral propodus	9	15	16	—	16	12	18	24	19	7	23
Dorsal dactylus	9	4	3	—	5	5	12	12	9	3	14
Uropodal exopodite											
Outer margin	8	11	9-10	8-9	8-9	8-9	8	8-11	7	9	7-8
Uropodal endopodite											
Outer margin	4	7-8	4	4-6	4-5	6-7	7	4	4-5	4-7	4-5

somites (Fig. 4 A); no ventral median abdominal spines. Generally similar to holotype, but differing in following respects. Rostrum with 6 dorsal spines; scaphocerite with 7–10 outer margin teeth. Third maxilliped (Fig. 4 B) with 7 ischial, 4 meral, 4 carpal, 3 propodal spines on outer margin; row of 6 small dorsomesial spines on merus. Third pereiopod (Fig. 4 C) with more scale-like structures; dorsal and ventral spines. Pleopods (Figs 4 D, E) larger, basipodite and rami covered with more numerous plumose setae. Outer margin of uropodal exopodite with 11 teeth, endopodite with 7–8 teeth. Other differences in spination of appendages are included in Table 1. This ovigerous female, the only one collected had an egg mass of 1592 eggs (Fig. 4 F) that were 0.50–0.53 mm in diameter.



FIG. 4. *Microprosthema manningi*, paratype, Old Providence Island, female: A, Dorsal view; allotype, female: B, Third maxilliped; C, Third pereiopod; D, First pleopod; E, Second pleopod; F, Egg with eyed embryo. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

PARATYPES: The new species is slightly variable in the number of body and appendage spines. Some of this variability is included in Table 1. Some of the morphological differences probably reflect allometric growth changes and normal variation in the species.

Coloration: The color pattern was consistent for the holotype, allotype and five paratypes from Belize and Mexico. The pattern was: carapace and telson whitish to pale tan; antennae, abdomen and appendages white, abdomen and pereopods sometimes edged in tan or pale magenta. Eggs were greenish to tan.

Type locality. Belize, Carrie Bow Cay.

Habitat. All specimens were collected in coralline sand and rubble substrates. The holotype and allotype as well as two male paratypes were taken in old, encrusted and eroded dead conch shells on the leeward side of Carrie Bow Cay. At least some of these shells were partially filled with fine sediments. The Mexican paratype male was taken from interstices of a dead coral head found resting on coralline sand. Two specimens of *Microprosthema semilaeve* were collected along with three paratypes of the new species taken from Old Providence Island. All specimens were collected at a relatively shallow depth of 1–3 m, which is consistent with the depth range for other members of the genus (Holthuis, 1946).

Etymology. The new species is named for Dr Raymond B. Manning who collected the holotype and allotype and whose accurate color description of *Microprosthema semilaeve* (Manning, 1961) first led us to suspect these specimens represented a closely related but distinct species.

***Microprosthema loensis* sp. nov.**

Figs 5–7

Material examined. FLORIDA KEYS: LOOE KEY, Florida, USA, Looe Key National Marine Program, DLF/JWG survey Area VI, near study finger number 3 (= 'east' study finger of early surveys), on underside of dead coral slab on coralline sand, depth 4–5 m, 19 June 1984, D. Felder, J. Goy, D. Lovett coll., USNM 233999 female (Holotype).

Diagnosis. A moderately small stenopodidean shrimp, with subcylindrical, depressed body, with few spinous processes; carapace covered with numerous large, blunt spinules; rostrum with lateral carina; propodus of third pereopod without distinct dorsal crista, few spines on carpus and merus; all pereopods, antennae and third maxillipeds covered with short hairlike setae; second and third abdominal somites with spinous transverse median carinae; scaphocerite lobate with 4 very strong teeth on outer margin; mandibular palp 2-segmented; first maxilliped with 2-segmented endopodite; body coloration tan-white, appendages white.

Description. HOLOTYPE: (female, USNM 233999). Rostrum (Figs 5 A, B) short, deflexed slightly, but extending past last antennular peduncle segment. Dorsal margin with 2 distal, sharp and 2 proximal, blunt spines; ventrally and laterally without spines, but laterally with strong carina.

Carapace (Figs 5 A, B) densely covered with mostly large blunt spinules placed in more or less longitudinal rows. Cervical groove distinct with 8 spines along each lateral margin. Orbit with small but distinct supraorbital spine. Large antennal, branchiostegal, hepatic and pterygostomial spines present. Ventrolateral carapacial angle and branchiostegite rounded.

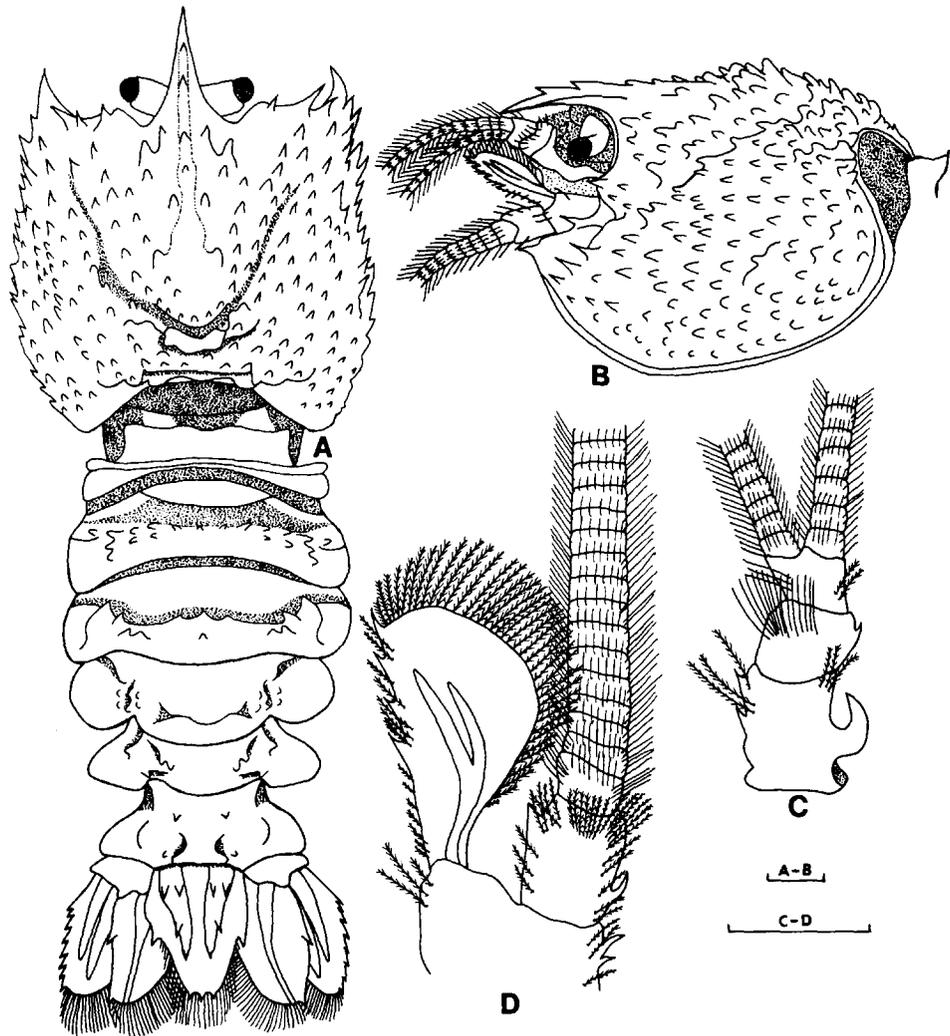


FIG. 5. *Microprosthema loensis*, holotype, female: A, Dorsal view; B, Carapace, lateral view; C, Antennule, dorsal view; D, Antenna and scaphocerite, dorsal view. Scale bars represent 1.0mm. Setules not shown on all setae for clarity.

First abdominal somite (Fig. 5 A) with glabrous posterior transverse carina, posterior margin near base of pleura rounded. Second somite with median transverse carina bearing 10 blunt spinules, 2 rows of 6 and 2 blunt spinules posterior to carina; pleura broadly rounded, unarmed. Third somite rather broad, with posterior margin broadly produced; dorsal median transverse carina reaching end of pleuron, bearing 7 large spines; largest spines merge laterally into short longitudinal carinae, almost reaching end of pleuron; row of 5 blunt spinules posterior to transverse carina; pleura broadly rounded, unarmed. Fourth somite with short glabrous posterior carina; posterior margin with deep blunt incision near base of broadly rounded, unarmed pleura; short lateral longitudinal carinae between 3 rows of 2 blunt spinules. Fifth somite with short anterolateral longitudinal carinae ending in blunt spinule, posterior margin with deep blunt incision near base of bluntly triangular pleura. Blunt spinule just anterior to this incision, 2 transverse median rows of 2 blunt spinules. Sixth somite

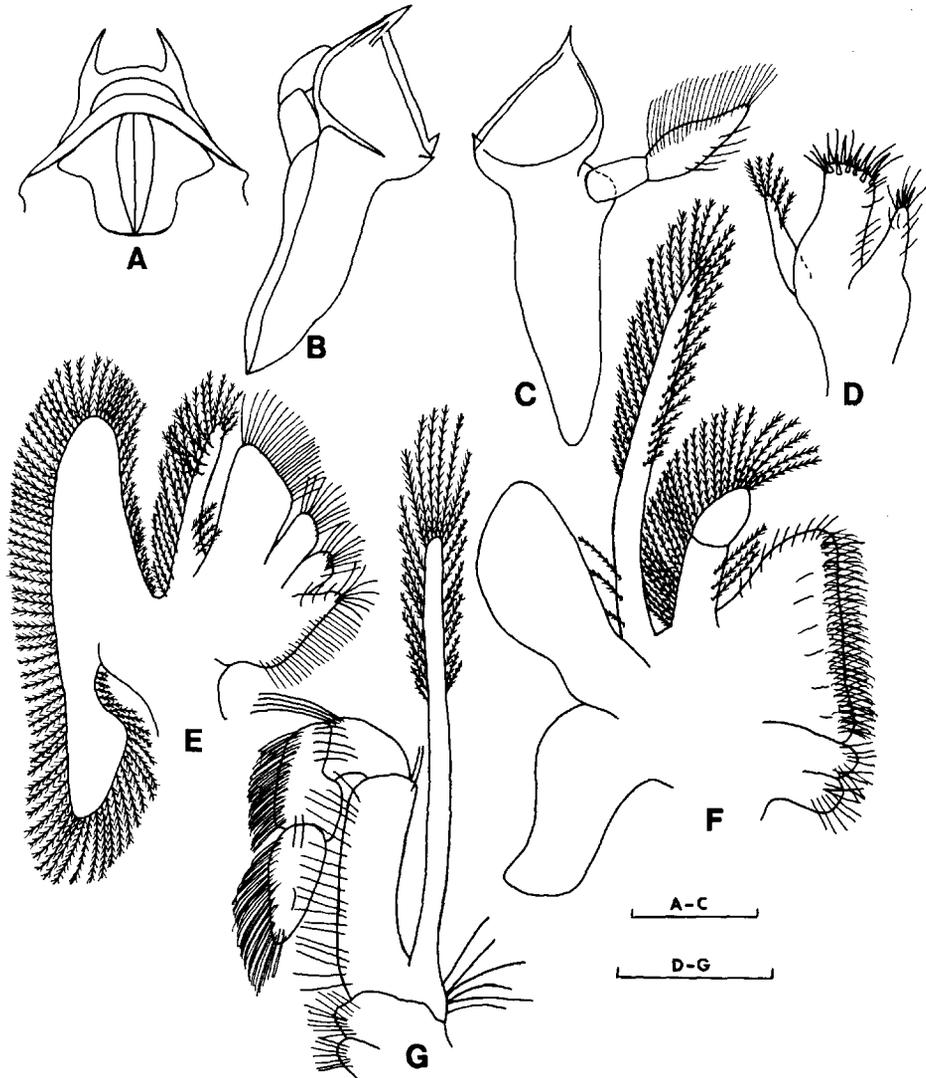


FIG. 6. *Microprosthemella loensis*, holotype, female: A, Epistome and labrum, ventral view; B, Mandible, ventral view; C, Mandible, dorsal view; D, Maxillule; E, Maxilla; F, First maxilliped; G, Second maxilliped. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

with 2 posteriorly diverging, weak ridges extending from anterior margin almost to posterior margin. Two transverse rows of 2 spinules; pleura bluntly pointed.

Telson (Fig. 5 A) about as long as uropods, triangular. Dorsal surface with 2 longitudinal ridges, ending considerable distance before posterior margin, bearing 4 strong teeth. Lateral margin at each side provided with large median lateral spine; posterior margin with 3 small spines; posterior $\frac{1}{2}$ of telson fringed with plumose setae.

Uropods (Fig. 5 A) well developed, slightly exceeding tip of telson. Exopodite with outer margin straight, bearing 8 teeth; inner margin semi-circular, fringed with plumose setae; dorsal surface with 2 distinct longitudinal ridges without spinules. Endopodite ovate, outer margin with 2 teeth; inner margin fringed with plumose setae; dorsal surface with distinct unarmed longitudinal ridge.

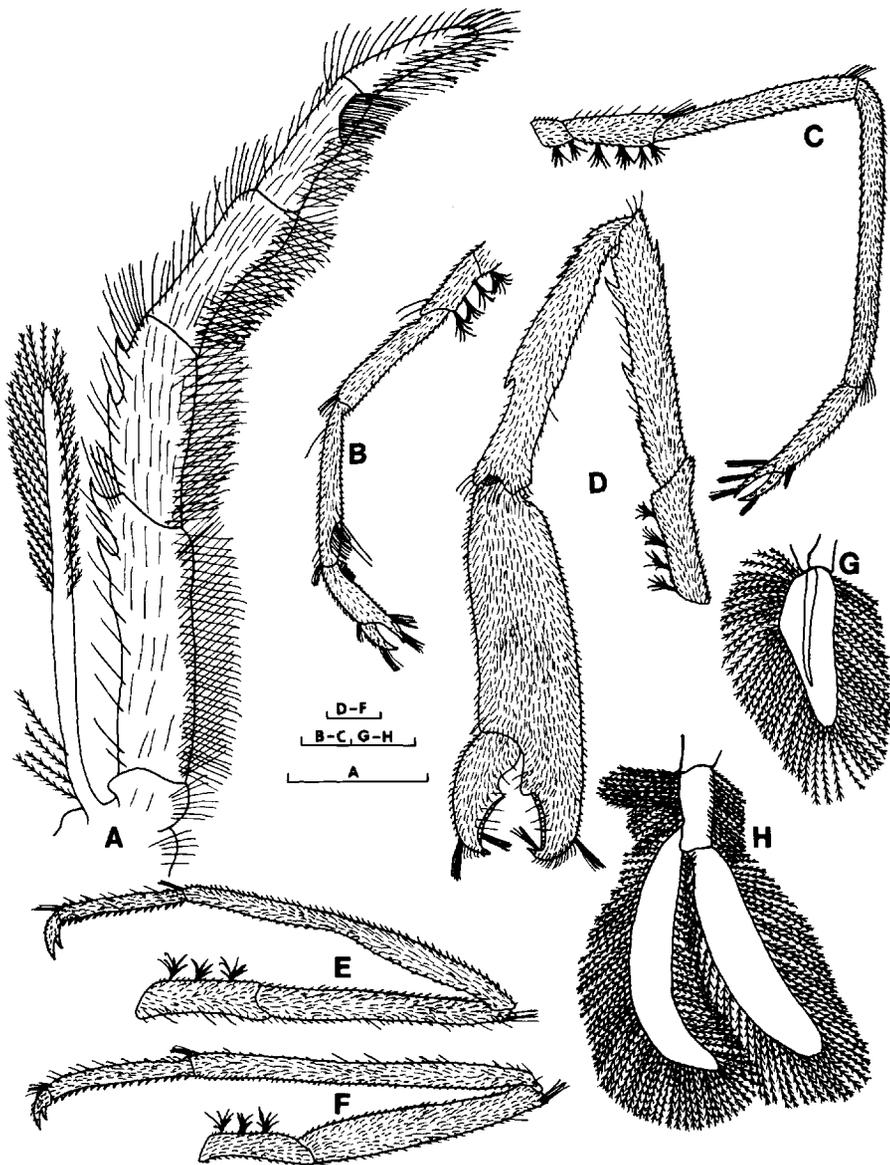


FIG. 7. *Microprosthema loensis*, holotype, female: A, Third maxilliped; B, First pereopod; C, Second pereopod; D, Third pereopod; E, Fourth pereopod; F, Fifth pereopod; G, First pleopod; H, Second pleopod. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

Eyes (Fig. 5 A) well developed, cornea smaller, narrower than peduncle. Facets, pigments distinct in cornea. Ophthalmic peduncle glabrous.

Basal segment of antennular peduncle (Fig. 5 C) with distinct, sharply pointed, curved stylocerite. Basal, middle segments with some spinules. Both flagella rather short, provided with numerous hairlike setae; upper flagellum with 18 aesthetascs, 2 on articles 8–16.

Antenna (Fig. 5 D) with strong basal segment bearing few spinules, numerous plumose setae, internal laminate process. Scaphocerite short, lobate, rather narrow at

base; outer margin straight with 4 sharp, strong teeth, numerous short plumose setae. Inner margin strongly convex, fringed with long plumose setae. Dorsal surface with distinct bifurcated longitudinal carina, ventral surface glabrous. Antennal flagellum well developed, extending slightly beyond abdominal somites, covered with numerous hairlike setae.

Epistome (Fig. 6 A) triangular anteriorly with 2 stout submedian spines. Labrum normally developed. Paragnath bilobed with lobes separated by median fissure. Thoracic sternites broadening from front to back with 4 submedian blunt spinules on segments 4–5, 2 on segment 6, 0 on segments 7–8.

Mandible (Figs 6 B, C) robust with short fused molar and incisor processes. Molar surface consisting of thickened glabrous ridge; incisor also thickened, with 2 small medial teeth. Palp well developed, 2-segmented. Proximal segment unarmed, distal segment fringed with plumose setae.

Maxillule (Fig. 6 D) with slender undivided endopodite bearing 5 plumose setae distally. Proximal endite broad, truncate distally, with 11 compound spinose setae, numerous simple setae. Distal endite narrower with 3 compound spinose setae, few simple setae.

Maxilla (Fig. 6 E) with setose coxal and basal endites. Endopodite long, slender, not exceeding anterior margin of scaphognathite, 27 long plumose setae laterally and distally. Scaphognathite long, narrow, fringed with numerous plumose setae.

First maxilliped (Fig. 6 F) bearing 2-segmented endopodite; proximal segment long with 15 long plumose setae laterally, 3 long plumose setae on inner margin; distal segment short, ovate, with 13 long plumose setae. Basipodite large, rounded anteriorly, with straight outer border bearing dense fringe of short plumose setae; coxopodite bilobed, with each lobe bearing numerous short plumose setae. Exopodite well developed, bearing 3 proximal and 32 distal long plumose setae. Large epipod with moderately slender proximal and distal lobes.

Second maxilliped (Fig. 6 G) with 4-segmented endopodite. Dactylus suboval, twice as long as broad, with dense fringe of setae along distodorsal margin. Propodus slightly longer than dactylus, densely setose on dorsal margin. Carpus short, subtriangular, with 4 long simple setae at distodorsal angle, 5 shorter simple setae mesially. Merus about 3 times length of dactylus, with slightly concave inner border bearing 2 simple setae distally; outer border convex with many long simple setae. Ischium and basis fused into lobe with dense fringe of setae. Coxa also lobate with dense setose fringe. Exopodite long, slender, undivided with distal $\frac{1}{3}$ bearing 26 long plumose setae, 6 long simple proximal setae.

Third maxilliped (Fig. 7 A) endopodite strongly developed, 5-segmented. Dactylus slender, tapering, with dense fringe of setae. Propodus slightly longer than dactylus, with numerous simple and hairlike setae, setiferous organ distally on inner margin. Carpus twice dactylar length, with numerous simple and hairlike setae. Merus same as carpal length, robust, with 2 sharp spines on outer margin, numerous simple and hairlike setae. Ischium twice meral length, with 2 sharp distal spines on outer margin, numerous simple and hair-like setae. Basis short, rounded, with fringe of simple setae. Coxa short, with few simple setae. Exopodite long, slender, reaching middle of merus, distal $\frac{1}{2}$ bearing 32 long plumose setae, proximal bearing 4 long plumose setae.

First pereopod (Fig. 7 B) small, slender, reaching past scaphocerite, all segments without spines, but covered with numerous hairlike setae. Fingers slightly compressed, with hooked tips, cutting edges indistinct, bearing small tufts of long setae. Distoventral part of carpus and proximoventral part of propodus provided with setiferous organ, 2

long setae extending over carpal part of organ. Carpus longest segment, about twice propodal length; merus about 0.8 times carpal length; ischium about 0.3 times carpal length. Carpus, merus, and ischium bearing few long setae at distodorsal extremities. Ventral margin of ischium with 3, basis with 2 tufts of long setae, coxa unarmed.

Second pereopod (Fig. 7C) similarly built as first, including setation, but longer. No setiferous organ present. Carpus longest segment, about 2.5 times longer than propodus; merus about twice propodal length; ischium about 0.7 times propodal length. Ventral margin of ischium with 4, basis with 2 tufts of long setae, coxa unarmed.

Third pereopod (Fig. 7D) robust; largest, strongest of pereopods, reaching with entire carpus beyond scaphocerite, covered with fine hairlike setae. Fingers with sharp, hooked crossing tips ending in strong sharp spines. Dactylus robust, distodorsally with small tuft of long setae; ventrally with another tuft, large triangular tooth on cutting edge along with 12 peglike teeth separated by rectangular chitinous lamellae. Propodus longest segment, robust but without dorsal crista, dorsal and ventral tufts of long setae; cutting edge with large blunt tooth, 12 peglike teeth separated by rectangular chitinous lamellae. Carpus nearly as long as propodus narrowing proximally; dorsal margin with large median spine, proximally with 5 smaller spines; ventral margin with 2 small proximal spines. Merus same length as carpus; dorsal margin with 2 small distal spines; ventral margin with 2 large, 4 smaller spines. Ischium short, about $\frac{1}{2}$ propodal length, without spines, ventral margin with 4 tufts of long setae. Basis and coxa short, unarmed, but ventral margin of basis with 2 tufts of long setae.

Fourth and fifth pereopods (Figs 7E, F) long, slender, covered with hairlike setae, propodus and carpus undivided. Dactyli biunguiculate with unguis long, slightly curved, not clearly separated from dactylar corpus; accessory spine short, straight, more than 0.5 times length of unguis. Propodi with ventral row of 18 movable spines, dorsally with few long simple setae. Carpi longest segments, twice length of meri; merus of fifth pereopod more robust than that of fourth. Ischia with 3, bases with 2 ventral tufts of long setae.

First pleopod (Fig. 7G) uniramous, second (Fig. 7H) to fifth biramous, all lacking appendices. First pleopod smallest, with exopodite twice length of basipodite; dorsal surface of exopodite with distinct longitudinal ridge, margin with dense fringe of long plumose setae. Rami of second pleopod more than twice length of basipodite, margins of basipodite, rami fringed with long plumose setae. Third to fifth pleopods generally similar, third largest of all pleopods, decreasing in size posteriorly.

Branchial formula: Same as *Microprosthema manningi* given above.

Measurements (in mm): Postorbital carapace length, 5.0. Rostral carapace length, 6.6. Total length, approx., 17.5. Length of third pereopod, 18.6.

Coloration: Carapace and abdomen whitish tan; antennae, telson, uropods, and all appendages white. Eggs are pale green.

Type locality. Florida Keys, Looe Key, Florida, USA.

Habitat. The single specimen was taken on the underside of a dead coral slab that was resting on white coralline sand. This specimen was collected at a relatively shallow depth of 4–5 m, which is consistent for other members of the genus (Holthius, 1946). The shrimp was ovigerous with about 20 large eggs when captured. The eggs were dropped and destroyed when the shrimp molted during the evening while it was being maintained in a small holding tank.

Remarks. Both new species, *Microprosthema manningi* and *M. loensis*, follow closely the definition of the genus *Microprosthema* Stimpson given by Holthius (1946).

Microprosthema manningi is most closely related to another western Atlantic species, *M. semilaeve*, but differs in color, uropods and spination of the third maxillipeds and pereopods. A complete color description of *M. semilaeve* was given by Manning (1961) and comparison with this new species shows that *M. manningi* has both a different overall body color and pattern. In all specimens of *M. semilaeve* (78) examined from the western Atlantic by one of us (JWG), the dorsal longitudinal ridge of the uropodal endopodite bears 1–2 medial spinules and ends in a spinule; the carpi and propodi of the third maxillipeds lack spines; the merus of the first pereopod lacks spines; and the second pereopod bears only 1–2 meral spines. *Microprosthema manningi* also resembles the recently described eastern Pacific *M. emmiltum* (Goy 1987) and the Indo-West Pacific *M. validum* but differs in color, as well as abdomen and appendage spination. Several authors have recently identified *Microprosthema* from India and Pakistan coasts as either *M. validum* (Pillai, 1962; Tirmizi and Kazmi, 1979) or *M. semilaeve* (Mahadevan *et al.*, 1962; Raje and Ranade, 1978). These above-mentioned Indian and Pakistani specimens are neither *M. validum* nor *M. semilaeve* but represent an undescribed species of *Microprosthema*.

Microprosthema loensis is most closely related to another Indo-West Pacific species, *M. scabricaudatum* having similar spination of the rostrum, carapace, abdomen and uropods. *Microprosthema scabricaudatum* differs from *M. loensis* in shape of the scaphocerite, number of ischial spines on the third maxilliped, having only one pair of spines on the dorsal longitudinal ridges of the telson, and in shape and spination of the third pereopod. *Microprosthema loensis* has mouthparts that can be considered somewhat reduced. The two-segmented mandibular palp is unique for stenopodideans and may represent a primitive characteristic.

Acknowledgements

We are extremely grateful to Dr R. B. Manning, National Museum of Natural History and Dr G. L. Voss, University of Miami Marine Laboratory for providing us with specimens used in this study. Mr Billy D. Causey, Director, Looe Key National Marine Sanctuary, provided assistance in field studies. A major portion of this study was funded by the NOAA National Marine Sanctuary Program, Cooperative Agreement No. NA-83-AA-H-CZO53, as a grant to DLF and JWG at the University of Southwestern Louisiana for studies in the Looe Key Sanctuary. Additional support was provided to DLF by a grant from the Coypu Foundation. For DLF, this is contribution No. 12 from the USL Center for Crustacean Research.

References

- GOY, J. W., 1987. *Microprosthema emmiltum*, new species, and other records of stenopodidean shrimps from the eastern Pacific (Crustacea: Decapoda). *Proceedings of the Biological Society of Washington*, **100** (4), 717–725.
- HOLTHUIS, L. B., 1946. Biological results of the Snellius Expedition XIV. The Stenopodidae, Nephropsidae, Scyllaridae, and Palinuridae. *Temminckia* **7**, 1–178.
- MAHADEVAN, S., RANARAJAN, K. and SANKARANKUTTY, C., 1962. On two specimens of *Microprosthema* sp. (Decapoda, Macrura) from Palk Bay. *Journal of the Marine Biological Association of India* **4**, 235–238.
- MANNING, R. B., 1961. Observations on *Microprosthema semilaeve* (Von Martens) (Decapoda, Stenopodidae) from Florida. *Crustaceana* **2** (1), 81–82.
- PILLAI, N. K., 1962. On the occurrence of *Microprosthema validum* Stimpson in Indian waters. *Journal of the Marine Biological Association of India* **3** (1–2), 267–269.
- RAJE, P. C. and RANADE, M. D., 1978. Early life history of a stenopodid shrimp, *Microprosthema semilaeve* (Decapoda: Macrura). *Journal of the Marine Biological Association of India* **17** (1), 1975 (1978), 213–222.
- TIRMIZI, N. M. and KAZMI, Q. B., 1979. New decapod crustacean records for the northern Arabian Sea. *Crustaceana* **36** (2), 181–185.