

STUDIES ON THE FAUNA OF CURAÇAO AND OTHER
CARIBBEAN ISLANDS: No. 161.

COPEPODA ASSOCIATED WITH WEST INDIAN
ACTINIARIA AND CORALLIMORPHARIA

by

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Four new species of cyclopoid copepods are described: three in the genus *Asteropontius*, one in the genus *Paramolgus*. These two genera were previously recorded from the Indo-West Pacific only. — *Aspidomolgus stoichactinus* Humes is recorded from a number of new localities and from a new host, the actinarian *Homostichanthus denticulosus*. — Two species, both new, are recorded from Corallimorpharia (= Asclerocorallia); up to now, no copepod associates were known from this group of coelenterates. The remaining species have been found on Actiniaria.

The present material has been collected at three occasions: during a stay on Curaçao and Bonaire (Netherlands Antilles) in 1958/59, and again in 1973/74, and during a visit in 1963 to La Parguera, Puerto Rico.

The copepods recorded here as associates of Actiniaria and Corallimorpharia (Asclerocorallia) all belong to the Cyclopoida. Two sections of these are represented: the Poecilostomata and the Siphonostomata. Members of other copepod groups were not found in the Antillean region on the hosts in question.

Three genera were found: the siphonostome genus *Asteropontius* Thompson & Scott, 1903, with three species (all new), and the poecilostome genera *Paramolgus* Humes & Stock, 1972, with one new species, and *Aspidomolgus* Humes, 1969, with one, already known, species.

Both *Asteropontius* and *Paramolgus* contained already several species, all from the Indo-West Pacific; these genera are new to the West Indies. *Aspidomolgus* is monospecific, endemic to and widely distributed in the West Indian region; in the present paper

some notes on its morphological variability, some new records, and a new host are presented.

The following taxa are treated in this paper:

Family ASTEROCHERIDAE

Genus *Asteropontius* Thompson & Scott, 1903 (diagnosis emended and restricted)

A. parvipalpus n. sp., from the actinarian *Condylactis gigantea* (Weinland) in Curaçao.

A. ungelatus n. sp., from the actinarians *Stoichactis anemone* (Ellis) and *Phymanthus crucifer* (Lesueur) in Puerto Rico.

A. longipalpus n. sp., from the corallimorpharian *Ricordea florida* Duchassaing & Michellotti in Puerto Rico.

Genus *Asteropontoides* nov., based on *Asteropontius attenuatus* Thompson & Scott, 1903 (type-species), and *A. nicobaricus* Sewell, 1949, both from the Indian Ocean.

Incertae sedis (discussed on the basis of literature data only):

Asteropontius littoralis Ummerkutty, 1962, *A. sewelli* Ummerkutty, 1962, and *A. mycalei* Krishnaswamy, 1959.

Family LICHOMOLGIDAE

Genus *Paramoligus* Humes & Stock, 1972

P. antillianus n. sp., from the corallimorpharian *Ricordea florida* Duchassaing & Michellotti, from Puerto Rico.

Genus *Aspidomoligus* Humes, 1969.

A. stoichactinus Humes, 1969, from the actinarian *Stoichactis anemone* (Ellis) (= *S. helianthus* (Ellis)), from Curaçao, Bonaire, Puerto Rico, and the Florida Keys;

and from the actinarian *Homostichanthus denticulosus* (Lesueur) (new host) from the Grenadines, St. Martin, and Puerto Rico.

The greater part of the material treated in this paper is preserved in the Zoologisch Museum, Amsterdam (ZMA); a number of samples of *Aspidomoligus stoichactinus* also in the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH). Unless otherwise stated, all material was collected by the author. The copepods were obtained by washing the hosts in a solution of 7% of magnesium chloride in sea water.

Measurements were taken from specimens placed in lactophenol. Drawings were made from dissected specimens mounted in Reyne's modification of Faure's medium.

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DELIMITATION OF THE GENUS *ASTEROPONTIUS* AND RELATED TAXA

The following species have been attributed by their authors to the genus *Asteropontius* Thompson & Scott, 1903: *typicus* Thompson & Scott, 1903 (type-species, by subsequent selection, vide STOCK, 1966: 164), *attenuatus* Thompson & Scott, 1903, *nicobaricus* Sewell, 1949, *mycalei* Krishnaswami, 1959, *sewelli* Ummerkutty, 1962, *littoralis* Ummerkutty, 1962, and *corallophilus* Stock, 1966. Several of these are incompletely known, which is the more annoying since salient details, pertaining to the acception or declination of the position of species in the genus *Asteropontius*, are sometimes unknown.

At any rate, it seems that from the very creation of *Asteropontius* by Thompson & Scott, several rather dissimilar types hide under this name. I find it hard to unite *A. typicus* Thompson & Scott and *A. attenuatus* Thompson & Scott in the same genus, especially because of the different chaetotaxis of leg 4, but also because of other characters.

The starting point of my considerations is that in *Asterocheres*, with its dozens of species, the morphology is very coherent (e.g. a constant armature of the posterior antenna, mandible, and legs),

with the exception perhaps of the anterior antenna which can have rather different numbers of articles (distad of the aesthete 1, 2, or 3 articles may be found).

From the more primitive genus *Asterocheres*, a gliding scale of intermediate links can be found, leading to *Scottocheres*. These links show a gradual reduction of the number of articles in the anterior antenna, a gradual reduction in number of elements on the legs 1 to 4, and a gradual reduction of the mandible palp.

Asteropontius s. str. can be diagnosed as follows (emended diagnosis): Anterior antenna (♀) still with 19 or 20 articles (thus not yet much reduced), with 1 or 2 articles distad of the aesthete; no supplementary aesthetes in ♂. Posterior antenna (♀, ♂): distal element on endopodite article 3 short, claw-like (long and more setiform in *Asterocheres*); this article bears in addition to the claw one more, setiform, element (2 such elements in *Asterocheres*). Mandible palp segment reduced, very short and unarticulate, or entirely absent; distal armature of palp consisting of one longer seta, which is in reduction (a long, 1- or 2-segmented palp, with at least 2 long setae in *Asterocheres*). Mandibular stylet distally widened, forming a transverse, toothed cutting blade (without transverse blade, styliform, smooth or dentate, in *Asterocheres*). Second endopodite article of leg 1 "normal" (i.e., trapezoidal). Chaetotaxis of the legs as in *Asterocheres*, i.e. endopodite article 3 of P2 with 2 terminal setae (and not I-1), exopodite article 3 of P4 with 8 elements (III-I-4), endopodite article 3 of P4 with 5 elements (1-1+I-2). Coxopodite of P4 with a long, plumose internal seta (reduced or lacking in *Asterocheres*). Basipodite of legs 1 to 4 with a well-developed lateral seta. Coxopodite of P1 with a medial seta. Fifth leg and urosome as in *Asterocheres*.

In addition to the type-species, *A. typicus* Thompson & Scott, 1903, we can place here with certainty *A. corallophilus* Stock, 1966, and the three new species described in the sequel.

A. littoralis Ummerkutty, 1962, comes close to *Asteropontius*, but can according to its description not be placed in that genus because of (1) the untoothed, unwidened mandibular stylet; (2) the

armature of the mandibular palp with 3 setae, of which 2 are long; (3) the absence of an inner seta on the coxopodite of P4; (4) the chaetotaxis formula of the 3rd endopodite article of P3 (1-2-3, versus 1-1+I-3 in typical *Asteropontius*).

Asteropontoides n. gen. can be diagnosed as follows (based on the descriptions and illustrations of THOMPSON & SCOTT, 1903, and SEWELL, 1949): Anterior antenna (♀) 18-segmented. Posterior antenna: distal element on endopodite article 3 long, setiform; further armature of this article as in *Asteropontius*. Mandible palp segment reduced, uniarticulate; distal armature consisting of 2 longer setae; mandibular stylet with a minute cutting blade. Chaetotaxis of P4 distinctive, in that the 3rd exopodite article bears 7 elements (III-I-3), and the 3rd endopodite article 4 elements (1-I-2). Coxopodite of P4 with plumose inner seta, basipod without lateral seta. Endopodite article 2 of leg 1 transformed, laterally concave, thus L-shaped. Fifth leg linear, very elongated. Urosome as in *Asteropontius*.

Type-species *Asteropontius attenuatus* Thompson & Scott, 1903; other species *Asteropontius nicobaricus* Sewell, 1949.

Asteropontius sewelli Ummerkuty, 1962, comes in several respects close to *Asteropontoides* (e.g. in the elongate nature of the 2nd endopod article of P4), but this similarity might be seemingly only. *A. sewelli* has the posterior antenna and the mandible (both stylet and palp) as in *Asterocheres*, and not as in *Asteropontius* or *Asteropontoides*. However, the lateral spine of exopodite article 1 of P1 in *A. sewelli* is not produced (it always is in *Asterocheres*, *Asteropontius*, and *Asteropontoides*). The chaetotaxis of the biramous legs in *A. sewelli* shows several deviating traits, e.g. the 3rd exopodite article of P1 shows a formula of II-I+1-2 (normally III-2-2); the 3rd exopodite article of P2 with 1-1+I-3 (normally 1-2-3); the 3rd exopodite article of P3 with II-I-4 (normally III-I-4). The coxopodite and basipodite of P4 are *Asterocheres*-like in armature. The 2nd exopodite article of P1 is, unlike the situation in *Asteropontoides*, unmodified. I feel that several of these characters, which I have taken from the original description and figures, need recon-

firmation, in particular the mandible structure, and the armature of P1, P2, and P3.

Asteropontius mycalei Krishnaswami, 1959, needs re-checking before it can be classified properly. At any rate, the posterior antenna and mandible are as in *Asterocheres* and not as in *Asteropontius*. The chaetotaxis of the biramous legs is probably indicated erroneously in KRISHNASWAMY'S figures, e.g. the 1st exopodite article of P1 is illustrated with the formula I-0 (normally I-1); the 3rd endopodite article of P1 with 1-2-4 (normally 1-2-3); the 3rd endopodite article of P2 with 0-I-3 (normally 1-2-3); the 3rd endopodite article of P3 with II-II-3 (normally 1-1+I-3); the 2nd endopodite article of P4 with 0-1 (normally 0-2); and the 3rd endopodite article of P4 with II-II-3 (normally 1-1+I-2).

In *Scottocheres* Giesbrecht, 1897, the final stage in this trend is reached. The anterior antenna (♀) has 16 or 17 articles, the aesthete is on the penultimate segment. The mandible palp has disappeared. Leg 1 lacks a median coxopod seta. The number of elements on endopodite article 2 of leg 1 is reduced to one. The 3rd endopodite article of P4 has, like *Asteropontoides*, 4 elements. The reductions in this genus start to touch the 3rd endopodite article of P3, that in some species still has 6 elements (1-1+I-3), in others only 5 (1-I-3). The male of *S. laubieri* Stock, 1967, has the latter formula, whereas the female of the same species shows the former formula. The 3rd exopodite article of P4 has 6 or 7 elements in *Scottocheres* (III-I-3 or II-I-3), versus 8 in the less modified genera (III-I-4). The 5th leg of *Scottocheres* is remarkable in that it forms a morphological link with the *Collocheres*-group: it has a clearly individualized basal segment.

It is possible that *Discopontius* Nicholls, 1944, from Australia, also belongs in this lineage. The anterior antenna (♀) has only 13 articles (though the aesthete is on the antepenultimate and not on the penultimate article). The mandible palp is stated to be absent, and the reduction of the endopodite of P4 has proceeded still farther in that it has become 2-segmented.

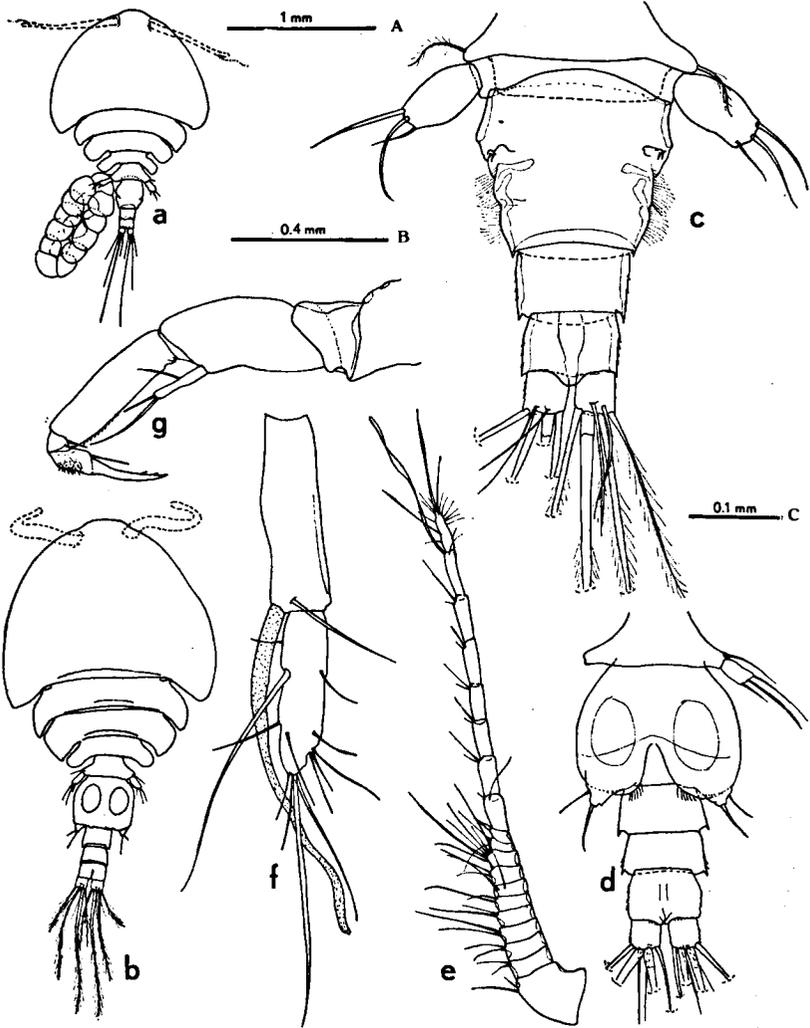


Fig. 176. *Asteropontius parvipalpus* n. sp., paratypes.
 a, female, dorsal (scale A); b, male, dorsal (B); c, urosome, ♀, dorsal (C); d, urosome, ♂, ventral (C); e, anterior antenna, ♀ (C); f, distal portion of anterior antenna, ♀ (D); g, posterior antenna, ♀ (E).

DESCRIPTION OF WEST INDIAN SPECIES

Asteropontius parvipalpus n. sp.

(Figs. 176–178)

Material: CURAÇAO: 1♀ (holotype), 1♂ (allotype), 33♀, 13♂, and 2 juveniles (paratypes), on the tentacles of the actiniarian *Condylactis gigantea* (Weinberg, 1860). Piscadera Bay, depth about 1 m, Nov. 15, 1973. (ZMA Co. 102.538). – Same host, same locality, but 2 to 3 m depth, Jan. 4, 1959 (23♀, 10♂, 6 juv.) and Jan. 8, 1959 (13♀, 13♂, 14 juv.) (ZMA).

Female: Length of the body (Fig. 176a), without furcal setae, 1412–1482 μm (mean 1447 μm , based on 5 specimens); greatest width of cephalosome 915–978 μm (mean 952 μm). Ovisacs elongately ovate, length 597–800 μm (mean 719 μm), diameter 305–338 μm (mean 320 μm), containing relatively few (20–25) eggs. Cephalosome the largest somite, wider than long. Metasome somites 1 to 3 with distinct epimera, gradually decreasing in width. Urosome consisting of the fifth pedigerous somite, which is trapezoidal, the genital somite, and two postgenital somites. The first urosome somite bears a plumose seta near the implantation of leg 5. The genital somite (Fig. 176c) consists of a smooth anterior part, separated by a notch from the posterior part that has ciliated margins. The postgenital somites show epidermal spinules along their lateral margins, but no armature or ornamentation along their posterior margins. The caudal ramus (Fig. 176c) is slightly longer than wide, $54 \times 46 \mu\text{m}$, with 4 plumose terminal setae, a dorsal seta implanted just over the base of the second-longest furcal seta, and a lateral seta which is displaced and implanted over the base of the longest furcal seta.

Anterior antenna (Fig. 176e) 19-segmented. Segments 1 to 8 each with 2 setae. Segment 9 with 6 setae, segment 10 with 2. Segment 11 with a spine. Segments 12 to 17 each with 2 setae. Segment 18 with 1 seta and 1 long aesthete. Segment 19 (Fig. 176f) with 13 setae. The segments 1 to 11 are wider than long, the segments 12 to 19 longer than wide.

Posterior antenna (Fig. 176g) with unarmed coxopodite and basi-

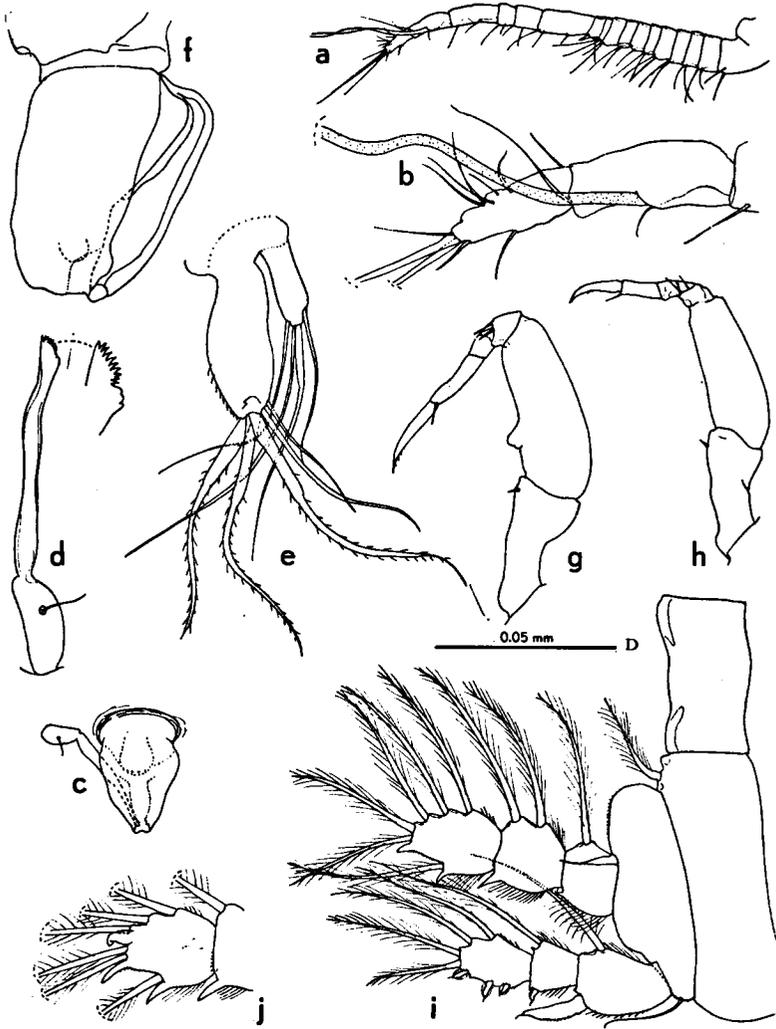


Fig. 177. *Asteropontius parvipalpus* n. sp., paratypes.

a, anterior antenna, ♂ (scale C); b, distal portion of anterior antenna, ♂ (D); c, proboscis, ♂, ventral, in situ (C); d, mandible, ♀ (E), distal part of stylet more enlarged; e, anterior maxilla, ♀ (F); f, posterior maxilla, ♀ (E); g, maxilliped, ♂ (E); h, maxilliped, ♀ (C); i, first leg, ♀ (E); j, distal endopodite article of first leg, ♂ (F).

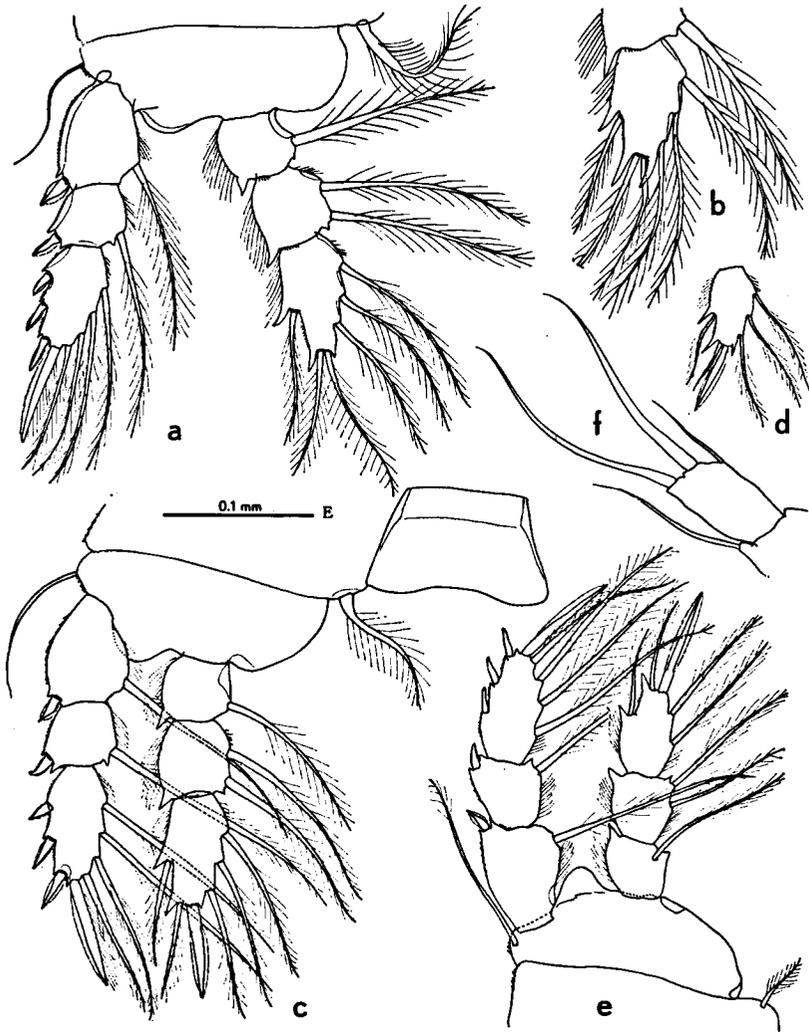


Fig. 178. *Asteropontius parvipalpus* n. sp., paratypes.
 a, second leg, ♀ (scale E); b, distal endopodite article of second leg, ♂ (F); c, third leg, ♀ (E); d, distal article of endopodite of third leg, ♂ (E); e, fourth leg, ♀ (E); f, fifth leg, ♂ (D).

article is very strongly developed, whereas the spines on exopodite articles 2 and 3 are surprisingly short. The usual element on the basipodite of leg 1, at the base of the endipodite, is present.

Leg 5 (Fig. 176c) consists of a single free segment, angularly ovate in outline, $96 \times 47 \mu\text{m}$, distally armed with 1 short, median seta, and 2 longer lateral setae. Leg 6 present in the shape of 2 spinules in the anterior half of the genital segment, in front of the genital apertures.

Male: Length of the body (without furcal setae) 929–1038 μm (mean, based on 5 specimens, 964 μm). Greatest diameter of cephalosome 516–590 μm (mean 551 μm). The prosome is slightly less wide than in female, in relation to the length of the urosome (Fig. 176b). Genital segment (Fig. 176d) roundedly squarish, posterior margin produced into 2 triangular lobes, each with 2 setae, representing the 6th legs. Three postgenital somites.

The anterior antenna (Fig. 177a) consists of 17 articles. The proximal 11 articles are similar to those in female. Segment 12 is elongate, segments 13 and 14 are much shorter, segments 15 and 16 are elongate again. Segment 16 carries, near its middle, the aesthete (Fig. 177b). Segment 17 bears 11 setae.

Posterior antenna, proboscis, mandible, anterior and posterior maxillae as in female. Maxilliped (Fig. 177g) similar to that in female, except for the presence of a roundedly triangular process in the proximal part of article 2.

Legs 1 to 4 similar to those in female, except for the length of the spiniform processes on the endopodites (Figs. 177j, 178b, 178d). The lateral spiniform process of the 3rd endopodite article in legs 1, 2, and 3 is longer and more slender in male than in female. The mediobasal spiniform process of the 3rd endopodite article, which is low or almost indiscernible in female, is long and well-developed in legs 1, 2, and 3 of the male. In leg 4 hardly any secondary sexual differences are present. Leg 5 in male is roughly rectangular in outline, $29 \times 18 \mu\text{m}$ (Fig. 178f).

Colour: Body of live specimens semi-transparent to opaque, whitish; ovaries and intestine dirty white; ovisacs white; eye small, bright red.

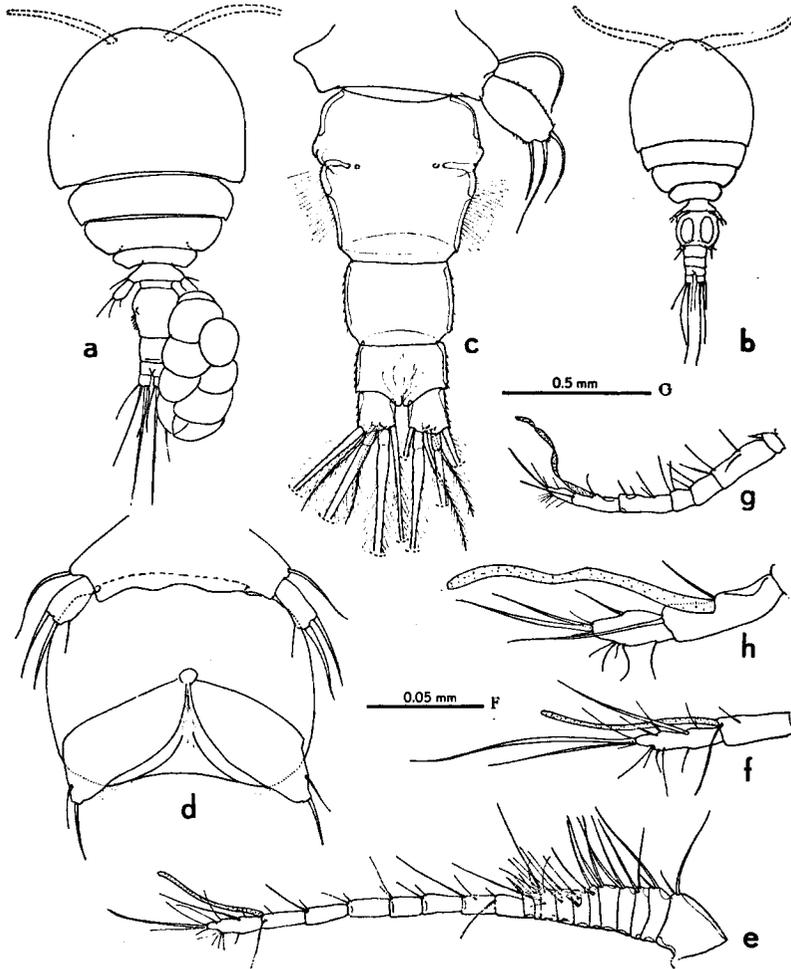


Fig. 179. *Asteropontius ungelatus* n. sp., paratypes.
 a, female, dorsal (scale G); b, male, dorsal (G); c, urosome, ♀, ventral (C); d, first and second urosome somites, ♂, ventral (E); e, anterior antenna, ♀ (C); f, distal two articles of anterior antenna, ♀ (E); g, articles 11 to 17 of anterior antenna, ♂ (C); h, distal two articles of anterior antenna, ♂ (F).

Frequency: *Asteropontius parvipalpus* is a constant associate of *Condylactis* in Piscadera Bay, Curaçao. Some 15 copepods per actinian have been counted. No specimens of the host from other localities have been checked, but it is likely, in analogy with the association of *Stoichactis* with *Aspidomolgus*, that the copepod will show up wherever *Condylactis* will be examined in the West Indies.

Affinities: This was the first species of siphonostome encountered during my field-work in the West Indies. When first found, it was classified provisionally with a new genus, because of the extreme reduction (to a vestigial seta) of the mandible palp. The two other species recorded in this paper, however, link the associate of *Condylactis* with members of the genus *Asteropontius* showing various degrees of reduction of the mandible palp.

Derivatio nominis: The specific name, *parvipalpus* (latin) alludes to the extreme smallness of the mandible palp.

***Asteropontius ungelatus* n. sp.**

(Figs. 178–181)

Material: PUERTO RICO: 1♀ (holotype), 1♂ (allotype), 13♀ and 5♂ (paratypes), from the actinarian *Stoichactis anemone* (Ellis, 1767) (= *S. helianthus*). Cayo Enrique, reef, off La Parguera, depth about 1 m, Jan. 29, 1963 (from 2 specimens of the host) (ZMA Co. 102.539). – 1♀, La Parguera, Cayo Terremoto, reef, depth about 0.5 m, Jan. 30, 1963 (from 7 specimens of *Stoichactis anemone*) (ZMA). – 2♀, 1♂, from 7 specimens of the actinarian *Phymanthus crucifer* (Lesueur, 1817), La Parguera, small coral island called locally "Mata Cagada", depth 0.3 m, in sand, Jan. 31, 1963 (ZMA).

Female: Body length, excluding furcal setae, 1327–1381 μm (mean, based on 5 specimens, 1350 μm). The cephalosome (Fig. 179a) is slightly less wide than in the preceding species, 756–777 μm (mean 764 μm). Ovisacs 579 × 306 μm. Caudal ramus (Fig. 179c) about as long as wide (length 46 μm, width 44 μm). General morphology and urosome as in the preceding species.

Anterior antenna (Figs. 179e, 179f) very similar to that of the preceding species. Posterior antenna (Fig. 180a) with shorter exopod than in *A. parvipalpus*; armature of exopod as in *parvipalpus*;

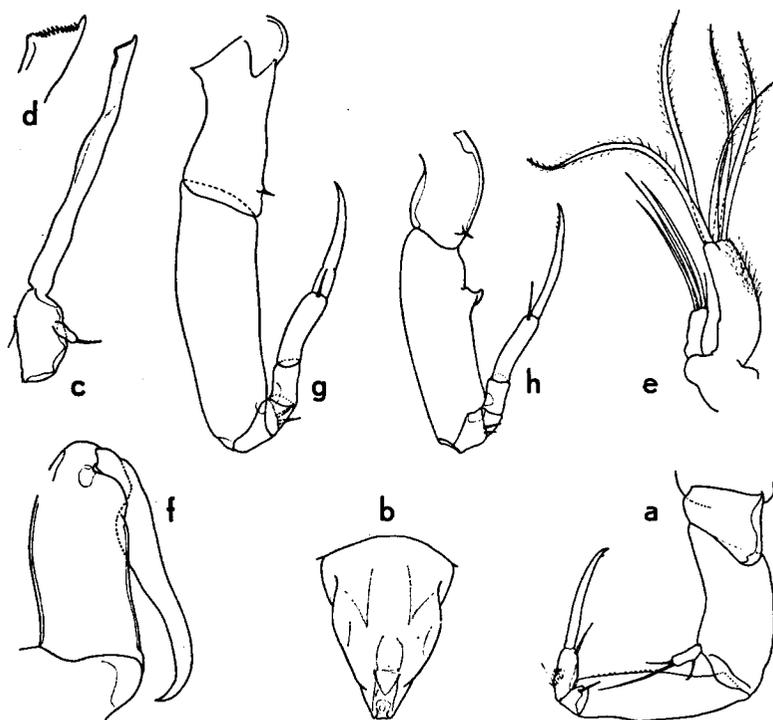


Fig. 180. *Asteropontius ungelatus* n. sp., paratypes.

a, posterior antenna, ♀ (scale E); b, proboscis, ♀, ventral (C); c, mandible, ♀ (E); d, distal portion of mandibular stylet, ♀ (D); e, anterior maxilla, ♀ (E); f, posterior maxilla, ♀ (E); g, maxilliped, ♀ (E); h, maxilliped, ♂ (E).

terminal claw and third endopod article much more slender than in *parvipalpus*.

Mandible (Figs. 180c, 180d): stylet rather similar to that of the preceding species. Palp slightly less reduced, in that a very small basal article is individualized, distally provided with a vestigial seta.

Proboscis (Fig. 180b) and anterior maxilla (Fig. 180e) similar to the homologous parts in *A. parvipalpus*. Posterior maxilla (Fig. 180f) with slightly less robust basal segment, and slightly more slender distal claw. Maxilliped, especially the distalmost article of

the claw section, much more elongate than in *A. parvipalpus* (Fig. 180g).

Leg 1 (Fig. 181a) differing from that of the preceding species in having distinctly longer lateral exopodite spines. Legs 2 to 4 (Figs. 181b, 181c, 181d), except for slightly longer exopodite spines, similar to those of *A. parvipalpus*.

Leg 5 (Fig. 179c) $90 \times 48 \mu\text{m}$.

Male: Body (Fig. 179b), without furcal setae, 922–1050 μm long (mean, based on 5 specimens, 974 μm); greatest diameter of cephalosome 483–529 μm (mean 504 μm).

Anterior antenna (Fig. 179g) similar to that of *A. parvipalpus*; terminal article (Fig. 179h) slightly shorter. Maxilliped claw, more in particular its distal article, long; 2nd article with triangular process (Fig. 180h).

Spiniform processes on third endopodite article of legs 1 to 4 (Figs. 181e–h) longer than in female. Fifth leg and genital segment as illustrated (Fig. 179d).

Colour: Body of live specimens yellowish; ovaries and ovisacs slightly pinkish.

Affinities: Though closely related to *A. parvipalpus*, the present form differs clearly in the more elongate claw on the posterior antenna (♀, ♂) and maxilliped (♀, ♂). The length of the lateral exopodite spines, more in particular on leg 1 (♀, ♂), forms a useful additional distinction. Other points of difference are observed in the shorter antennal exopodite and the presence of a minute article in the mandible palp of the new species.

Variability: The material from the actinian *Phymanthus* is slightly smaller than that from the typical host, *Stoichactis* (the 2 females from *Phymanthus* have a body length of 1199 and 1204 μm , respectively; the width of the cephalosome is 625 and 628 μm). All details in the morphology of the exoskeleton are, however, identical to those found in the type series, except perhaps the 5th leg (♀) in which the shortest seta is a trifle shorter, whereas it is implanted

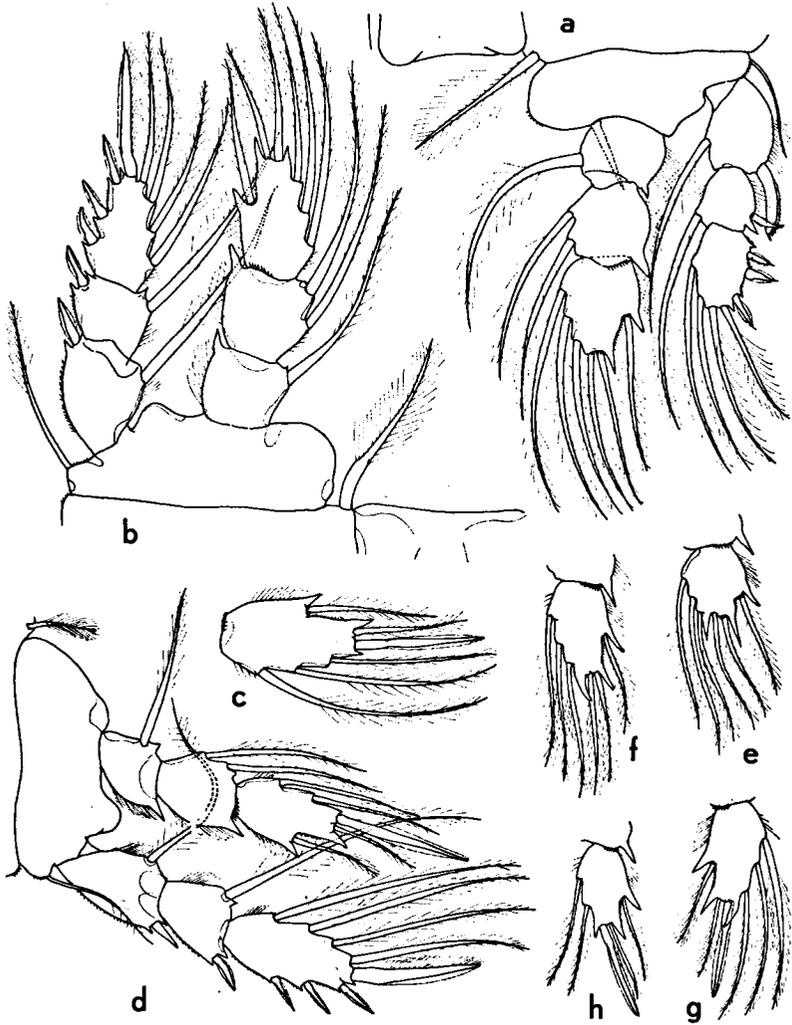


Fig. 181. *Asteropontius ungelatus* n. sp., paratypes.
 a, first leg, ♀ (scale E); b, second leg, ♀ (E); c, third endopodite article of third leg, ♀ (E); d, fourth leg, ♀ (E); e, third endopodite article of first leg, ♂ (E); f, same of second leg, ♂ (E); g, same of third leg, ♂ (E); h, same of fourth leg, ♂ (E).

a trifle more in proximal direction. These differences are considered of no taxonomic value.

Derivatio nominis: The specific name, *ungellatus* (latin) refers to the long claws of the posterior antenna and maxilliped.

Asteropontius longipalpus n. sp.

(Fig. 182-183)

Material: PUERTO RICO: 1♀ (holotype), 2♀ and 1 young specimen (paratypes), from the corallimorpharian *Ricordea florida* Duchassaing & Michelotti, 1860. Cayo Enrique, off La Parguera, depth about 1 m, Jan. 29, 1963 (ZMA Co. 102.540).

Female: The body length of 3 specimens (excluding furcal setae) is 1139, 1164, and 1169 μm ; the corresponding greatest width of the cephalosome is 618, 609, and 604 μm , respectively. Shape and size of the ovisacs unknown. The body shape (Fig. 182a) is, in comparison with the two other West Indian species, less wide. The genital segment has a ciliated stretch along its lateral margins, behind the genital orifices (Fig. 182b). The caudal ramus is hardly wider than long ($40 \times 38 \mu\text{m}$).

The anterior antenna (Fig. 182c) is, like in the other two species, 19-segmented. The aesthete is implanted on the penultimate article.

The slenderness of the exopodite of the posterior antenna is similar to that found in *A. ungelatus*. The slenderness of the terminal endopodite claw (Fig. 182d) is intermediate between that of *ungellatus* and *parvipalpus*.

The proboscis is like that in the other species. The mandible (Fig. 182e) has a palp consisting of a minute article and a long, naked seta that is only slightly shorter than the mandibular stylet. The latter is similar to that of the other species (Fig. 182f).

The anterior maxilla (Fig. 182g) has 4 setae (2 plumose, 2 naked) on the shorter and narrower outer lobe, and 4 plumose setae (3 longer, 1 shorter) on the longer and wider inner lobe.

The posterior maxilla (Fig. 182h) differs from that of the two preceding species in having a much more slender claw, the apical

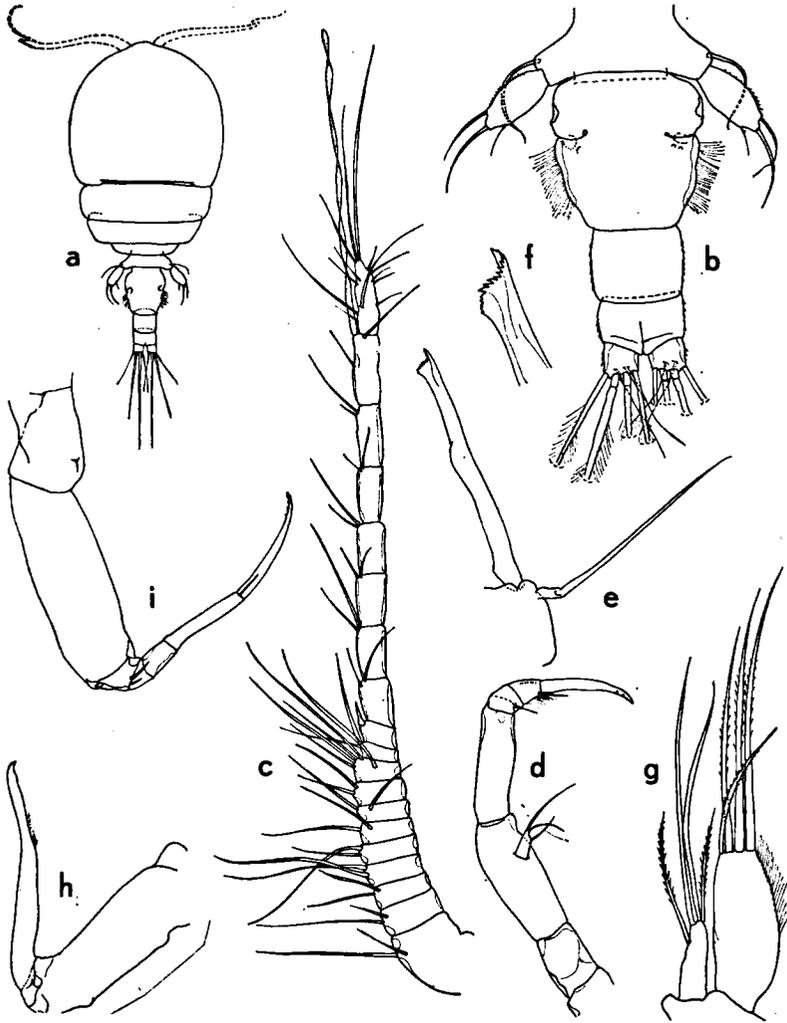


Fig. 182. *Asteropontius longipalpus* n. sp., ♀ paratype.
 a, body, dorsal (scale G); b, urosome, ventral (C); c, anterior antenna (E); d, posterior antenna (E); e, mandible (E); f, distal part of mandibular stylet (D); g, anterior maxilla (F); h, posterior maxilla (E); i, maxilliped (E).

portion of which is not curved inward over such a great distance (just the very tip is recurved).

The maxilliped (Fig. 182i) has a more slender claw than the two previous species; this slenderness is particularly pronounced in the great elongation of the penultimate claw article.

Legs 1 to 4 (Figs. 183a-d) with the same chaetotaxis formula as *A. parvipalpus*. Lateral spines on exopodite of P1 longer than in *parvipalpus*, about as long as in *ungellatus*. Third endopodite article of P1-P4 more elongate in outline than in the two preceding species.

Leg 5 (Fig. 182b) consists of a more or less ovate free segment, $87 \times 38 \mu\text{m}$. The lateral margin of the segment bears a row of minute spinules; latero-subapically a long, naked seta arises; apically a still longer naked seta; and a very short and thin seta, likewise naked, is found on the medial margin of the segment, at about 1/4 of the length of the margin away from the tip.

Male: Unknown.

Colour: Body of live specimens opaque, orange.

Affinities: Surprisingly enough, this species is more closely related in its morphology to *A. corallophilus* Stock, 1966 (from Mauritius) than to the remaining two Antillean species. This might be due to the fact that these two others are associates of Actiniaria, whereas the host of the present species, a corallimorpharian, is more closely related to the hosts of *A. corallophilus*, which are a number of hermatypic coral species.

The differences between the present species and the two other Antillean species treated in the preceding pages, pertain to the greater length of the distal seta on the mandible palp, to the presence of only 4 (not 5) strong setae on the inner lobe of the anterior maxilla, to the slenderness and not-hooked condition of the claw of the posterior maxilla, to the reduced nature and the more proximal insertion of the medial seta on P5, to the more slender body shape, etc.

From *A. corallophilus*, the present species can be discriminated

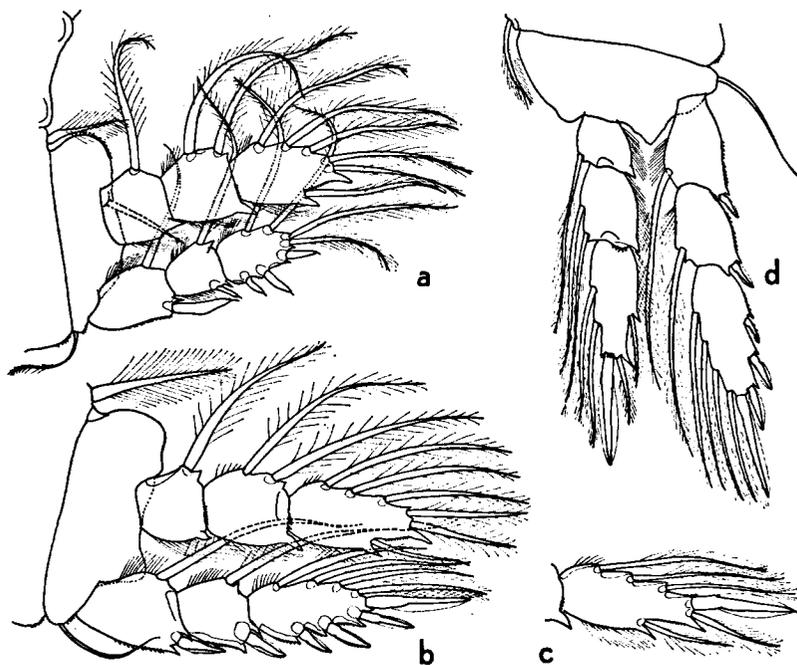


Fig. 183. *Asteropontius longipalpus* n. sp., ♀ paratype.
 a, first leg (scale E); b, second leg (E); c, distal article of endopodite of third leg (E);
 d, fourth leg (E).

by the lateral ornamentation of the genital somite (with a tuft of fine spinules in *corallophilus*, with a stretch of cilia in *longipalpus*), by having 4 (not 3) setae on the outer lobe of the anterior maxilla, by having the aesthete of A1♀ on the penultimate article (on the antepenultimate in *corallophilus*), and by the shape of the 5th leg (tapering in *corallophilus*, ovate in *longipalpus*).

Derivatio nominis: The specific name, *longipalpus* (latin) refers to the greater length of the seta on the mandible palp, as compared to the condition found in the two other Caribbean species of *Asteropontius*.

Paramolgus antillianus n. sp.

(Figs. 184–185)

Material: PUERTO RICO: 1♀ (holotype), 1♂ (allotype), 7♀, 12♂, 8 copepodites (paratypes). In washings of the corallimorpharian *Ricordea florida* Duchassaing & Michelotti, 1860. Cayo Enrique, off La Parguera, reef, depth about 1 m, Jan. 29, 1963 (ZMA Co. 102. 541).

Female: Body length, excluding furcal setae, 1022–1159 μm (mean, based on 5 specimens, 1097 μm); greatest width of cephalosome 492–532 μm (mean 513 μm). Body (Fig. 184a) moderately slender. The somite bearing leg 1 is almost completely fused with the cephalic somite. The somite of leg 5 is 132 μm wide. The genital somite is longer than wide, 155 \times 134 μm . Each area of attachment of the ovisacs bears 2 short, spiniform setae. The shape of the genital somite (Fig. 184b) is characteristic: it is rather narrow at its anterior articulation, then it widenes in a bell-shaped way to the level of the genital orifices, then it suddenly constricts to the parallel-sided posterior portion. All postgenital somites are unornamented. The caudal ramus (Fig. 184b) is slightly longer than wide (39 \times 32 μm). The lateral seta is naked; the remaining furcal setae bear plumosities. The dorsal seta arises slightly proximad of, and in between, the implantations of the innermost and longest furcal setae. The longest seta is also the thickest. The length of the terminal furcal setae, from lateral to median, is 95, 305, 433, and 193 μm , respectively.

The anterior antenna (Fig. 184d) is 7-segmented; the segments have the following lengths: 59, 101, 27, 56, 60, 40, and 25 μm . The 7 segments have the following chaetotaxis formula (setae without, aesthetes in parentheses): 4, 14, 7, 3, 5 (+1), 2 (+1), 7 (+1). The rostral area is broadly rounded, weakly defined, especially posteriorly.

The posterior antenna (Fig. 184e) is slender, 4-segmented. Segment 1 bears a short, terminal, inner seta. Segment 2 bears a similar seta at about $\frac{3}{4}$ of its length. Segment 3 is trapezoidal, and bears 3 inner setae. The elongate segment 4 bears 1 subterminal outer setule, 3 shorter and 1 longer terminal setae, and a slender, curved, terminal claw.

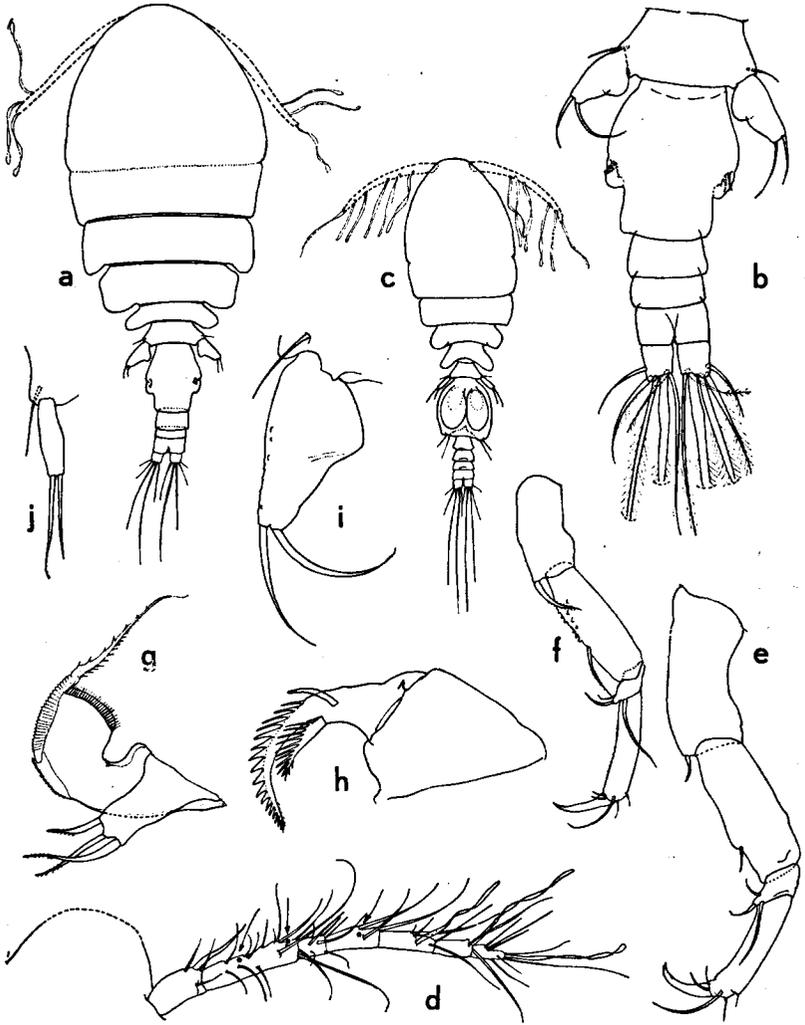


Fig. 184. *Paramolgus antillianus* n. sp., paratypes.

a, female, dorsal (scale B); b, urosome, ♀, ventral (C); c, male, dorsal (B); d, anterior antenna, ♀ (C) (the black dots, indicated by arrows, mark the positions of the additional aesthetes occurring in the male); e, posterior antenna, ♀ (E); f, posterior antenna, ♂ (E); g, mandible and anterior maxilla, ♀ (F); h, posterior maxilla, ♀ (F); i, fifth leg, ♀ (F); j, fifth leg, ♂ (F).

The labrum has 2 lobes separated by a median cleft.

The mandible (Fig. 184g) consists of a basal portion and a distal lash. The convex side of the basal portion has first a hyaline, finely serrated fringe, then a more coarsely serrated and striated fringe. The concave side of the basal portion is rectangular, with a row of fine spinules. The lash bears some sparse denticles on the one side, finer spinules on the other.

The anterior maxilla (Fig. 184g) bears 3 setae, all (sub)terminal.

The posterior maxilla (Fig. 184h) has an unarmed basal segment which gradually attenuates into a main lash armed with some 17 teeth (the more proximal of these are spiniform, the central ones are triangular, the distal ones spiniform again). The auxiliary lash bears 10 spiniform teeth on the convex margin, 3 smaller ones on the distal part of the concave margin. At the base of the lash, an obtuse, naked element arises. The usual proximal setule is replaced by a minute triangular, cuticular process.

The maxilliped (Fig. 185h) is 3-segmented. Segment 1 is unarmed; segment 2 bears 1 short, spiniform element, and 1 long, plumose seta. Segment 3 is pointed and bears 1 setule and 1 very strong spine.

The coxopodites of legs 1 to 4 bear a median element, setiform and plumose in legs 1 to 3, reduced, spiniform and naked in leg 4. The basipodite carries a, not particularly elongated, seta in legs 1 to 4. Chaetotaxis formula conforming the generic diagnosis (cf. HUMES & STOCK, 1973). Further details: see Figs. 185a-d.

Leg 5 (Fig. 184i) with a free segment of 83 μm long; this segment has a very strongly marked inner basal expansion (greatest width at the level of this expansion 43 μm); the diameter at a slight distance from the tip of the segment is 16 μm . Two naked setae, not much different in length, are implanted on the tip of the segment. Lateral margin of the free segment with some cuticular rugosities, otherwise unornamented.

Male: Body length 677-898 μm (mean, based on 5 specimens, 769 μm). Greatest diameter of the cephalosome 229-357 μm (mean 278 μm). Body shape definitely slender (Fig. 184c). Genital somite

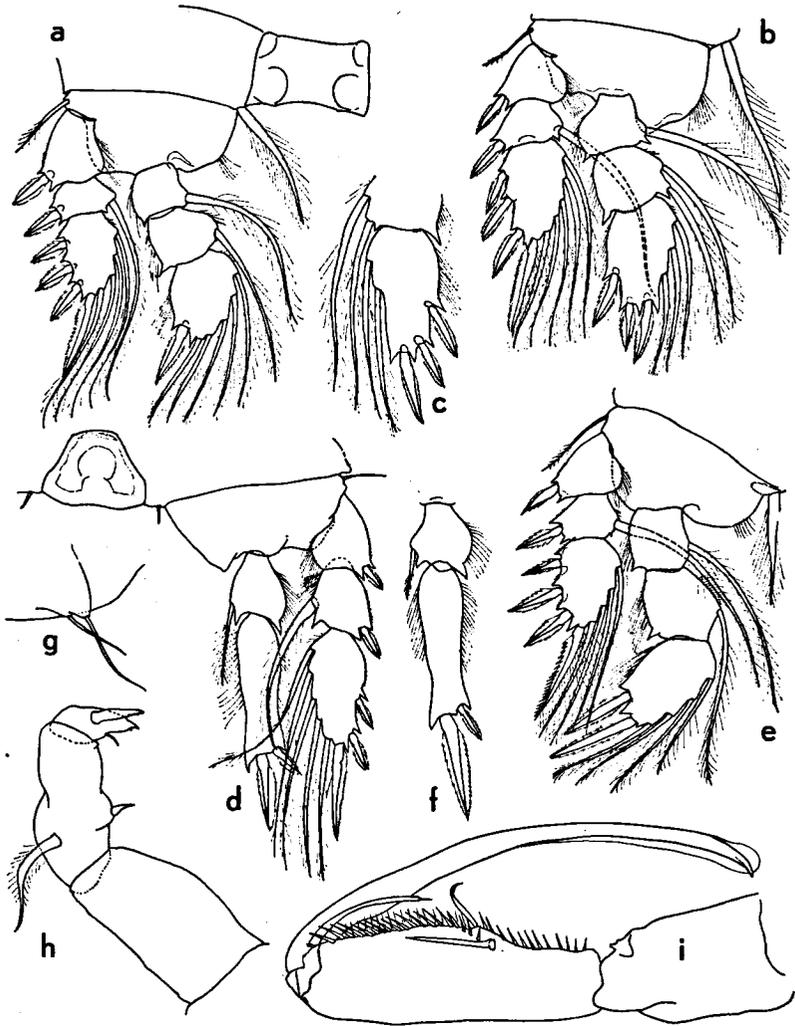


Fig. 185. *Paramolgus antillianus* n. sp., paratypes.
 a, first leg, ♀ (scale E); b, second leg, ♀ (E); c, third endopodite article of third leg, ♀ (E); d, fourth leg, ♀ (E); e, first leg, ♂ (F); f, endopodite of fourth leg, ♂ (F);
 g, sixth leg, ♂ (F); h, maxilliped, ♀ (F); i, maxilliped, ♂ (F).

151 μm wide, 169 μm long; ventrolateral flap on the genital somite representing the 6th leg, armed with 2 naked setae (Fig. 185g).

Caudal ramus 24 μm long, 23 μm wide, otherwise similar to that in female.

Anterior antenna armed as in female, but with 2 extra aesthetes on segment 2, and 1 extra aesthete on segment 4 (indicated by black dots in Fig. 184d).

Posterior antenna (Fig. 184f) with longer setae than in female on segments 1 and 2. Segment 2, inner margin, with several knobs which are absent in female.

Mouth parts as in female. Maxilliped (Fig. 185i) with 2-segmented basal portion, and 2-segmented claw. Segment 1 unarmed but with a small triangular process on the inner distal corner. Segment 2 with 2 long setae in its central part, and 2 rows of spines, one row all along the inner margin of the article, one row from the long seta to the distal end of the article. Proximal claw segment small; distal claw segment very long, slightly curved, with a spiniform element implanted near its base.

First leg sexually dimorph in its endopodite (Fig. 185e). Third endopodite article turned laterad, chaetotaxis formula II-4 (versus I-5 in female).

No sexual dimorphism in legs 2 and 3. Endopodite of leg 4 (Fig. 185f) with a short plumose seta on article 1 (versus a longer one in female); distal spines on article 2 very unequal in length (versus less so in female).

Fifth leg much more slender than in female (Fig. 184j), without basal expansion, 35 μm long, maximum width 10 μm .

Color: Body of live specimens opaque, colourless; eye red.

Remarks: This is the first species of *Paramolgus* discovered in the West Indies. All other 10 species are known from the Indo-West Pacific region, where they were found associated with actinarians, octocorals, and antipatharians. The present new species, called for obvious reasons *antillianus*, which is associated with Corallimorpharia (= Asclerocorallia), agrees both morphologically and in choice of a host well with the previously recorded forms.

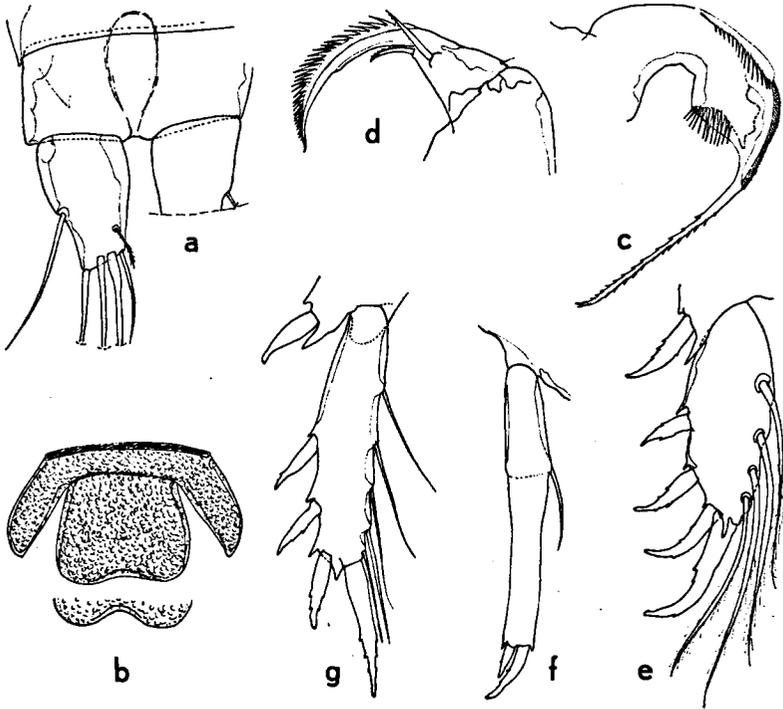


Fig. 186. *Aspidomolgus stoichactinus* Humes, 1969, ♀, from the Florida Keys. a, anal segment and caudal rami, dorsal (scale C); b, posterior part of metasome, of two different specimens, dorsal (A); c, mandible (E); d, posterior maxilla (E); e, third exopodite article of first leg (F); f, endopodite of fourth leg (E); g, third exopodite article of fourth leg (F).

P. antillianus differs from *P. ostentus* Humes, 1973, *P. eniwetokensis* Humes, 1973, and *P. spathophorus* (Humes & Ho, 1968) in having the lateral basipodite seta of leg 1 of normal length (excessively long in the three Indo-Pacific species).

Four other species of *Paramolgus*, viz. *clavatus* (Humes & Ho, 1968), *politus* (Humes & Ho, 1967), *insectus* (Humes, 1969), and *ellisellae* Humes, 1974, differ from *antillianus* in having elongate caudal rami (i.e., more than twice as long as wide).

P. simulans (Humes & Ho, 1967) differs from the present species in having 4 (instead of 3) setae on the anterior maxilla; in having

the basal teeth on the lash of the posterior maxilla triangular (instead of spiniform); in having a less insected female genital somite; in having 3 spiniform processes on the 3rd endopodite article of leg 1 in the female (instead of 2 such processes); in having the basal expansion of leg 5 (♀) smaller and more restricted to the basal portion of the article; in a less elongated 2nd endopodite article of leg 4 (♀, ♂); in less numerous spines in the 2 rows on the maxilliped (♂); in lacking sexual dimorphism in the setal length on the segments 1 and 2 of the posterior antenna, etc.

P. constrictus (Humes, 1969) differs from the present species in having 2 setiform elements of equal size on segment 2 of the ♀ maxilliped (instead of 2 very unequal elements); in having a short lash, with a low number of teeth, on the posterior maxilla (♀, ♂); in a less elongated posterior antenna (♀, ♂), which bears on segment 3 a seta that is longer than segment 4 (instead of a seta that is much shorter than segment 4); in the absence of denticulations on the basalmost part of the convex side of the mandible (♀, ♂); in a much more slender free segment of leg 5 (♀); in a much lower number of spines on the 2nd article of the ♂ maxilliped, etc.

P. anomalus (A. Scott, 1909) is an imperfectly known species, only provisionally attributed to the genus *Paramolgus* (vide HUMES & STOCK, 1973: 273). It cannot be identified with the present species, since it has 5 setae on the anterior maxilla (3 in *antillianus*), a caudal ramus that is wider than long (slightly longer than wide in *antillianus*), a shorter 2nd article in the posterior antenna, and a broader ♀ prosome.

Derivatio nominis: The specific name *antillianus* has been inspired by the fact that this is the first species of *Paramolgus* recorded outside the Indo-West Pacific.

***Aspidomolgus stoichactinus* Humes, 1969**

(Fig. 186)

A. stoichactinus HUMES, 1969, p. 226–242, figs. 1–69; HUMES & STOCK, 1973, p. 147, fig. 83.

Material. – From the typical host, *Stoichactis anemone* (Ellis) (= *S. helianthus* (Ellis)):

CURAÇAO: 5♀, 3♂, from 5 actinians, Boca Santos Pretos (Noordkant), in rock pools, Jan. 6, 1959 (ZMA). – 1♂, 1 fragm. from 1 actinian, Fuik Bay, near former prisoners camp, depth about 1 m, Jan. 27, 1959 (ZMA). – 1♀, from 1 actinian, about 500 m W. of Piscadera Bay, depth 6–9 m, Mar. 22, 1974 (ZMA).

BONAIRE: 1♀, 1 juv., from 1 actinian, Lac near Cai, depth about 1 m, Dec. 23, 1958 (ZMA).

BARBADOS: 3♀, 3♂ (paratypes), St. James, in front of Bellairs Research Institute, July 23, 1959 (coll. A. G. Humes). – 10♀, 1♂, St. James, Finn Sander coll. (RMNH).

PUERTO RICO: 9♀, 6♂, La Parguera, Sep. 10, 1973, J. C. den Hartog coll. (RMNH). – 8 specimens, from 2 actinians, La Parguera, reef of Cayo Enrique, depth about 1 m, Jan. 29, 1963 (ZMA). – 10♀, 7♂, 1 copepodid, from 7 actinians, La Parguera, Cayo Terremoto, depth 0.5 m, Jan. 30, 1963 (ZMA). – 10♀, 14♂ Arrecife Romero, near La Parguera, Aug. 12, 1959, A. G. Humes coll. (ZMA).

FLORIDA KEYS: 13♀, shallow rocky zones off Marathon, Sombrero Key, Robert S. Balaban & Patrick J. Walsh coll. (ZMA).

From *Homostichanthus denticulosus* (Lesueur):

GRENADINES: 3♀, Baradal, Tobago Cays, Mar. 17, 1956, D. V. Nicholson coll. (RMNH).

ST. MARTIN: 1♂, l'Embouchure, Oct. 1972, J. C. den Hartog coll. (RMNH).

PUERTO RICO: 5♀, La Parguera, Sep. 10, 1973, J. C. den Hartog coll. (RMNH). – 1♂, 1♀, off La Parguera, in *Thalassia* field, depth about 1 m, Sep. 10, 1973, J. C. den Hartog coll. (RMNH).

Remarks: The present material was partly collected on the typical host, *Stoichactis*, partly on a new host, the closely related *Homostichanthus*. The material from these two hosts does not show any morphological differences. The material examined includes two samples examined by HUMES (1969) for the description of his species (6 paratypes from St. James, Barbados and 24 specimens from Arrecife Romero, Puerto Rico), and one topotypic sample (11 specimens from St. James, Barbados). All samples examined differ consistently in certain details from the original description:

The terminal spine of the 3rd exopodite article of legs 1 to 4 (Figs. 186e, 186g) is considerably longer than in HUMES' figures. In many cases the exopodite spines are curved or hooked in appearance, but they may show up differently according to the angle under which they are observed. In leg 4, the terminal exopodite spine is longer than the setae on the same article (shorter in HUMES' fig. 23).

The medial cleft of the 3rd metasome somite is not a narrow slit as in HUMES' fig. 1, but a wide incurvation, the depth of which

may vary from very shallow (Fig. 186b, top) to rather deep (Fig. 186b, bottom).

The medial endopodite setule on P4 may vary in length. In some specimens this seta is short, as in HUMES' fig. 24, in others it is longer, as in our Fig. 186f. In one specimen, from La Parguera, Puerto Rico, the 3rd exopodite article of P1 has III-I-5 as chaetotaxis formula, though III-I-4 is the normal constellation.

The caudal ramus shows up slightly shorter and broader than in HUMES' fig. 3; the length and width of the ramus varies between $150 \times 94 \mu\text{m}$ to $141 \times 71 \mu\text{m}$ (Fig. 186a).

The terminal lash of the mandible (Fig. 186c) and of the posterior maxilla (Fig. 186d) may show up a trifle longer than in the types.

Many specimens look rather different in general aspect, when compared with HUMES' figures 1, 2, and 26. This is due to the fact that the urosome is a telescoping structure, which can be fully extended (as in HUMES' figures), or contracted and then completely hidden under the tergum of the 3rd metasome somite, so that the caudal rami are invisible in dorsal view. In the 6 paratypes examined, 4 have a long (extended) urosome, whereas 2 have a short (contracted) urosome.

The remaining morphology is exactly as described and illustrated in the original publication.

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