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RECORDS OF MARINE ISOPOD CRUSTACEANS ASSOCIATED WITH THE CORAL *MADRACIS MIRABILIS* FROM BARBADOS

Brian Kensley and Paul Snelgrove

Abstract.—Eleven isopod species are recorded from the coral *Madracis mirabilis* in Barbados. Two of these are described as new: *Chalixanthura lewisi,* which differs from its congener in possessing more antennal and antennular flagellar articles and a shorter maxillipedal endite, and in lacking a strongly incised uropodal exopod, and *Eisothistos teri,* which is characterized by the possession of middorsal spination of the telson, a recurved tooth on the female uropodal exopod, and a laminate process on the basal peduncular article of the antennule. Five of the previously described species had thus far only been recorded from Belize in the western Caribbean.

Since the first description of the coral reefs of Barbados, West Indies by Lewis (1960), a number of studies have contributed to the quantification of the marine fauna around the island (e.g., Ott 1975, Lewis and Bray 1983, Tomascik and Sander 1986). However, little work has been done on the cryptofauna associated with these reefs, and a baseline study of the organisms present is lacking.

In April 1985, a study of the crustaceans associated with *Madracis mirabilis* was undertaken along the west coast of the island. *Madracis mirabilis* is an erect branching coral that grows in small isolated heads in shallow water (approximate depth 5 m) or in large monospecific beds in deeper water (approximate depth 10 m). The spaces and crevices between the branches provide an ideal habitat for a diverse crustacean cryptofauna that is numerically dominated by isopod species. The present paper documents this isopod fauna, which includes two new species of anthurideans.

Holotypes and paratypes are deposited in the National Museum of Natural Sciences, Ottawa (NMNS); paratypes are also deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

Methods

Swimming transects perpendicular to shore were used to locate *M. mirabilis* at six sites along the west coast of Barbados (Fig. 1). Between June and October 1985, each of the sites was visited three times, and five samples were obtained during each visit. Samples were taken from the large beds by forcing a section of PVC tubing into the coral and then inserting a metal plate to cut the coral off at the base. A polyurethane bag was then wrapped tightly around the base of the tubing and the coral allowed to fall into the bag. Once the contents had settled, the tubing and metal plate were gently removed and the bag sealed. At the Paynes Bay site *M. mirabilis* was found only in isolated heads approximately 20 cm in diameter, therefore sampling was accomplished by wrapping a polyurethane bag around the head and prying it from the substrate with the metal plate. Samples were then transported to a Bellairs Research Institute for overnight treatment with an irritant solution of 20 ml 4% formalin and 51 ml seawater (Brander et al. 1971), before washing over a 0.297 mm sieve and fixing in 5% formalin the following morning. The washings and coral were later examined under a dissecting microscope and all crustaceans were removed and stored separately. The isopods found in these samples are described below.

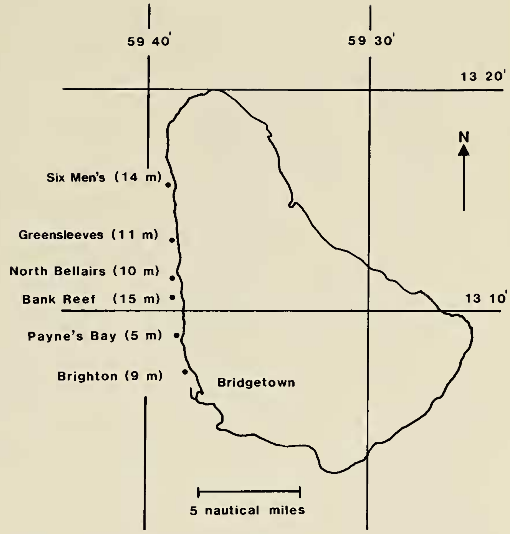

Fig. 1. Map of Barbados, West Indies, with sampling sites and approximate depths.

Family Anthuridae
Chalixanthura lewisi, new species
Figs. 2–5

Material.—HOLOTYPE, NMNS NMC-C-1986-1122, non-ovig. ♀, 3.0 mm, Bank Reef, 11 Jun 1985; PARATYPES, NMNS, 3 juvs., North Bellairs, 19 Jun 1985; 4 non-ovig. ♀, 2.1–3.1 mm, Six Men's, 1 Jun 1985; 2 non-ovig. ♀, 2.0 mm, 1 juv., Six Men's, 1 Jun 1985; 2 non-ovig. ♀, 1 juv., Bank Reef, 11 Jun 1985; 1 non-ovig. ♀, 3 juvs., North Bellairs, 19 Jun 1985; 2 non-ovig. ♀, Six Men's, 1 Jun 1985; 2 non-ovig. ♀, 4 juvs., Bank Reef, 11 Jun 1985; 2 juvs., Brighton, 5 Jul 1985; 1 ♂, 2.1 mm, Six Men's, 1 Jun 1985; 1 ♂, 2.1 mm, Six Men's, 19 Jul 1985; 1 ♂, damaged, Sox Men's, 1 Jun 1985. An additional 40 juvs. collected at Paynes Bay, 13 Jul 1985. PARATYPES, USNM 211428, 5 non-ovig. ♀, 2.0 mm, Brighton, 20 Aug 1985; PARATYPES, USNM 211429, 2 ♂, 2.2 mm, Greensleeves, 26 Jun 1985.

Description.—Female: Body about 10× longer than wide, widest at pereonite 6. Proportions: $C < 1 < 2 = 3 < 4 > 5 > 6 > 7$. Cephalon with very low rounded rostral point; eyes small, pigmented, of about 10 ommatidia. Pleonites short, free, 1–4 subequal, 5 slightly longer, 6 with posterior margin broadly bilobed. Telson lacking statocysts, lanceolate, widest at midlength, lateral margins in posterior half with 6 serrations; few setae on rounded apex.

Basal antennular peduncular article longest and broadest; flagellum of 3 articles, article 2 longest, with single aesthetasc, article 3 with 2 aesthetascs. Antennal peduncle with article 2 longest and widest; articles 3 and 4 together slightly shorter than article 5; flagellum of 7 setose articles. Mandibular palp of 3 articles; terminal article bearing 3 spines; lamina dentata of 5 serrations; molar short, truncate; incisor of 2 or 3 sclerotized cusps. Maxilla with 6 distal teeth. Maxilliped with palp of 5 articles, article 3 longest; broad endite almost reaching base of palp article 4, distally acute.

Pereopod 1, propodus slightly expanded, palm straight, bearing few simple setae; unguis ¾ length of remainder of dactylus, with short auxiliary spine at base. Pereopods 2 and 3 similar, propodi less expanded than in pereopod 1, with 2 sensory spines on palm; short strong auxiliary spine at base of dactylar unguis. Pereopod 7, carpus with short anterior margin, shorter than posterior margin, small sensory spine at posterodistal angle; propodus with posterodistal sensory spine and 2 elongate distally fringed anterodistal spines. Pleopod 1, exopod operculiform, with 9 marginal plumose setae; endopod about ⅔ length and ¼ greatest width of exopod, with 2 distal plumose setae. Uropodal sympod with mesioventral

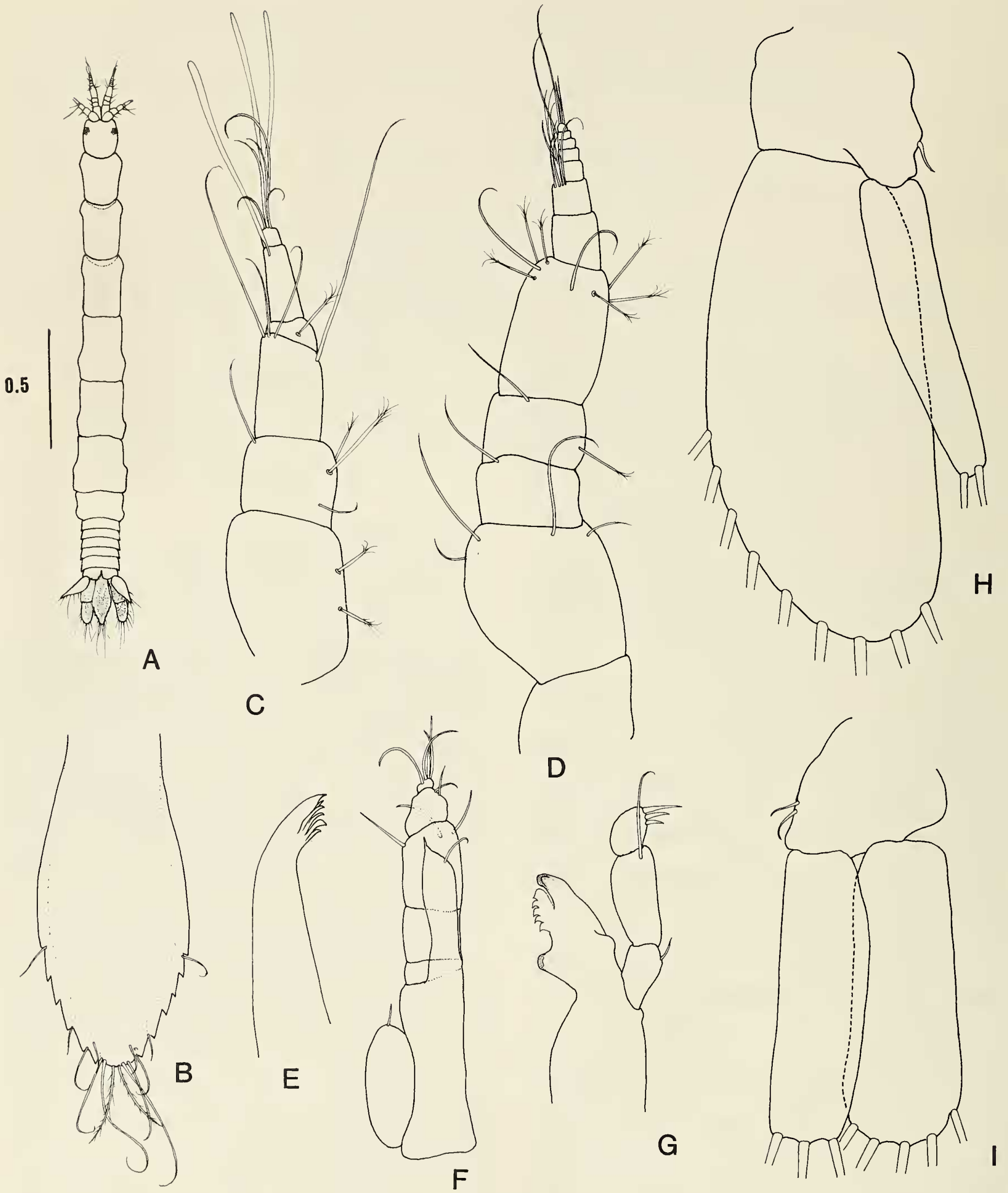

Fig. 2. *Chalixanthura lewisi,* female: A, Adult in dorsal view; B, Telson; C, Antennule; D, Antenna; E, Maxilla; F, Maxilliped; G, Mandible; H, Pleopod 1; I, Pleopod 2.

row of plumose setae; exopod ovate, apically acute, with 2–3 distal serrations on outer margin and several elongate setae; endopod equal in length to basis, distally broadly rounded, distolateral margin serrate, bearing elongate simple setae.

Male: Body about 13× longer than wide. Proportions: $C > 1 = 2 = 3 < 4 > 5 = 6 > 7$. Cephalon with low rostral point. Eyes enlarged, of about 30 ommatidia, almost contiguous middorsally, extending ventrally and leaving narrow median strip in which

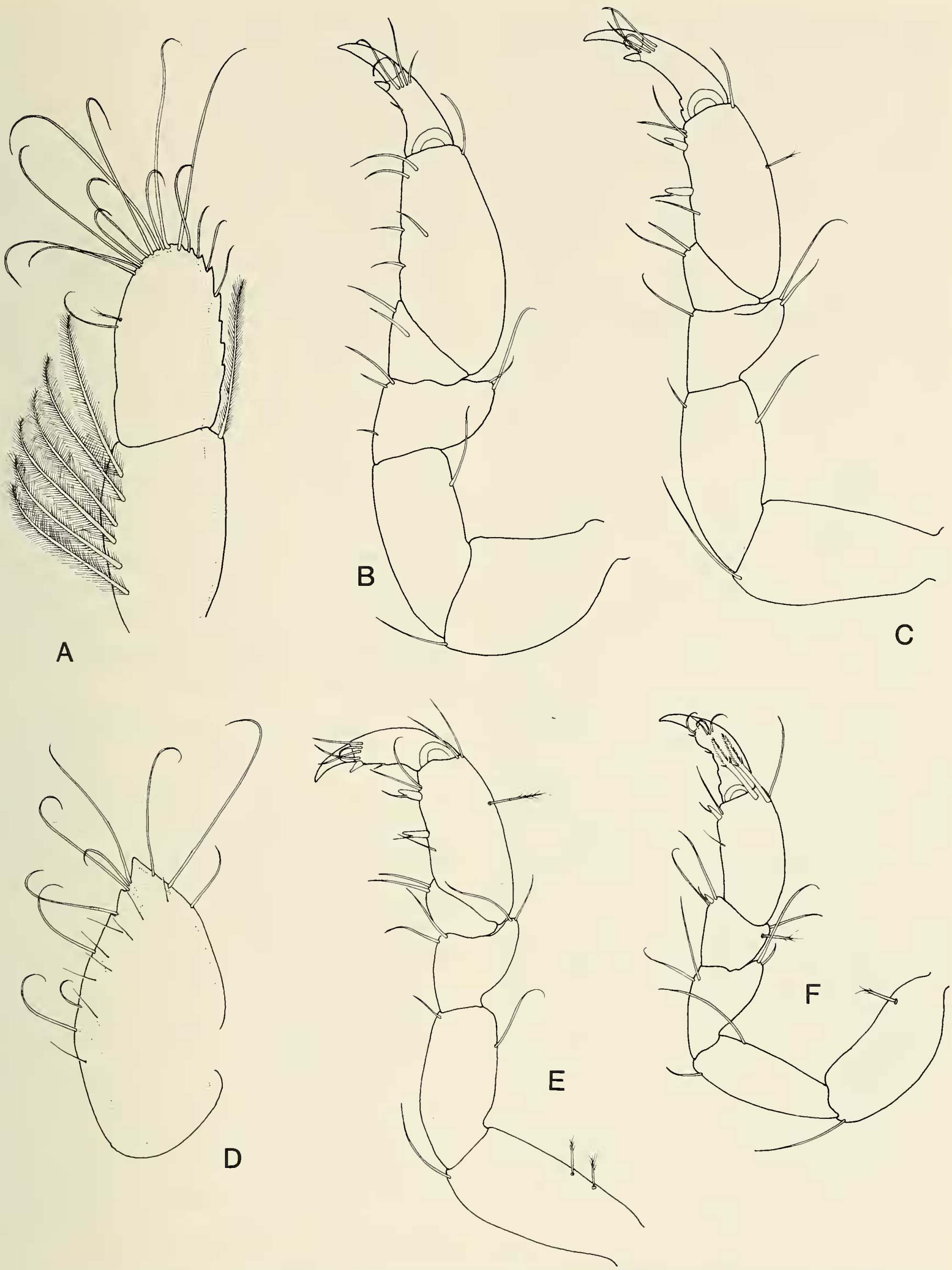

Fig. 3. *Chalixanthura lewisi,* female: A, Uropodal sympod and endopod; B, Pereopod 1; C, Pereopod 2; D, Uropodal exopod; E, Pereopod 3; F, Pereopod 7.

mandibular palp and maxilliped accommodated. Pleonites short, free, 1–4 subequal, 5 slightly longer, 6 with posterior margin middorsally bilobed. Telson lanceolate, posterior half of lateral margins with 8–9 serrations, several setae on rounded apex.

Antennular flagellum of 11 articles, proximal articles bearing numerous aesthetascs, number of aesthetascs reduced distally. Antenna similar to female, flagellum of 6 or 7 setose articles. Mandibular palp of 3 articles, terminal article with 4 spines; body of mandible reduced to narrow columnar structure. Maxilliped segmentation obscure, at least 3 distal articles, endite lacking.

Pereopod 1, propodus with slightly concave palm bearing 2 basally broadened spines, mesial surface near palm with 7 spines; unguis ⅔ length of remainder of dactylus, with auxiliary spine more slender than in female. Pereopods 2 and 3 similar; propodus more elongate and slender than in female, with 2 (pereopod 2) or 3 (pereopod 3) sensory spines on palm. Pereopod 6, carpus with anterior margin shorter than posterior, with posterodistal spine; propodus with 3 serrate sensory spines on posterior margin. Pereopod 7, carpus as in pereopod 6; propodus with strong serrate sensory spine at posterodistal angle, and with 2 elongate distally fringed spines anterodistally. Pleopod 1, rami subequal in length, endopod half width of exopod. Pleopod 2, copulatory stylet elongate, slender, reaching by more than half its length beyond distal margin of ramus, articulating in proximal half of endopod; latter with 5 distal plumose setae; exopod broader and slightly longer than endopod, with transverse suture at about midlength, 10 plumose setae on distal margin. Pleopod 3, exopod longer and wider than endopod with transverse suture. Uropodal endopod longer than sympod, with serrate distolateral margin, several elongate simple setae distally; exopod narrowly lanceolate, apically acute, outer margin with 5 serrations and few elongate setae.

Remarks.—The following features place this species in the group of genera apparently related to *Panathura*: Short free pleonites, pleonite 1 exopod operculiform, telson lacking statocysts, large apically acute maxillipedal endite, maxillipedal palp of 5 articles, pleopods 2–5 with biarticulate exopods, pereopod 1 propodus only slightly more inflated than in pereopods 2 and 3, posterior pereopods with carpus having anterior margin shorter than posterior margin.

Of these genera, the present species most closely resembles the monotypic *Chalixanthura* Kensley, 1984, in overall body shape and especially in the modifications of the male. The major differences lie in the antennal and antennular flagella which have more articles in the present species, and in the maxillipedal endite of the female, which is much shorter in *C. scopulosa.* The present species also does not have the strongly incised uropodal exopod seen in the female of *C. scopulosa.* The maxillipedal endite more closely resembles that of *Expanathura* Wägele, 1981, another member of the "*Panathura*" group of genera.

Etymology.—The species is named for Dr. John B. Lewis, professor of Oceanography at McGill University, who has contributed more than anyone to the knowledge of the marine fauna of Barbados.

Eisothistos teri, new species

Figs. 6, 7

Material.—HOLOTYPE, NMNS NMC-C-1986-1134, non-ovig. ♀, 3.2 mm, Six Men's, 1 Jun 1985. PARATYPES, NMNH, 2 ♂, 2.0 mm, Brighton, 20 Aug 1985; 1 ♂, damaged, Six Men's, 1 Jun 1985; 1 ♂, 1.8 mm, Greensleeves, 26 Jun 1985; 3 ♂, 2.0 mm, Bank Reef, 27 Jul 1985; 2 non-ovig ♀, 1.4 mm, Greensleeves, 26 Jun 1985; 2 non-ovig. ♀, 1.8 mm. 1 damaged, Six Men's 1 Jun 1985; 2 non-ovig. ♀, 1.3 mm, 2.4 mm, Six Men's, 1 Jun 1985; 1 non-ovig. ♀, 2.4 mm, Brighton, 20 Aug 1985. PARATYPES, USNM 211430, 3 ♂, 2.0 mm, Bank Reef, 11 Jun 1985; PARATYPES, USNM 211431, 2 non-ovig. ♀, 1.3 mm, 1.8 mm, Greensleeves, 13 Aug 1985.

Description.—Female: Body about 7× longer than wide. Only tailfan markedly indurate. Prominent anterolateral eye with 5 or 6 ommatidia. Pleonites short, free, 1–5 subequal, 6 longer than preceding pleonites, with broad posterolateral lobes separated by wide middorsal notch. Telson widening

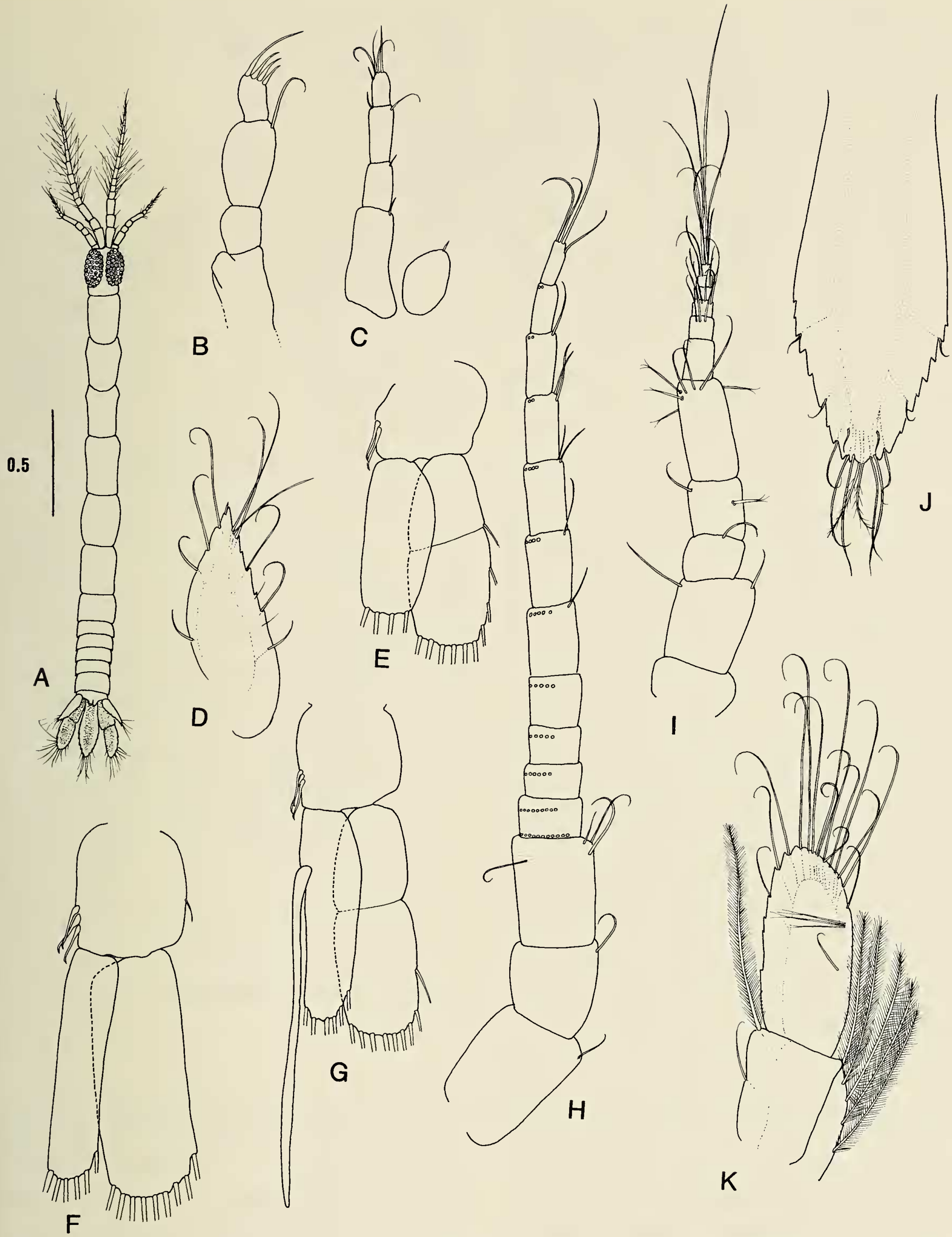

Fig. 4. *Chalixanthura lewisi,* male: A, Adult in dorsal view; B, Mandible; C, Maxilliped; D, Uropodal exopod; E, Pleopod 3; F, Pleopod 1; G, Pleopod 2; H, Antennule; I, Antenna; J, Telson; K, Uropodal endopod and sympod.

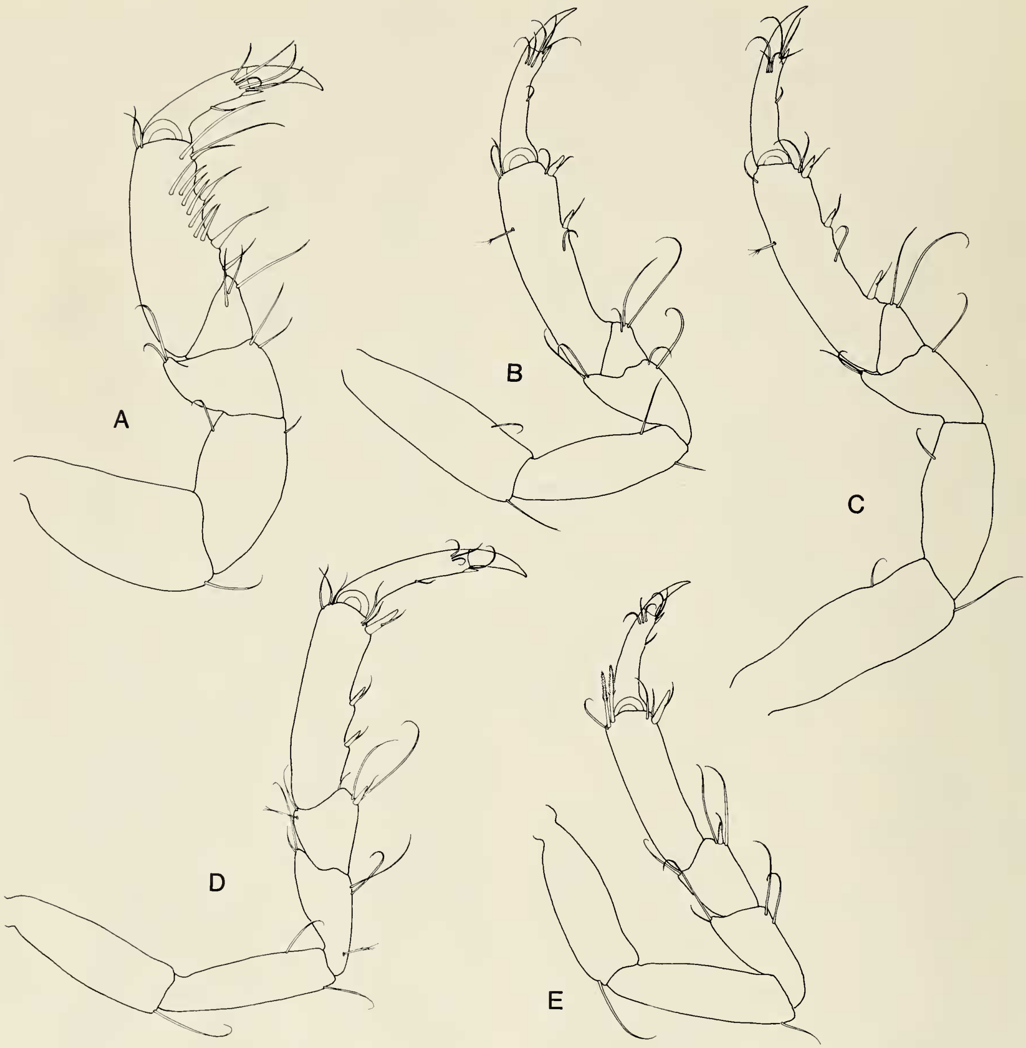

Fig. 5. *Chalixanthura lewisi,* male: A, Pereopod 1; B, Pereopod 2; C. Pereopod 3; D, Pereopod 6; E, Pereopod 7.

posteriorly, broadly rounded posterior margin deeply incised into 13–14 acute to narrowly rounded teeth; middorsally with row of 8 or 9 well separated erect teeth, becoming progressively larger and somewhat recurved posteriorly.

Antennule with basal article broad, bearing mediodistal flattened, narrowly triangular, apically narrowly-rounded process bearing single seta; peduncular articles 2–3 narrow, subequal; flagellum of 7 articles, article 1 short, article 2 longest; single aesthetasc on penultimate and antepenultimate articles each. Antenna with peduncular article 5 longest; flagellum of 6 setose articles. Mandible lacking palp; incisor with single broad strongly sclerotized cusp; subterminal lamina dentata of 2 teeth. Maxilla having 2 broad and 4 narrow distal teeth. Maxilliped elongate, slender, proximal segmentation obscure; short distal article with 4 setae.

Pereopod 1, carpus triangular, with very short free anterior margin; propodus elongate, distally tapering, palm unarmed except for few distal setae; unguis about ⅔ length of remainder of dactylus. Pereopod 2, ischium having 11 sclerotized tubercles near posterior margin, merus with 2 sclerotized tubercles; carpus triangular; propodus bearing row of about 20 fringed scales (appearing as spines in lateral view) plus strong posterodistal fringed spine; unguis about ½ length of remainder of dactylus. Pereopod 7, carpus roughly rectangular with row of about 9 fringed scales plus strong posterodistal fringed spine; propodus elongate-rectangular, with row of about 14 fringed scales on posterior margin plus strong posterodistal fringed spine; unguis slightly less than ½ length of remainder of dactylus. Pleopod 1, rami fused for ¾ length, distal endopod and exopod with 2–4 plumose setae each. Uropodal sympod with mesial margin serrate, 4 spines near lateral margin; endopod with mesial margin longer than lateral margin, extending well beyond telsonic apex, margins bearing acute to rounded teeth; exopod proximally broad, margins serrate, with distal spine-like, apically acute extension bearing strong recurved tooth on dorsal surface (2 on right, 1 on left in holotype).

Male: Body about 15× longer than wide. Eyes relatively larger than in female, each with 9–10 ommatidia, extending onto ventrolateral surface; mouthparts obsolete. Pleonites free, 1–3 subequal, longer than 4 and 5. Telson widening slightly posteriorly, dorsally unarmed, posterior margin with 12 acute to narrowly rounded teeth.

Antennule with basal article slightly longer than article 2; articles 2 and 3 subequal; flagellum of 8 articles, article 1 inserted obliquely on peduncle, bearing 9 elongate aesthetascs; article 2 with 2 aesthetascs; articles 3–8 each with single aesthetasc. Antennal peduncle with 3 proximal peduncular articles short, 2 distal articles elongate, article 5 just less than twice length of article 4; flagellum of 6 setose articles.

Pereopod 1, carpus triangular, with short free anterior margin; propodus elongate-rectangular, with 19–20 fringed spines near posterior margin plus posterodorsal unfringed spine; unguis just more than ½ length of remainder of dactylus. Pereopod 2, propodus elongate-rectangular, with few posterodistal fringed scales and strong fringed posterodistal spine; unguis ½ length of remainder of dactylus. Pereopod 7, carpus rectangular, with 5 fringed scales and strong fringed posterodistal spine; propodus with about 14 fringed scales on posterior margin and 2 strong fringed spines. Pleopod 1, basis about ⅔ length of endopod; rami separate, each with 3–4 elongate plumose setae on distal margin. Pleopod 2, basis ¼ length of rami; endopod with copulatory stylet attached proximally; stylet distally rounded, not reaching beyond rami.

Remarks.—Of the 12 species of *Eisothistos* described, only four have middorsal spination of the telson, similar to that seen in the present species. These are the two Mediterranean species *E. macrurus* Wägele, and *E. pumilis* Wägele, *E. antarcticus* Vanhöffen from the Antarctic, and *E. crateris* Kensley from St. Paul and Amsterdam Islands. None of these species show the arrangement of large slightly recurved teeth increasing in length posteriorly on the telson of the female, and none possess the heavy recurved tooth on the "spike" of the uropodal exopod. One striking feature, the laminate process of the basal article of the female antennule, immediately separates *E. teri* from all other described species. A similar but more elaborate structure is seen in *Licranthura amyle* Kensley and Schotte, 1987. In the latter, however, the process arises from the third peduncular article of the antennule.

Etymology.—The species is named for Teri Snelgrove, who has the kindness to feign interest in marine biology.

Mesanthura paucidens Menzies and Glynn

Mesanthura paucidens Menzies and Glynn, 1968:27, fig. 9a–g.—Kensley, 1982:335, fig. 150, 151.

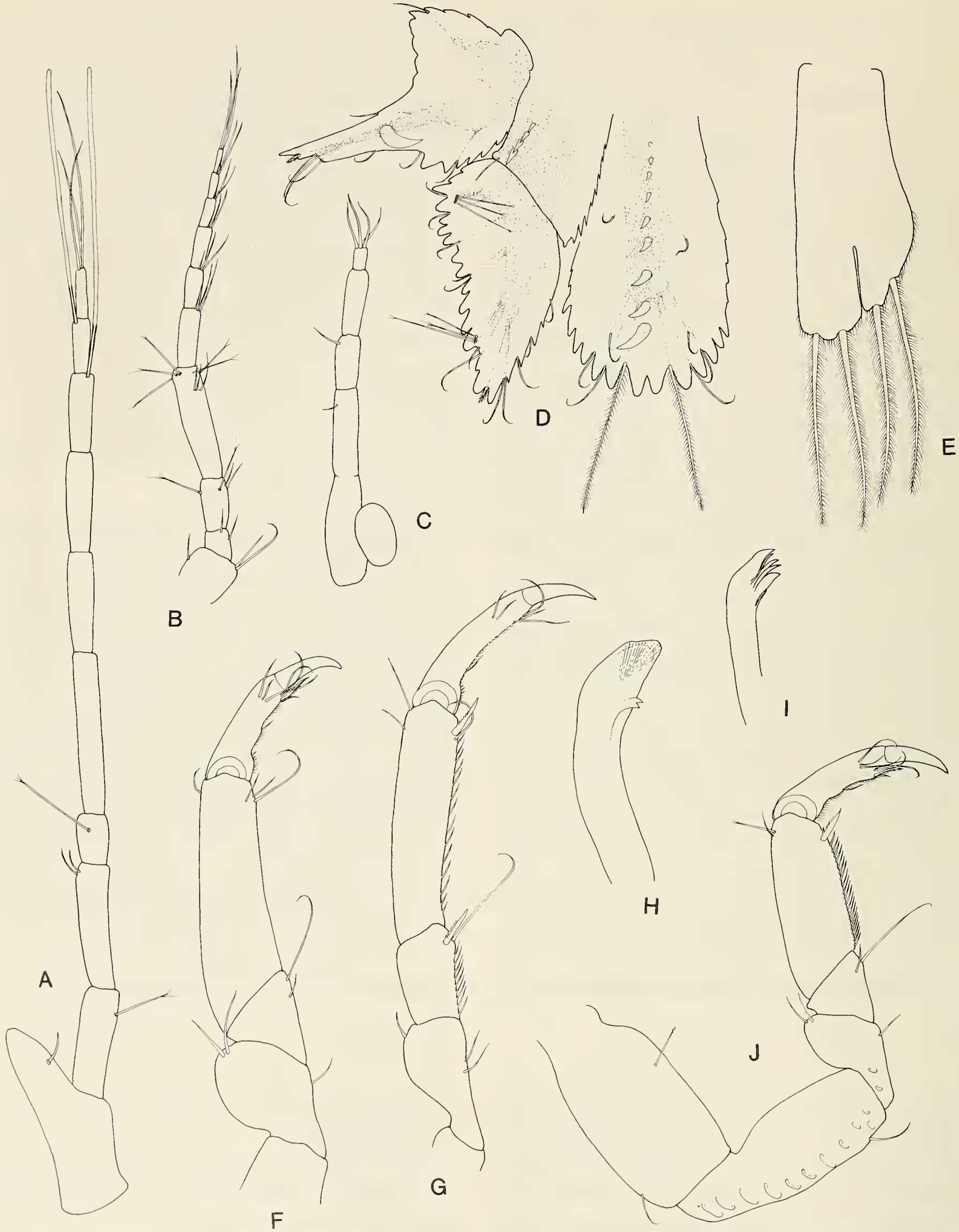

Fig. 6. *Eisothistos teri,* female: A, Antennule; B, Antenna; C, Maxilliped; D, Left uropod and telson; E, Pleopod 1; F, Pereopod 1; G, Pereopod 7; H, Mandible; I, Maxilla; J, Pereopod 2.

Material.—1 specimen from Paynes Bay, 22 Oct 1985.

Previous records.—Puerto Rico; Carrie Bow Cay, Belize; shallow water.

Mesanthura pulchra Barnard

Mesanthura pulchra Barnard, 1925:145, fig. 9e—Kensley, 1982:337–338, fig. 152, 153.

Material.—3 specimens, Six Men's, 1 Jun

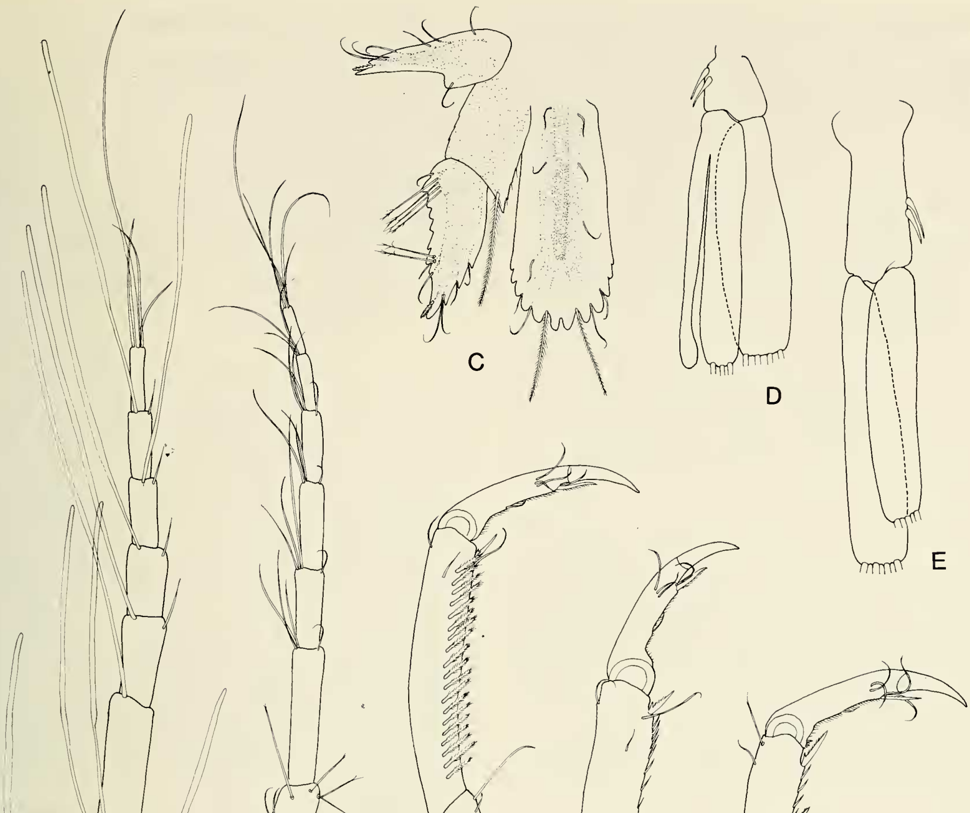

Fig. 7. *Eisothistos teri,* male: A, Antennule; B, Antenna; C, Left uropod and telson; D, pleopod 2; E, Pleopod 1; F, Pereopod 1; G, Pereopod 2; H, Pereopod 7.

1985; 1 specimen Bank Reef, 19 Jul 1985; 3 specimens, Paynes Bay, 13 Jul 1985; 1 specimen, Bank Reef, 8 Sep 1985; 1 specimen, North Bellairs, 19 Jun 1985.

Minyanthura corallicola Kensley

Minyanthura corallicola Kensley, 1982: 343, figs. 157, 158.

Material.—1 non-ovig. ♀, 2 manca, Six Men's, 1 Jun 1985. Numerous other specimens from Six Men's (1 Jun; 19 Jul; 16 Sep 1985), Greensleeves (26 Jun; 13 Aug; 13 Oct 1985), Bank Reef (11 Jun; 27 Jul; 8 Sep 1985). Present but rare at North Bellairs (19 Jun; 2 Aug 1985), Paynes Bay (22 Oct 1985), and Brighton (20 Aug; 10 Oct 1985). Overall, the most abundant anthuridean species.

Previous records.—Carrie Bow Cay, Belize, 6–24 m.

Family Cirolanidae

Cirolana minuta Hansen

Cirolana minuta Hansen, 1890:347, pl. 3 fig. 5, pl. 4 fig. 1.

Material.—2 specimens, Paynes Bay, 13 Jul 1985. Other specimens from Six Men's (19 Jul; 16 Sep 1985), Greensleeves (26 Jun; 13 Aug; 13 Oct 1985), Bank Reef (8 Sep 1985), Paynes Bay (13 Jul 1985), Brighton (5 Jul; 20 Aug; 10 Oct 1985). Rare at all sites and absent from North Bellairs.

Previous records.—St. Thomas, West Indies.

Family Gnathiidae

Gnathia rathi Kensley

Gnathia rathi Kensley, 1984:43, fig. 27a–i.

Material.—5 specimens, Six Men's, 1 Jun 1985; 12 praniza, Six Men's, 1 Jun 1985. Numerous other specimens from Six Men's (1 Jun; 19 Jul; 16 Sep 1985), Greensleeves (26 Jun 1985; 13 Aug; 13 Oct 1985), Bank Reef (11 Jun; 27 Jul; 8 Sep 1985), North Bellairs (19 Jun; 2 Aug; 24 Sep 1985). Present but rare at Paynes Bay (13 Jul; 27 Aug; 22 Oct 1985) and Brighton (5 Jul; 20 Aug; 10 Oct 1985).

Previous records.—Carrie Bow Cay, Belize, 0.5–36 m.

Family Stenetriidae

Stenetrium patulipalma Kensley

Stenetrium patulipalma Kensley, 1984:52, figs. 33, 34.

Material.—4 ♀, Six Men's, 1 Jun 1985. Numerous other specimens from Six Men's (1 Jun; 19 Jul; 16 Sep 1985), Greensleeves (26 Jun; 13 Aug; 13 Oct 1985), Bank Reef (11 Jun; 27 Jul; 8 Sep 1985), North Bellairs (19 Jun; 2 Aug; 24 Sep 1985), Brighton (5 Jul; 20 Aug; 10 Oct 1985). Present but rare at Paynes Bay (13 Jul; 27 Aug 1985).

Previous records.—Carrie Bow Cay, Belize, 9.1–15.2 m.

Stenetrium spathulicarpus Kensley

Stenetrium spathulicarpus Kensley, 1984: 55, figs. 35, 36, 37d.

Material.—1 ♂, 2 ♀, 3 juvs., Paynes Bay, 27 Aug 1985; 1 ♂, 3 juvs., Six Men's, 1 Jun 1985. Numerous other specimens from Paynes Bay (13 Jul; 27 Aug; 22 Oct 1985). Present but rare at Six Men's (1 June; 19 Jul; 16 Sep 1985), Greensleeves (26 Jun; 13 Aug; 13 Oct 1985), Bank Reef (11 Jun; 27 Jul; 8 Sep 1985), North Bellairs (19 Jun; 2 Aug 1985), and Brighton (5 Jul; 20 Aug; 10 Oct 1985).

Previous records.—Carrie Bow Cay, Belize, intertidal—20 m.

Family Janiridae

Carpias minutus (Richardson)

Bagatus minutus (Richardson), Pires, 1982: 231, figs. 1–16.

Carpias minutus: Bowman and Morris, 1979:650, figs. 1–3, 4a–d.

Material.—1 ♂, 1 ovig. ♀, 1 ♀, Six Men's, 1 Jun 1985. Numerous other specimens from Six Men's (1 Jun; 19 Jul; 16 Sep 1985), Greensleeves (26 Jun; 13 Aug; 13 Oct 1985), Bank Reef (11 Jun; 27 Jul; 8 Sep 1985), North Bellairs (19 Jun; 2 Aug; 24 Sep 1985), Brighton (5 Jul; 20 Aug; 10 Oct 1985). Present but rare at Paynes Bay (13 Jul; 27 Aug 1985).

Previous records.—Bermuda; Georgia, U.S.A. to Brazil; Azores, intertidal to shallow intratidal.

Family Joeropsidae
Joeropsis personata Kensley

Joeropsis personatus Kensley, 1984:70, fig. 44.

Material.—3 ♂, Bank Reef, 27 Jul 1985. Other specimens present but rare at Bank Reef (11 Jun; 27 Jul; 8 Sep 1985). Not present at any other site.

Previous records.—Carrie Bow Cay, Belize, 1–20 m.

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