Four Species of Synopiidae from the Caribbean Region (Crustacea: Amphipoda)

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FOUR SPECIES OF SYNOPIIDAE FROM THE CARIBBEAN REGION (CRUSTACEA: AMPHIPODA)

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Abstract.—*Synopia ultramarina* is redescribed from the Gulf Stream and the Florida Keys and comments are made on the tangled taxonomy in *Synopia. Tiron bellairsi,* originally described from Barbados, is reported from Belize, at the opposite side of the Caribbean Basin. *Garosyrrhoe bigarra,* a Pacific species, is also reported from Belize, but no clear subspecific differences are detected as yet between Pacific and Atlantic populations.

Specimens of *Synopia ultramarina* Dana (1853) are described and illustrated from the Gulf Stream and *Synopia scheeleana* Bovallius (1886) is also reported. A key to seven species of the genus *Synopia* was given by J. L. Barnard (1972); Andres (1984) described 2 additional species. Four of the nine species remain poorly described: *S. angustifrons* Dana (1853, tropical Pacific), *S. caraibica* Bovallius (1886, Venezuela), *S. gracilis* Dana (1853, tropical Atlantic) and *S. orientalis* Kossmann (1880, Red Sea). Species of this genus are rarely reported in modern times, perhaps because they occur mainly in neritic waters or in epipelagic waters of the high seas. Collections made in neritic and epipelagic waters rarely are examined by gammaridean taxonomists, who appear to concentrate on benthic samples. Two of the species come from the tropical Pacific where little neritic collecting has been accomplished this century. Individuals of *Synopia* may actually be mostly nighttime emergents into neritic waters though they appear to occur in daytime in epipelagic waters particularly in or near sargasso-like flotsam. We have searched for *S. caraibica* in neritic waters in the daytime in Florida, Belize and Trinidad, to no avail. Pereopods 5–7 of that species have ovate article 2 of pereopods 5–7 but otherwise the species is well enough described by Bovallius to suggest it is not a species of *Tiron,* a better known genus than *Synopia.*

Synopiidae

Synopia Dana

Synopia Dana, 1852:315 (*Synopia ultramarina* Dana, 1853, selected by J. L. Barnard, 1969b).—J. L. Barnard, 1972:50.

Diagnosis.—Forehead protuberant (possible exception, *S. orientalis*); lateral cephalic lobe not sharp. Eyes and accessory eyes present. Antenna 1 of female shorter than pereon, of male much longer than pereon. Mandible with huge palp (mainly article 2), molar large, triturative or swollen, pillowlike in shape and poorly triturative (*S. variabilis*). Outer plate of maxilla 1 with eight or nine spines. Maxilliped inner plate lacking large smooth spines; outer plate furnished medially only with plumose setae (no inflexible spines).

Coxae 1–2 small, similar, truncate distally; coxae 3–4 pelagont, coxa 3 very large and enfolding small coxa 4. Gnathopods simple (propodus of gnathopod 1 often tumid), defining spines absent; gnathopod 2 very slender, dactyl tiny. Pereopods 3–4 slightly to strongly diversified, articles 4–5 stout; pereopods 5–7 elongate.

Pleonites 1–6 neither denticulate nor toothed. Uropod 3 exceeding uropods 1–2, peduncle short. Telson relatively short for family.

Relationship.—Differing from *Tiron* in the shorter peduncle of antenna 1, thick mandibular palp, presence of only 8–9 spines on the outer plate of maxilla 1, the absence of large smooth apical spines on the inner plate of the maxilliped, the outer plate bearing only medial plumose setae, no smooth spines; the much enlarged coxa 3; inflated propodus of gnathopod 1; tiny dactyl of gnathopod 2; diversity and tumidity of pereopods 3–4; lack of dorsal body teeth; and relatively shorter telson.

Remarks.—We believe that Barnard (1965) misrepresented the mandibular molar of *S. variabilis* as being non-triturative; he apparently did not turn the molar far enough upward to see the triturative surface.

Key to the Species of *Synopia*

1. Telson entire 2
– Telson cleft 4
2. Apex of telson broad and armed with 3 widely spread spines ...... *rotunda*
– Apex of telson narrow and armed with 2 or fewer appressed spines .. 3
3. Telson with 2 notches separated by subtruncate protrusion, bearing only setules .... *variabilis*
– Telson with single apical notch armed with 2 spines .... *triangula*
4. Forehead not protuberant .. *orientalis*
– Forehead protuberant 5
5. Article 2 of pereopods 5–6 rectangular or with quadrate posteroventral corners 6
– Article 2 of pereopods 5–6 ovate or with rounded posteroventral corners 7
6. Article 2 of pereopod 5 narrowly rectangular, scarcely twice as broad as article 3 and with scarcely protruding posteroventral corner .... *angustifrons*
– Article 2 of pereopod 5 widely rectangular, nearly twice as broad as article 3 and with strongly protruding posteroventral corner .... *gracilis*
7. Flagellar articles 2, 3, 4 . . . n of antenna 1 with long "hairs"* .. *caraibica*
– Flagellar articles 2, 3, 4 . . . n of antenna 1 lacking long "hairs" 8
8. Telson scarcely longer than broad, apicolateral margins smooth, each apex with one stout spine .. *scheeleana*
– Telson much longer than broad, apicolateral margins crenulate, each apex with one stout spine and one long seta .... *ultramarina*

Synopia ultramarina Dana
Fig. 1–4, part

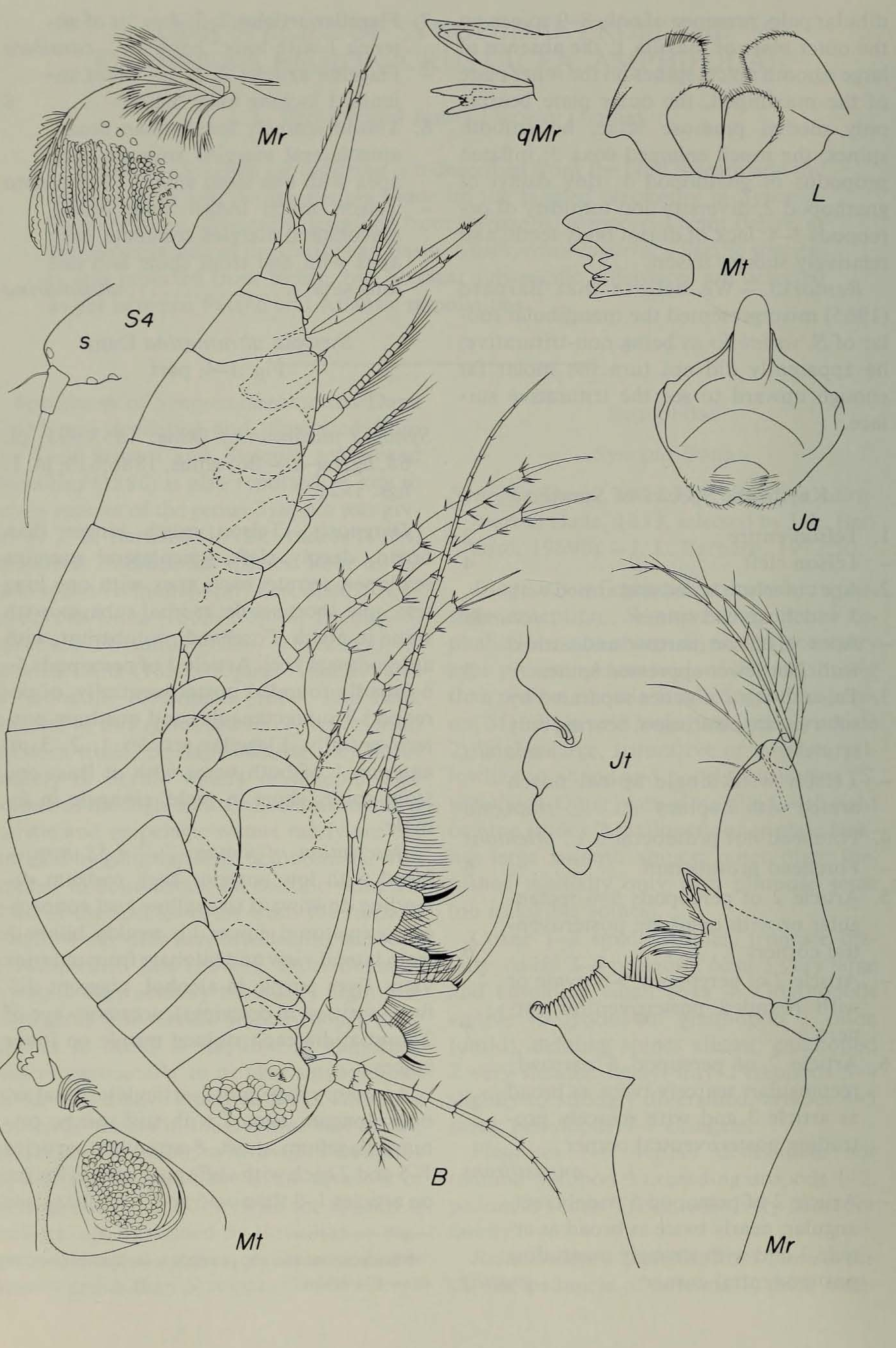
Synopia ultramarina Dana, 1853:995, pl. 68, fig. 6a–h.—Bovallius, 1886:613, pl. 1, figs. 1–21.

Diagnosis.—Telson much longer than broad, deeply cleft, apicolateral margins scalloped-serrate, each apex with one long seta, one short setule, medial subapex with spine in notch. Forehead protuberant, with anterodorsal keel. Article 2 of pereopods 5–6 broadly rounded posteroventrally, of pereopod 7 subrectangular and quadrate posteroventrally. Flagellar articles 1, 2, 3 on antenna 1 of both sexes with at least one stout spine, short in male, elongate in female.

Description of female "u" 4.53 mm.—Head with low anterior keel; rostrum extending downward to shallow keel connected to epistome, upper lip weakly bilobate from lateral view and bilobate from anterior view. Eyes purple in alcohol, pigment diffuse (omitted in drawings), accessory eye of 2 ommatidia each stained purple on inner apices.

Accessory flagellum 2-articulate, basal article elongate, armed with stiff spines; primary flagellum short, 8-articulate, articles 1–5 and 7 each with stiff spine, spines longer on articles 1–3 than on 5 and 7. Each incisor

* Structure unknown, possibly setae, aesthetascs, or straw-like scales.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and left lacinia mobilis with 4 teeth, right lacinia mobilis bifid and weakly hook-shaped, larger rakers about 4 left, 7 right, first 2 or 3 when turned to plane view bifid; molar heavily triturative, armed basally with large brush of apically feathered setae. Inner plate of maxilla 1 with 5 large medial setae and 2 short apical setae, outer plate with 8 spines, apex of palp with 5 tooth-spines (one illustration showing 4 as aberrancy), medial oral face with groups of 3 and 4 apical setae. Two principal apical spines on inner plate of maxilliped plumose, with two other apical setae, one apicoventral seta, two medial setae and one ventral locking spine; medial margin of outer plate with marginal and ventral submarginal rows of plumose setae, lateral margin with two long setae, one apicad, the other strongly subapical, lateral base raggedly serrate; article 2 of palp evenly and densely setose medially; dactyl short, nail elongate.

Many setae on gnathopod 2 apically forked; dactyl with shriveled appearance (but this appearance normal). Pereopods 3–4 with three unlocking setae each, pereopods 5–7 with two unlocking spines each, short and simple on pereopod 7, on pereopods 5–6 one spine elongate and with apical hooded hook. Gills large, unpleated, on coxae 2–7; oostegites, thin, strap-shaped, sparsely setose, on coxae 2–5.

Epimera naked below, epimeron 1 sharply quadrate, epimeron 2 with small tooth and epimeron 3 round-quadrate posteroventrally. Each pleopod with two coupling hooks and one plumose accessory spine, peduncles with 1–3 setae only, rami with 12–14 articles, inner rami with one fewer article than outer rami and with forked basomedial spines, generally two.

Urosomite 3 with posterodorsal spine. Outer rami of uropods 1–2 with dorsolateral comb, similar comb on inner rami ventrolateral. Telson scarcely longer than peduncle of uropod 3, cleft about two-thirds, cuticle covered with notch-like lunes.

Male "q" 5.84 mm.—Antenna 1 about 4.0 mm long, antenna 2 about 5.9 mm long. Eyes slightly larger than in female. Basal article of primary flagellum slightly longer than in female and callynophore denser; articles of primary flagellum with extra mid-ventral male sensory setules, large spines of female reduced in size. Dorsal margins of articles 4–5 of peduncle of antenna 2 plus articles of flagellum bearing dense male sensory setules. Epimera and pleopods larger than in female, epimeron 2 lacking tooth. Uropod 3 more setose than in female.

Intermediate male "s" 4.33 mm.—Eyes scarcely enlarged. Antenna 1 elongate but basal spines of flagellum elongate as in female. Posterior setules on flagellum of antenna 1 and anterior setules on antenna 2 poorly developed. Tooth of epimeron 2 intermediate between male and female. Setae of uropod 3 moderately developed.

Illustrations.—Maxilla 1 magnified more than maxilla 2; telson magnified more than uropod 3.

Material.—MFP-1, in Gulf Stream, off Grand Bahama Island, 27°26'N, 78°57'W, 219 m, 8 Jul 1986, coll. Jack Morton, attracted to night light, female "p" 4.35 mm, male "q" 5.84 mm (illustrated), female "r" 4.40 mm, male "s" 4.33 mm, male "t" 4.79 mm, female "u" 4.53 mm (illustrated) (and

←

Fig. 1. *Synopia ultramarina,* unattributed figures = female "u"; q = male "q." Capital letters as follows refer to parts; lower case letters to the left of capital letters refer to specimens noted in legends; lower case letters to right of capitals refer to adjectival modifications in list below: B, body; D, dactyl; G, gnathopod; H, head; I, inner plate or ramus; J, prebuccal; L, labium; M, mandible; O, outer plate or ramus; P, pereopod; R, uropod; S, maxilliped; T, telson; U, labrum; V, palp; W, pleon; X, maxilla; a, anterior; d, dorsal; o, opposite; r, right; s, setae removed; t, left; x, apex.

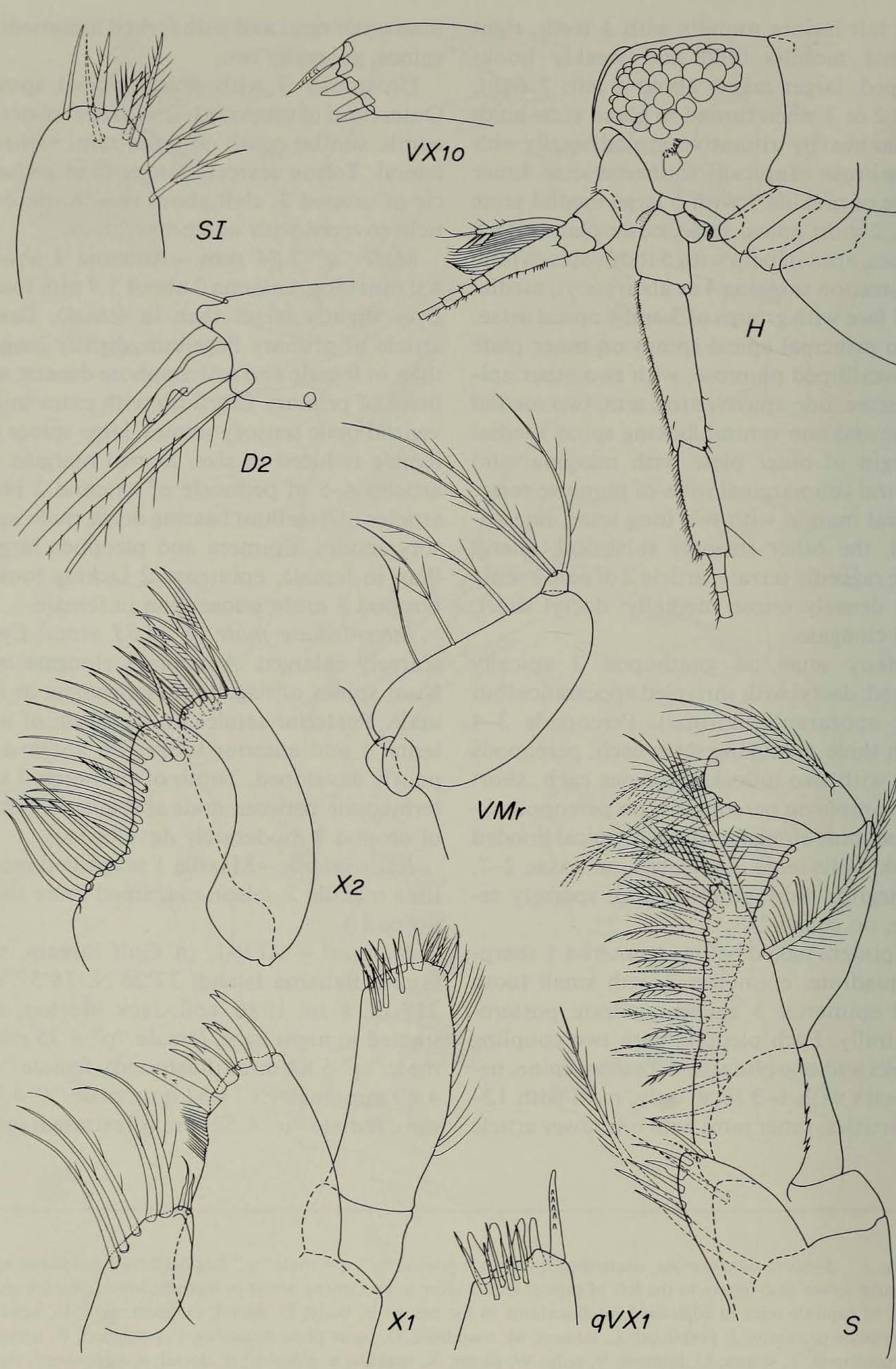

Fig. 2. *Synopia ultramarina,* unattributed figures = female "u"; q = male "q." Letter codes, see Fig. 1.

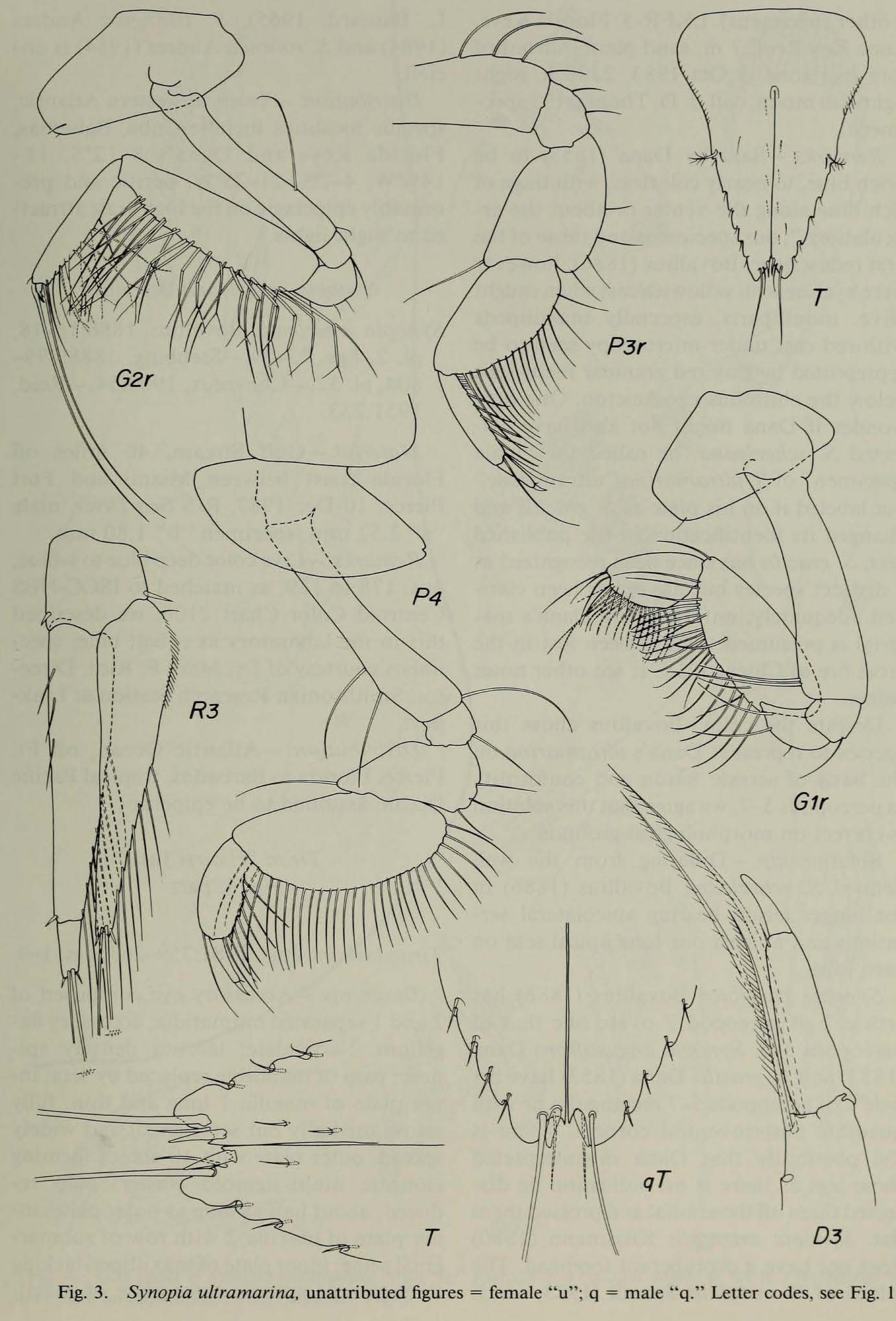

Fig. 3. *Synopia ultramarina*, unattributed figures = female "u"; q = male "q." Letter codes, see Fig. 1.

6 other specimens). LKFR-5, Florida Keys, Looe Key Reef, 7 m, sand plain in front of fore reef zone, 9 Oct 1983, 2300 h, night light, full moon, coll. J. D. Thomas (35 specimens).

Remarks.—Said by Dana (1853) to be "rich blue, to nearly colorless, with tinge of rich blue along the venter or about the articulations"; our specimens and those of the first redescriber, Bovallius (1886), however were hyaline with yellowish cast when caught alive, mouthparts, especially maxillipeds with red cast under microscopy seen to be represented by tiny red granular inclusions below the chitinous exoskeleton. One may wonder if Dana might not also have collected *S. scheeleana*; he called the "male specimen" of *S. ultramarina* "ultramarine" but labeled it on his plate as *S. gracilis* and changed its identification in the published text; *S. gracilis* has since been recognized as a distinct species but has never been clarified adequately; unfortunately Dana's material is presumed to have been lost in the great fire of Chicago, 1871; see other notes below.

Despite the color, Bovallius chose this species to represent Dana's *ultramarina* on the basis of serrate telson and conformity in pereopods 5–7; we agree that this solution is correct on morphological grounds.

Relationship.—Differing from the well defined *S. scheeleana* Bovallius (1886) in the longer telson bearing apicolateral serrations and at least one long apical seta on each lobe.

Synopia caraibica Bovallius (1886) has article 2 of pereopod 7 ovate like that of pereopods 5–6. *Synopia angustifrons* Dana (1853) and *S. gracilis* Dana (1853) have article 2 of pereopods 5–7 rectangular or with quadrate posteroventral corners. There is the possibility that Dana misinterpreted these legs as there is no indication he dissected them off the animal and pressed them flat. *Synopia orientalis* Kossmann (1880) does not have a protuberant forehead. The telson of *S. variabilis* Spandl (1923, see J. L. Barnard, 1965), *S. triangula* Andres (1984) and *S. rotunda* Andres (1984) is uncleft.

Distribution.—Tropical western Atlantic; specific localities include Cuba, Bahamas, Florida Keys and Dana's 8–12°S, 11–14¼°W, 4–7°S, 21–25°W; neritic and presumably epipelagic on the high seas; attracted to night lights.

Synopia scheeleana Bovallius

Synopia scheeleana Bovallius, 1886:16–18, pl. 2, figs. 22–29.—Stebbing, 1888:799–804, pl. 52.—Chevreux, 1900:54.—Reid, 1951:233.

Material.—Gulf Stream, 40 miles off Florida coast between Miami and Fort Pierce, 10 Dec 1987, R/S *Sea Diver,* male "a" 2.52 mm, specimen "b" 1.80 mm.

Remarks.—Live color deep blue to s-blue, nos. 178 to 179, as matched to ISCC-NBS Centroid Color Chart 2106; we described this in the laboratory as cobalt blue; specimens courtesy of Dr. Mary E. Rice, Director, Smithsonian Research Station at Linkport.

Distribution.—Atlantic Ocean, off Ft. Pierce, Florida to Barbados; tropical Pacific Ocean; assumed to be epipelagic.

Tiron bellairsi Just
Fig. 4, part

Tiron bellairsi Just, 1981:259–263, figs. 1–4.

Diagnosis.—Accessory eye composed of 2 and 1 separated ommatidia; accessory flagellum 2-articulate; labrum densely spinose; palp of mandible replaced by seta; inner plate of maxilla 1 long and thin, fully setose medially but setae small and widely spread, outer plate with 10 spines forming elongate multi-sigmoid cluster, palp reduced, about half as long as outer plate; inner plate of maxilla 2 with row of submarginal setae; inner plate of maxilliped lacking thick simple spines; outer plate of maxil-

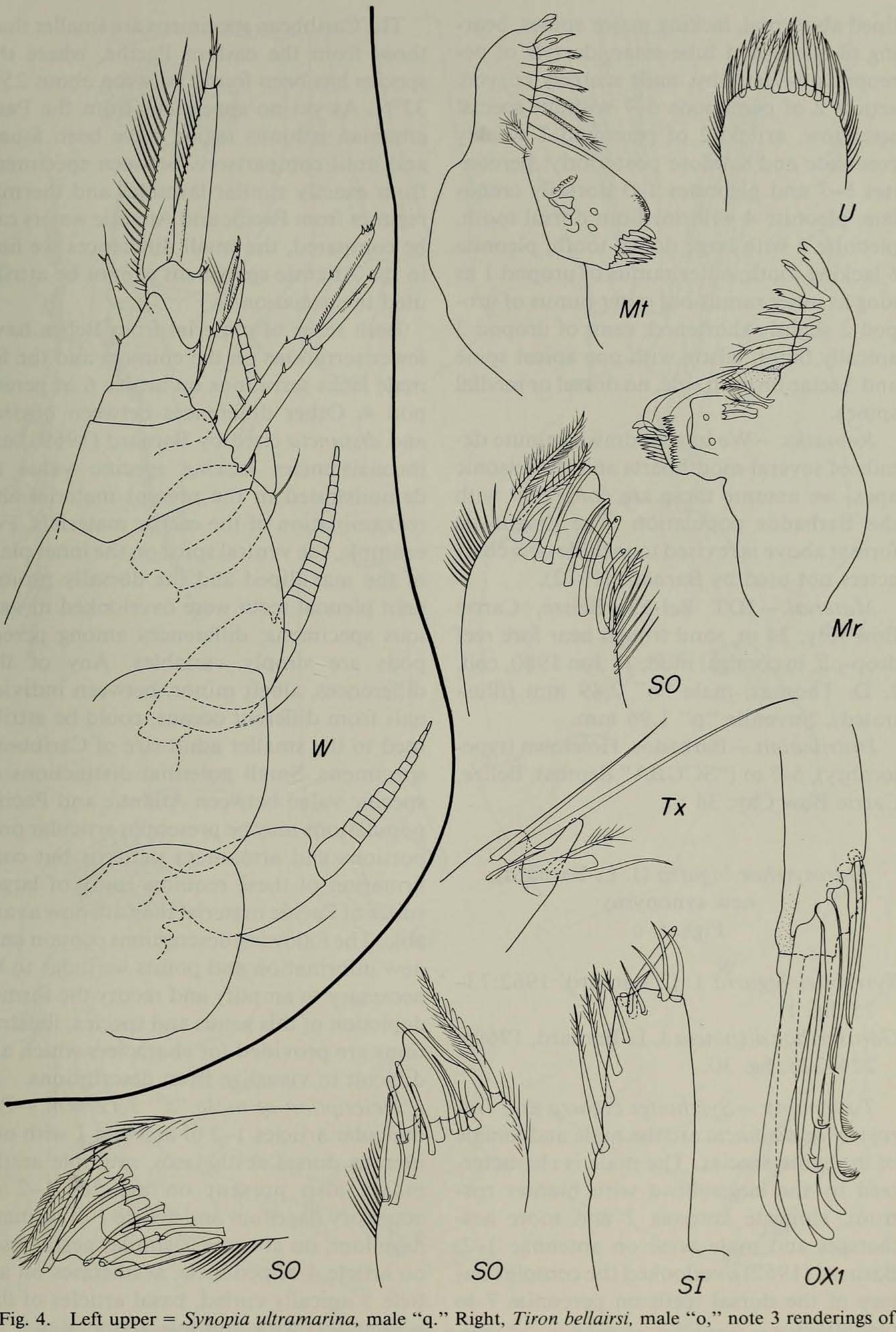

Fig. 4. Left upper = *Synopia ultramarina,* male "q." Right, *Tiron bellairsi,* male "o," note 3 renderings of outer plate on maxilliped. Letter codes, see Fig. 1.

liped abnormal, lacking major spines, bearing plumose and tube-setae; dactyls of pereopods 3–7 stubby, nails scarcely curved; article 2 of pereopods 6–7 without special setal row, article 2 of pereopod 7 weakly crenulate and setulose posteriorly; pereonites 5–7 and pleonites 1–3 dorsally crenulate, pleonite 4 with medium dorsal tooth, pleonite 5 with large dorsal tooth, pleonite 6 lacking tooth; outer ramus of uropod 1 as long as inner ramus but outer ramus of uropod 2 slightly shortened; rami of uropod 3 apically blunt; telson with one apical spine and 3 setae on each side, no dorsal or medial spines.

Remarks.—We have redrawn minute details of several mouthparts and the telsonic apex; we assume these are congruent with the Barbados population. The diagnostic format above is revised to include new characters not used by Barnard (1972).

Material.—JDT Bel-53, Belize, Carrie Bow Key, 34 m, sand trough near fore reef drop-off, in coralgal mud, 11 Jun 1980, coll. J. D. Thomas, male "o" 2.49 mm (illustrated), ?juvenile "p" 1.96 mm.

Distribution.—Barbados, Holetown (type-locality), 5–? m ("SCUBA" depths); Belize, Carrie Bow Cay, 34 m.

Garosyrrhoe bigarra (J. L. Barnard), new synonymy
Figs. 5–6

Syrrhoites bigarra J. L. Barnard, 1962:73–75, fig. 1.

Garosyrrhoe disjuncta J. L. Barnard, 1969a: 224–225, fig. 30.

Taxonomy.—*Syrrhoites bigarra* and *Garosyrrhoe disjuncta* are the male and female of the same species. The male is characterized by the larger head with blunter rostrum, elongate antenna 2 and more aesthetascs and male setae on antennae 1–2. Barnard (1962) overlooked the complex nature of the dorsal teeth on pereonite 7 to pleonite 3.

The Caribbean specimens are smaller than those from the eastern Pacific, where the species has been found between about 25°–32°N. As yet no specimens from the Panamanian isthmus region have been found and until comparisons between specimens from exactly similar latitudes and thermal regimes from Pacific and Atlantic waters can be compared, the small differences we find in the Atlantic specimens cannot be attributed to speciation.

Both sexes of material from Belize have fewer serrations on the epimera and the female lacks serrations on article 6 of pereopod 4. Other differences between *bigarra* and *disjuncta* cited by Barnard (1969a) are inconsistencies lacking specific value as demonstrated in the present material and reexamination of the earlier materials. For example, the ventral spine on the inner plate of the maxilliped and the dorsally prominent pleonal teeth were overlooked in various specimens; differences among pereopods are simply variables. Any of the differences, albeit minor, between individuals from different oceans, could be attributed to the smaller adult size of Caribbean specimens. Small potential distinctions of specific value between Atlantic and Pacific populations may be present in articular proportions and armament patterns but confirmation of these requires study of larger suites of Pacific material than are now available. The following descriptions contain only new information and points we judge to be necessary to amplify and rectify the former depiction of this genus and species; illustrations are provided for characters which are difficult to visualize from descriptions.

Description of male "x" 3.12 mm.—Peduncular articles 1–2 of antenna 1 with numerous dorsal aesthetascs, multiple aesthetascs also present on articles 1–2 of accessory flagellum and article 1 of primary flagellum; on antenna 2 similar aesthetascs on article 4 of peduncle, aesthetascs on article 5 apically curled, basal articles of flagellum also with multiple aesthetascs.

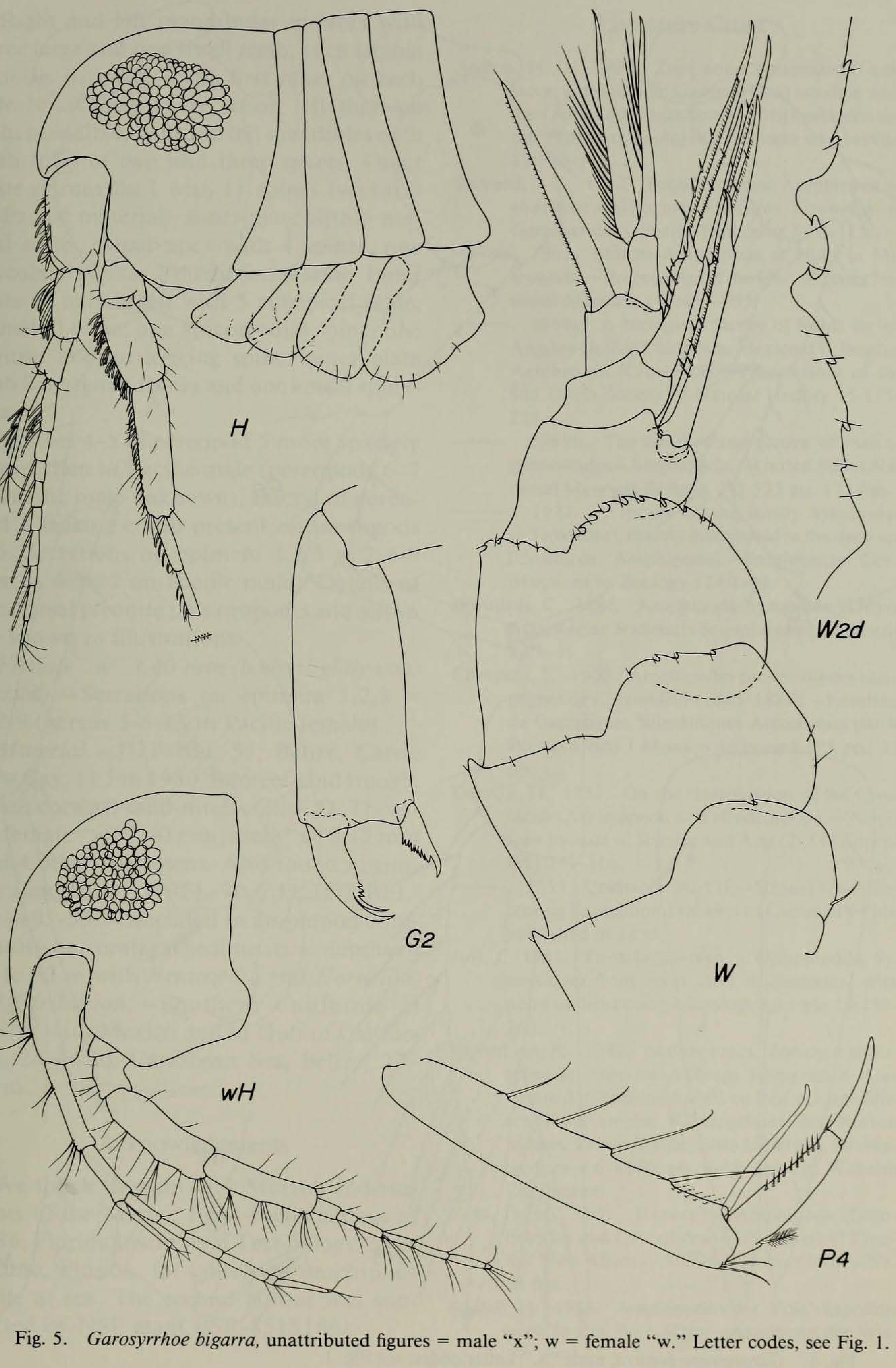

Fig. 5. *Garosyrrhoe bigarra,* unattributed figures = male "x"; w = female "w." Letter codes, see Fig. 1.

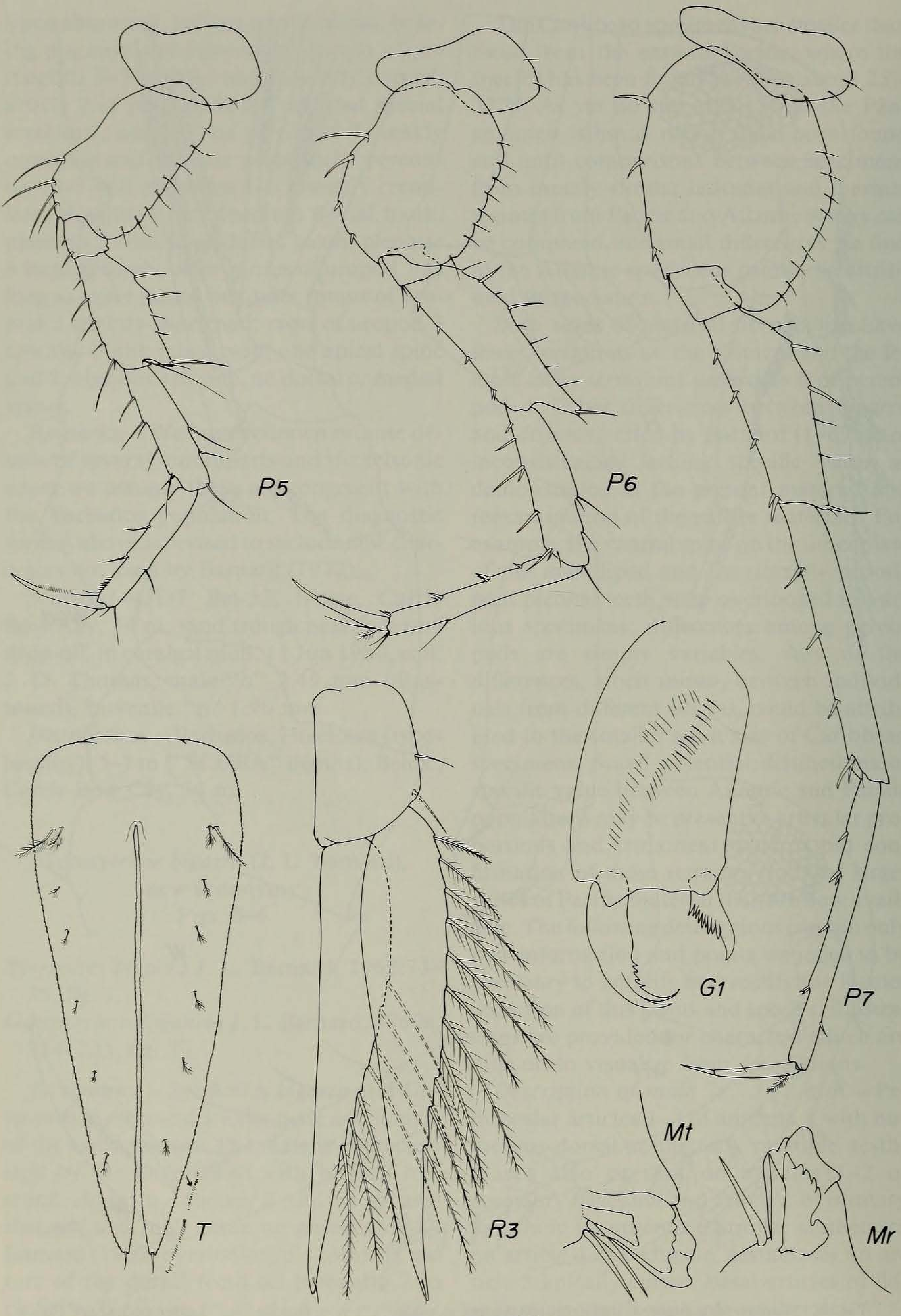

Fig. 6. *Garosyrrhoe bigarra,* male "x." Letter codes, see Fig. 1.

Right and left mandibular incisors with three large and one small teeth, each lacinia mobilis with five teeth, first raker on each side broadened, more so on left than on right mandible, right and left mandibles each with total of two and three rakers. Outer plate of maxilla 1 with 11 spines (versus 9 in Pacific material), inner plate with 6 medial setae, palpar apex with 4 spines, one apicolateral seta, 2 mediofacial setae. Inner plate of maxilliped with 5 subapical setae, 2 medial setae, one apicomedial spine, one ventral hooked locking spine; outer plate with 8 marginal spines and one apical spine-seta.

Articles 4–5 of pereopod 5 more sparsely armed than in Pacific male (pereopods 6–7 in Pacific male unknown). Dactyl of pereopod 7 lacking comb present on pereopods 3–6. Serrations on epimera 1,2,3 = 2-4-9 (versus 4-7-12 on Pacific male). Details of one dorsal pleonite plus uropod 3 and telson are shown in illustrations.

Female "w" 3.40 mm (body slightly contracted).—Serrations on epimera 1,2,3 = 2-2-9 (versus 5-6-13 in Pacific female).

Material.—JDT BEL-53, Belize, Carrie Bow Cay, 11 Jun 1980, forereef sand trough, 29 m, coralgal sand-mud, coll. J. D. Thomas, female "w" 3.40 mm, male "x" 3.12 mm and 4 other specimens. Also found in similar samples: JDT BEL-9B,C,D; JDT BEL-14; -19; -53. Associated in amphipod community on coralagal sediments at depths of 27 to 33 m with *Netamelita* and *Hornellia.*

Distribution.—Southern California at border with Mexico and in Gulf of California, 24–44 m; Caribbean Sea, Belize, 27–33 m.

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