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ASSOCIATIONS OF HYDROCORALLIA STYLASTERINA WITH GALL-INHABITING COPEPODA SIPHONOSTOMATOIDEA FROM THE SOUTH-WEST PACIFIC

PART II. ON SIX SPECIES BELONGING TO FOUR NEW GENERA OF THE COPEPOD FAMILY ASTEROCHERIDAE

by

JAN H. STOCK

Institute of Taxonomic Zoology, University of Amsterdam, P.O. Box 20125, 1000 HC Amsterdam, The Netherlands

ABSTRACT

No specialized Copepoda associated with stylasterine corals were recorded thus far. Six different species in four genera (all new) are described. They have been found in cage-like galls on *Conopora laevis* (three species, in three different genera, from the Kermadec Islands and from New Zealand), *Stylaster sanguineus* (one species, from the New Hebrides), *Stylaster papuensis* (one species, from Papua), and *Crypthelia cryptotrema* (one species, from New Caledonia). The six copepod species appear to be phylogenetically related and belong to the family Asterocheridae (suborder Siphonostomatoidea). Based on the morphology of these new taxa, the value of the subfamily Cletopontoniinae of the Asterocheridae is called in question.

RÉSUMÉ

Jusqu'à présent, des Copépodes spécialisés associés avec des Coraux Stylastérines n'ont jamais été signalés. On en décrit dans le présent travail six espèces appartenant à quatre genres (tous ces taxa étant nouveaux). Ces espèces ont été trouvées dans des galles à aspect de cage, sur *Conopora laevis* (trois espèces, appartenant à trois genres différentes, des Iles Kermadec et de Nouvelle Zélande), sur *Stylaster sanguineus* (une espèce, des Nouvelles Hébrides), sur *Stylaster papuensis* (une espèce, de Papua), et sur *Crypthelia cryptotrema* (une espèce, de Nouvelle Calédonie). Du point de vue phylogénétique, les six espèces sont apparentées; elles appartiennent toutes à la famille des Asterocheridae (sous-ordre Siphonostomatoidea). L'étude de la morphologie des taxa nouveaux conduit à la mise en question de la validité de la sous-famille Cletopontoniinae des Asterocheridae.

1. INTRODUCTION

Copepoda inhabiting galls on stylasterine corals are described here for the first time. The host corals and the nature of the cage-like galls formed by the copepods are described in part I of this paper (Zibrowius, 1981). No previous records of copepod associates of Stylasterina are known. The copepods found in galls of *Stylaster, Conopora,* and *Crypthelia* belong to four different genera, all new, and to at least six species of Siphonostomatoidea (formerly Cyclopoida siphonostomata, see Kabata, 1979). These four genera are classified here as Asterocheridae, on account of (a) the presence of a mandible palp, and (b) the non-terminal position of the aesthete on antenna 1. The general body shape, more in particular the strongly developed pleurae on certain metasomites, are reminescent of the family Artotrogidae (sensu Eiselt, 1962), but the two abovementioned structural details in the mandible and the first antenna prevent such allocation.

As indicated in part I of this paper (Zibrowius, 1981) the galls develop from normal cyclosystems of the coral, due to partial dissolution, inducing abnormal growth. The mature females are definitely trapped in the galls and only the young stages (and possibly the males of certain genera described in this paper) are able to leave or to enter the galls through small apertures in the wall. It is assumed that the gall-building process is triggered when an early copepodid stage settles in the cyclosystem, possibly on the gastrozoid.

2. CHARACTERISTICS OF THE COPEPODS FOUND IN GALLS OF STYLASTERINA

The four genera collected are apparently related to one another. The similarity in overall body shape might still be the result of convergent developments, adaptations to the gallicole life inside the coral tissue. The following points of agreement seem to indicate phylogenetic relationship as well: (1) the swollen prosome in ♀ and the development of pleurae, at least on one or several metasomites; (2) the gradual reduction (in structure and armature) of P4 and P5; (3) the exopodite of the second antenna is terminal in all, and strongly developed in most species; (4) the mandible palp is well developed, though 1-segmented; (5) the proboscis has a tubiform distal part; (6) the anal operculum (♀) is more or less strongly developed; (7) the presence of only 2 (♀) or 3 (♂) postgenital somites; (8) the maxillipeds are almost or entirely devoid of sexual dimorphism.

In addition, the following diagnostic features of the four genera are salient:

Hammatimyzon n. gen.: ♀ transformed, ♂ elongate cyclopoid. Pleurae of metasomites 1, 2 and 3 (or of 2 and 3) large (♀). A1 8- to 10-segmented (♀, ♂), with extra aesthetes on proximal segments (♂); usual aesthete on penultimate segment (♀, ♂). Exopodite of A2 shorter than first endopodite segment (♀, ♂). Outer ramus of Mx1 with reduced armature (♀, ♂). Four pairs of biramous legs (♀, ♂); all rami 3-segmented; distal endopodite segment of P4 with armature I-2 (♀, ♂); third exopodite segment of P2-P4 with 4 spines (♀, ♂). Fifth leg with free segment (♀, ♂).

Cecidomyzon n. gen.: Both ♀ and ♂ transformed. Pleurae of metasomites 1-3 large (♀, ♂). A1 12- (♀) or 9- (♂) segmented, without extra aesthetes (♂); usual aesthete on antepenultimate (♀) or penultimate (♂) segment. Exopodite of A2 very elongate, as long as endopodite segment 1 (♀, ♂). Outer ramus of Mx1 with fully developed armature (♀, ♂). Four pairs of biramous legs (♀, ♂); all rami 3-segmented; third endopodite segment of P4 with armature I-2 (♀, ♂); third exopodite segment of P2-P4 with 3 spines (♀, ♂). Fifth leg with well-developed free segment (♀, ♂).

Oedomyzon n. gen.: ♀ transformed, ♂ more or less cyclopiform. Pleurae of metasomites 1 and 2 large (♀, ♂), of metasomite 3 small (♀, ♂). A1 7-segmented (♀, ♂), without extra aesthetes (♂); the usual aesthete implanted on the penultimate segment (♀, ♂). Exopodite of A2 well developed, though shorter than exopodite segment 1 (♀, ♂). Outer ramus of Mx1 with partially reduced armature (4 setae, of which 2 reduced in length) (♀, ♂). Three pairs of biramous legs, all rami 3-segmented (♀, ♂); third exopodite segment of P1-P3 with 3 spines (♀, ♂). P4 reduced to a bud armed with 1 to 3 short elements (♀, ♂). P5 reduced to a single seta (♀, ♂).

Cystomyzon n. gen.: ♀ transformed, ♂ more or less cyclopiform. Pleurae (♀, ♂) present, at least on metasomite 2. A1 7-segmented (♀, ♂), without extra aesthetes (♂); the usual aesthete on penultimate segment (♀, ♂). Exopodite of A2 small (♀, ♂). Outer ramus of Mx1 with reduced armature (♀, ♂). Three pairs of biramous legs (♀, ♂), both rami of P1 and endopodites of P2 and P3 2-segmented (♀, ♂). Third exopodite segment of P1-P3 with 3 spines (♀, ♂). Fourth leg reduced to a 1-segmented bud (♀, ♂), armed with 2 (♀) or 1 (♂) setae. Fifth leg absent (♀, ♂).

3. TAXONOMIC POSITION OF THE NEW GENERA

Hammatimyzon appears in several respects to be the least modified genus: the male is still cyclopoid in body shape, all four anterior pairs of legs are biramous and the number of segments in each ramus represents the plesiomorphous state of three, the fifth leg has a free segment, and the armature of the distal exopodite segments of P2-P4 consists of 4 spines. Apomorphous are the reduced number of segments in A1 and the very reduced nature of the armature of the outer ramus of Mx1. *Cecidomyzon* resembles *Hammatimyzon* in many respects, but has a plesiomorphous A1 with 12 segments in ♀, and a plesiomorphous (fully armed) Mx1. On the other hand the ♂ is transformed like the ♀ and the armature of the distal exopodite segments of P2-P4 represents a more apomorphous state with only 3 spines.

Oedomyzon and *Cystomyzon* are apomorphous in the reduction of the 3rd metasomite (with small pleurae only, bearing a vestigial P4); also P5 is strongly reduced or absent. In *Oedomyzon* the first three pairs of legs still have 3-segmented rami, the plesiomorphous condition; in *Cystomyzon* the exopodite of P1 and the endopodites of P1-P3 are 2-segmented. The males of both *Oedomyzon* and *Cystomyzon* are, remarkably enough, more or less cyclopiform, although their appendages are similar to those of the female, thus in an apomorphous condition, and the male pleurae are well developed.

According to Ummerkutty's (1966) criteria, the first two genera belong to the subfamily Asterocherinae of the family Asterocheridae. The more profoundly modified genera, *Oedomyzon* and *Cystomyzon*, although both in general habit and in structure of the cephalic appendages (A1, Md, Mx1, Mx2, Mxp) closely comparable to the other two genera, *Hammatimyzon* and *Cecidomyzon*, and no doubt belonging to the same monophyletic group, classify with Ummerkutty's subfamily Cletopontiinae because of the reduced nature of their P4. In view of this, either the diagnoses of the two subfamilies have to be modified, or the Cletopontiinae and Asterocherinae should be united again into one undivided family, the Asterocheridae. I definitely adhere to the latter opinion.

The four genera associated with Stylasterina belong to the group of genera within the Asterocheridae in which the female urosome is 4-segmented (there is only one extra somite between the genital and anal somites). In this group, the following genera are known: *Asterocheres* (= *Ascomyzon*, and including *Echinocheres*), *Monocheres, Asteropontius, Asteropontoides, Scottocheres, Mesocheres, Psilomyzon, Tuphacheres, Scottomyzon, Acontiophorus, Cholomyzon, Peltomyzon, Indomyzon, Doropontius, Cletopontius*, and possibly also *Discopontius*.

By the nature of the exopodite of A2 (rather long, except in *Cystomyzon*, and distally implanted), the new genera can be arranged near *Scottomyzon, Cletopontius*, and in particular near *Acontiophorus*. The subcircular shape of the cephalo- and metasome is reminescent of *Cholomyzon*, but especially of *Scottomyzon, Cletopontius, Doropontius*, and *Discopontius*. Finally, the reduced P4 found in *Oedomyzon* and *Cystomyzon* is also encountered in *Cholomyzon*. It is with these genera in particular that we will compare the associates of the Stylasterina.

The monotypic genus *Cholomyzon* Stock & Humes, 1969, endoparasitic in the scleractinian coral *Dendrophyllia*, differs in having (1) a reduced armature on the 3rd exopodite segment of P3 (II-I-1), versus II(III)-I-3-(4) in the Stylasterina associates; (2) a reduced armature on the distal endopodite segment of P3 (0-3), versus 1-I-3. The presence of numerous extra aesthetes on A1 of *Cholomyzon* (♀, ♂) bears some resemblance to the situation found in the male of *Hammatimyzon*, but differentiates it from females of all four genera. The vestigial, unarmed exopodite of A2 of *Cholomyzon* differentiates it from all new genera, although it remotely resembles the situation found in *Cystomyzon*; the latter has, however, 2-segmented endopodites in P1-P3, versus 3-segmented endopodites in *Cholomyzon*.

The monotypic genus *Scottomyzon* Giesbrecht, 1897, associated with starfish, has no well-developed pleurae, in spite of its subcircular body. The chaetotaxis of the four pairs of biramous legs is approximately the same as in *Cecidomyzon*, but the P5 bears as many as 3 setae. The A1 ♀ of *Scottomyzon* consists of more articles (19) than in any of the Stylasterina associates. The exopodite of A2 is rather long, but differs from that of the new genera in its distal armature consisting of 3 short setae.

The taxonomic status of *Discopontius* Nicholls, 1944, is not quite clear. Nicholls discovered this monotypic genus dislodged from any host and attributed it to the family Dyspontiidae. However, the non-terminal position of the aesthete on A1, combined with the fact that the mandible has not been described, makes one suspect that this genus belongs to the Asterocheridae instead of to the Dyspontiidae. At any rate, *Discopontius* differs from the four new genera in the endopodite of P4 (which is 2-segmented), and the very short, non-terminal exopodite of A2. The position of the medial spine on P1 of *Discopontius* is quite exceptional: on the coxopodite instead of on the basipodite.

The monotypic genus *Doropontius* Thompson & Scott, 1903, has been found dislodged from a host. It differs from the Stylasterina associates in its 2-segmented P5, long 17-segmented A1, and short A2 exopodite.

The monotypic genus *Cletopontius* Thompson & Scott, 1903, of which likewise the host is unknown, differs in having a 2-segmented P5, in lacking a P4 endopodite, in the long, 18-segmented A1, and in the 2-segmented exopodite of A2.

In the structure of A2, the new genera, except *Cystomyzon,* are no doubt closest to *Acontiophorus.* This genus was considered by Sars (1915) as the type of a special family, but Stock & Kleeton (1963) merged the Acontiophoridae with the Asterocheridae again. The presently described new genera, which have a *Acontiophorus*-like A2 but at the same time a very well-developed mandible palp, give strong support to Stock & Kleeton's opinion. Other differences with *Acontiophorus* are the presence of pleurae in the new genera, the reduced armature, with 1 or 2 elements only, on P5 (if present at all), instead of with 4 or 5 elements. At least one species of *Acontiophorus, A. bracatus* Stock & Kleeton, 1963, is known as an associate of Coelenterata (octocorals).

4. KEY TO THE GENERA OF COPEPODA PRODUCING GALLS IN STYLASTERINE CORALS

1a. Four pairs of biramous legs present (♀, ♂). Metasomite 3 with well-developed pleurae (♀). Fifth leg with a free segment (♀, ♂) 2
b. Three pairs of biramous legs present (♀, ♂). Metasomite 3 with small pleurae (♀). Fifth leg (♀, ♂) absent or vestigial (without free segment) . . 3
2a. First antenna with extra aesthetes (♂). Male cyclopiform. Outer ramus of first maxilla (♀, ♂) with reduced armature only. Third exopodite segment of P2-P4 with 4 spines (♀, ♂). Exopodite of second antenna shorter than first endopodite segment (♀, ♂) . . . . *Hammatimyzon* n. gen.
b. First antenna without extra aesthetes (♂). Male transformed. Outer ramus of first maxilla (♀, ♂) with full number of setae (4) of which at least two are of full length. Third exopodite segment of P2-P4 with 3 spines (♀, ♂). Exopodite of second antenna as long as first endopodite segment (♀, ♂) . *Cecidomyzon* n. gen.
3a. Rami of P1-P3 all 3-segmented (♀, ♂). Exopodite of second antenna elongate (at least half as long as first endopodite segment) . . . *Oedomyzon* n. gen.
b. Both rami of P1 and endopodites of P2-P3 2-segmented (♀, ♂). Exopodite of second antenna (♀, ♂) short . . . . *Cystomyzon* n. gen.

5. DESCRIPTIONS OF THE NEW TAXA

Hammatimyzon n. gen.

Family: Asterocheridae.
Diagnostic features: Vide supra.
Type-species: *Hammatimyzon dimorphum* n. sp.
Other species: *H. zibrowii* n. sp.
Derivatio nominis: *Hammatimyzon,* from the Greeks words ἅμμα (= chalk-stone, tubercle) and μυζειν (= to suck); *dimorphum,* from the Greek words δίς (= twice) and μορφή (= form), alluding to the strong sexual dimorphism in the body shape; *zibrowii,* in honour of the discoverer of gallicolous Copepoda in Stylasterina, Helmut Zibrowius.

Key to the species of *Hammatimyzon*

1a. Pleurae of metasomite 1 (♀) well-developed. Second maxilla and maxilliped robust (♀, ♂). Caudal ramus (♂) about as long as wide . *H. dimorphum* n. sp.
b. No pleurae on metasomite 1 (♀). Second maxilla and maxilliped (♀, ♂) slender. Caudal ramus (♂) much longer than wide . . . . *H. zibrowii* n. sp.

Hammatimyzon dimorphum n. sp. Figs. 1-3.

Material. — One ♀ (holotype), one ♂ (allotype). In gall of *Stylaster sanguineus* Milne Edwards & Haime, 1850. "Challenger" sta. 177, New Hebrides, off Api Island, 16°45'S 168°07'E, depth 115-128 m, 18 August 1874. Zoölogisch Museum Amsterdam (ZMA) coll. no. Co. 102.666 a-b.

One ♀ (not dissected, probably the same species). In gall of same host. No information about locality, etc., ex British Museum (Natural History), old dry collection (ZMA coll. no. Co. 102.667).

One ♀. In gall of same host. "Challenger" sta. 232, Japan, off Bay of Yokohama, 35°11'N 139°28'E, 632 m, 12 May 1875 (station record uncertain, see Zibrowius, 1981: 270) (ZMA coll. no. Co. 102.668).

Description, based on material from "Challenger" sta. 177. — Total length (excluding furcal setae) 1338 μm (♀) and 779 μm (♂). Greatest width of cephalosome 1202 μm (♀) and 261 μm (♂).

Female (fig. 1a): Cephalosome much wider than long, swollen, almost hemi-globular. Pleurae of metasomites 1 to 3 strongly developed, those of urosomite 1 small. Genital somite (fig. 1c) much wider than long, squarish, longer than urosomites 3 and 4 combined. Postgenital somite narrower than genital somite, posterior angles projecting. Anal somite narrower again.

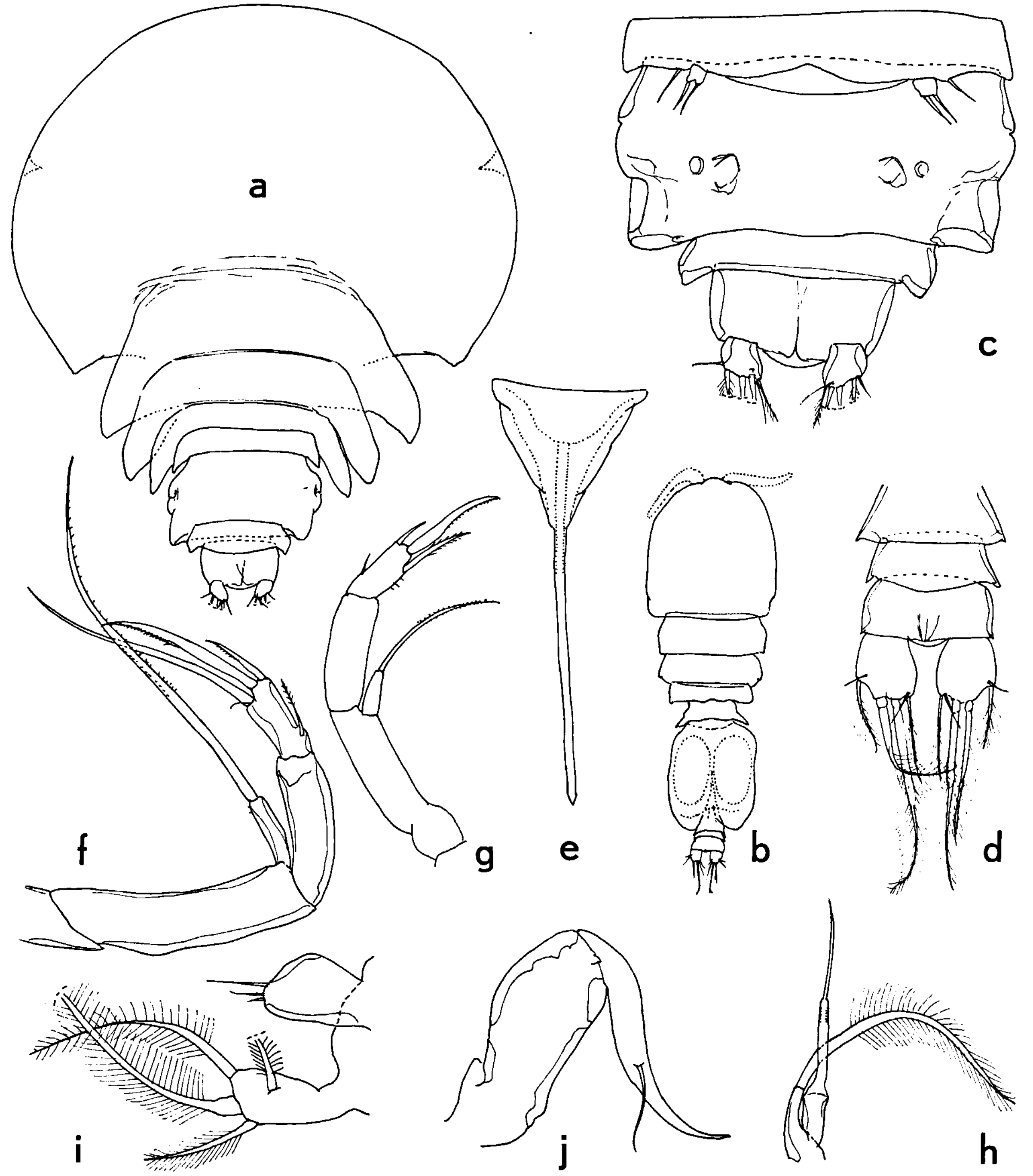

Fig. 1. *Hammatimyzon dimorphum* n. gen., n. sp.: a, female, dorsal (scale PS); b, male, dorsal (PS); c, urosome, ♀, ventral (AB); d, urosome, ♂, dorsal (AC); e, proboscis, ♀ (AB); f, second antenna, ♀ (AC); g, second antenna, ♂ (AD); h, mandible, ♀ (AB); i, first maxilla, ♀ (AC); j, second maxilla, ♀ (AB).

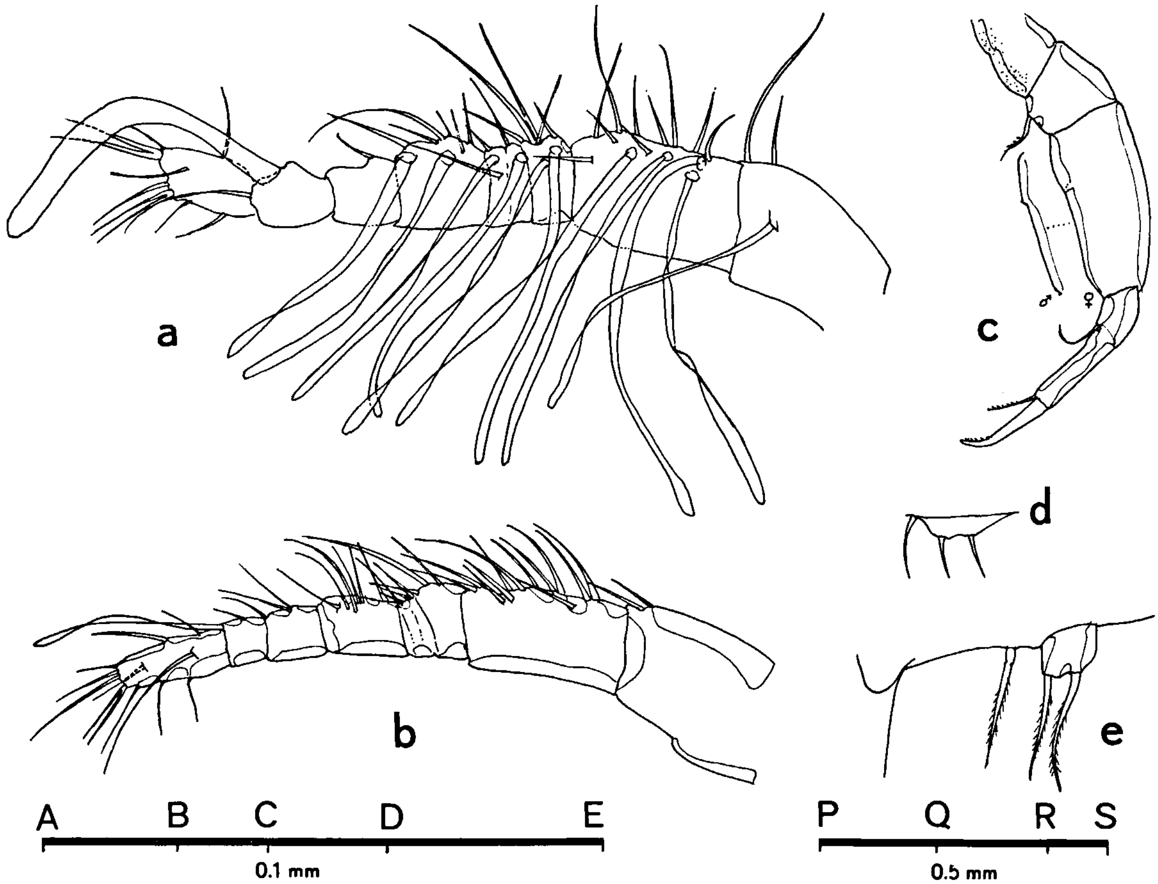

Fig. 2. *Hammatimyzon dimorphum* n. gen., n. sp.: a, first antenna, ♂ (scale AD); b, first antenna, ♀ (AC); c, maxilliped, ♀ (AB), and the inner margin of the 3rd segment of the ♂ maxilliped; d, fifth leg, ♂ (AD); e, fifth leg, ♀ (AD).

The first antenna (fig. 2b) is 8-segmented. The approximate number of elements on each segment is 2, 12, 3, 4, 6, 3, 1 + 1A, 12. The aesthete, on the penultimate segment, is narrow and thin. Segment 4 shows a faint line, indicating presumably that it is composed of 2 fused segments.

The second antenna (fig. 1f) has a 1-segmented exopodite that is more than half as long as the first endopodite segment; distally the exopodite bears one very long, heavy seta that overreaches the distal endopodite elements. The first endopodite segment is naked, the second bears 1 subbasal, inner setule; 2 terminal, claw-like elements; and 1 outer, subterminal seta, which is the longest endopodal element.

The proboscis (fig. 1e) is formed of a conical basal part and a long, slender, tubiform distal part.

The mandible (fig. 1h) consists of a styliform masticatory part and a 1-segmented palp distally armed with a very long, heavy, plumose seta which is longer than the styliform part.

The first maxilla (fig. 1i) consists of 2 rami, the inner one slender, with 4 long, plumose setae, the outer one shorter, with 3 very small setules.

The second maxilla (fig. 1j) consists of an unarmed basal segment and a sigmoid distal claw armed with 1 slender seta.

Maxilliped (fig. 2c) segment 1 unarmed; segment 2 with 1 seta; segment 3 unarmed; segments 4 and 5 each with 1 seta; segment 6 slightly curved, distally denticulated.

Four pairs of biramous legs present. Intercoxal plates well developed. Leg 1 (fig. 3a) with a well-developed inner basipodal spine and an outer basipodal seta; no coxopodal element found. Lateral exopodite spines on segments 2 and 3

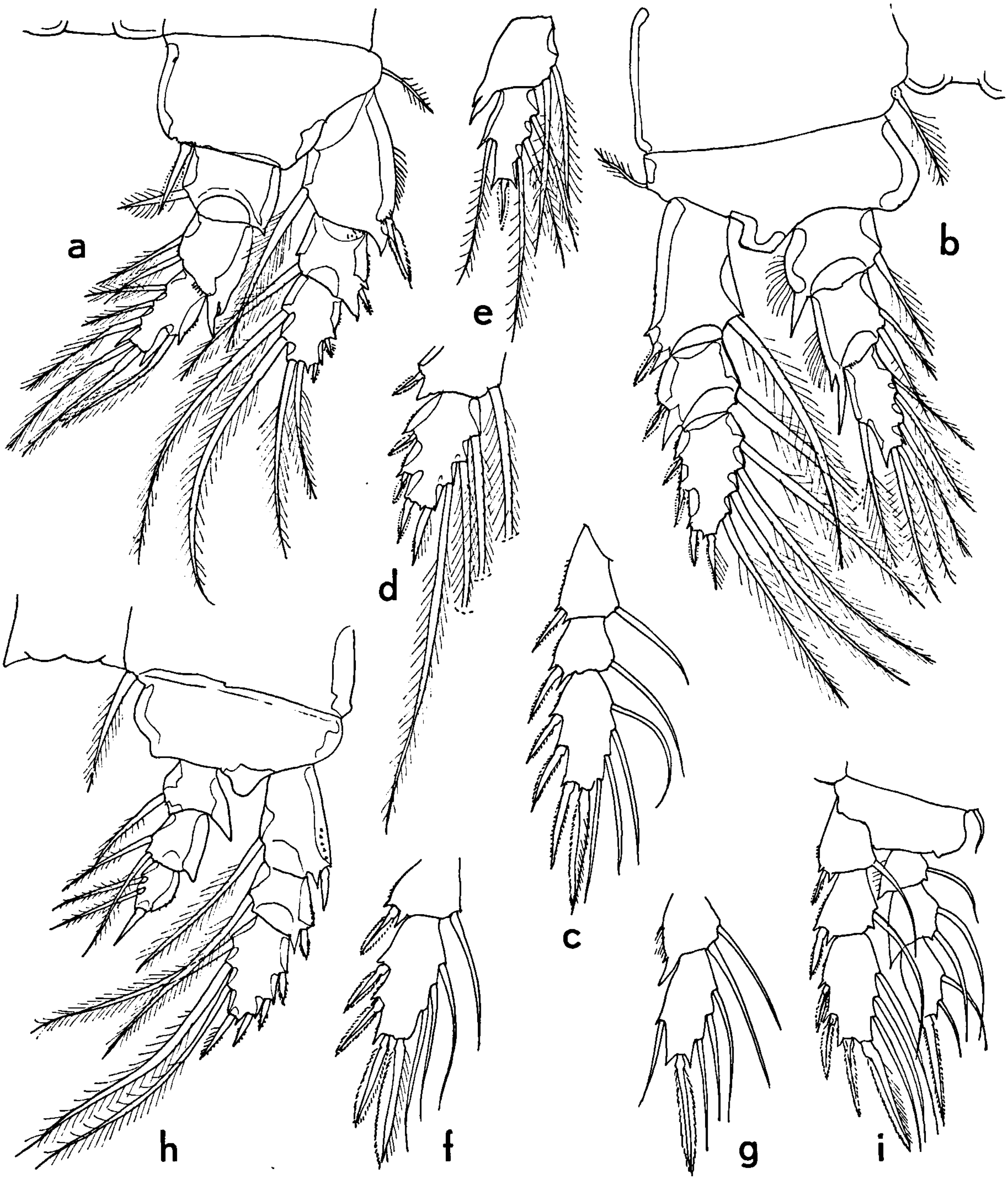

Fig. 3. *Hammatimyzon dimorphum* n. gen., n. sp.: a, first leg, ♀; b, second leg, ♀; c, exopodite second leg, ♂; d, exopodite third leg, ♀; e, endopodite third leg, ♀; f, exopodite third leg, ♂; g, endopodite third leg, ♂; h, fourth leg, ♀; i, fourth leg, ♂, plumosity of the setae omitted. All figures scale AC.

very reduced in length. Second endopodite segment with a laterodistal, bicuspidate prong. The basalmost 5 endopodite setae are shorter than the others.

Leg 2 (fig. 3b) has a plumose medial coxopodal seta. The lateral exopodal spines are rather short, but less so than in P1; the number of lateral spines on the 3rd exopodite segment is 3 on the one side of the body, but 2 on the other. Endopodite setae rather short, especially the 4 basalmost inner setae. A strong dagger-like projection is found on the lateral side of endopodite segment 1.

Leg 3 differs from leg 2 in having a shorter laterodistal projection on exopodite segment 2 (fig. 3d), and only 3 setae on exopodite segment 3. The prong on endopodite segment 2 is shorter, and the distal setation on endopodite segment 3 is replaced by a spine (fig. 3e).

Leg 4 (fig. 3h) shows a reduction of the endopodite, which is shorter than the exopodite and shows reduced armature on segment 3. Endopodite segment 1 is provided with a singularly strong lateral projection.

The chaetotaxis formula of the biramous legs is as follows:

	coxopodite	basipodite	exopodite	endopodite
P1	0-0	1-I	I-1; I-1; II-2-2	0-1; 0-2; 1-2-3
P2	0-1	1-0	I-1; I-1; III-I-4 or II-I-4	0-1; 0-2; 1-2-3
P3	0-1	1-0	I-1; I-1; III-I-3	0-1; 0-2; 1-I-3
P4	0-1	0-0	I-1; I-1; III-I-3	0-1; 0-2; 0-I-2

The fifth legs are placed at the posterior margin of the first urosomite, at some distance from the lateral margin (fig. 1c). Each leg consists of a squarish free segment armed with 2 setae and an isolated seta implanted laterally of the free segment (fig. 2e). Sixth legs absent.

The caudal rami are widely separated and have a shorter outer and a longer inner margin (fig. 1c). Length (in the centre) 34 μm, greatest width 36 μm. The medial terminal setae are broken in the females examined. Anal operculum rounded, not very prominent.

Male: The male is much smaller than the female, and not much transformed, still fully cyclopoid (fig. 1b). The large genital somite is most striking. The first urosomite has backward pointing pleurae. There are two postgenital somites. The caudal rami (fig. 1d) are implanted slightly apart; they are only slightly longer than wide (34 × 30 μm).

The following appendages show sexual differences:

The first antenna (fig. 2a) is 8-segmented like that of the female, and its setal armature is approximately identical. However, several long, ribbon-like extra aesthetes are present on segments 1 to 5 (1, 4, 2, 2, and 2 aesthetes, respectively). The aesthete on the penultimate segment is present in the male as well, but it is extraordinary broad. The length of the terminal segment is shorter than in the female.

The second antenna (fig. 1g) has a slightly shorter exopodite armature than in the female (it does not overreach the terminal armature of the endopodite). The lateral, subterminal endopodite seta is much shorter than in the female.

Mouthparts identical to those of the female, but the 3rd maxillipedal segment of the male shows a slightly more distinct notch on its inner margin (fig. 2c).

Legs 1 to 4 armed as in the female. The lateral and terminal exopod spines are better developed than in the female (figs. 3c, f). The bicuspidate prong on the 2nd endopodite segment is slightly less strong (fig. 3g), but the distal endopodite spine of P3 is stronger (fig. 3g). The fourth leg (fig. 3i) has a less reduced endopodite than in the female; the laterodistal projection of segment 1 is much smaller.

Leg 5 is a narrow lobe, armed with 2 distal and 1 lateral setae (fig. 2d).

Hammatimyzon zibrowii n. sp. Figs. 4-6.

M a t e r i a l. — One ♀ (holotype), one ♂ (allotype), six ♀♀ (paratypes). In galls of *Crypthelia cryptotrema* Zibrowius, 1981. "Vauban" sta. HSP 27, New Caledonia, east entrance of Havannah Channel, 22°39.0'S 167°07.0'E, dredged in 170-190 m, 13 April 1978 (ZMA coll. no. Co. 102.664 a-c).

D e s c r i p t i o n. — Female: Total length of two intact females 0.56 and 0.52 mm, corresponding greatest diameter of cephalosome 0.46 and 0.49 mm.

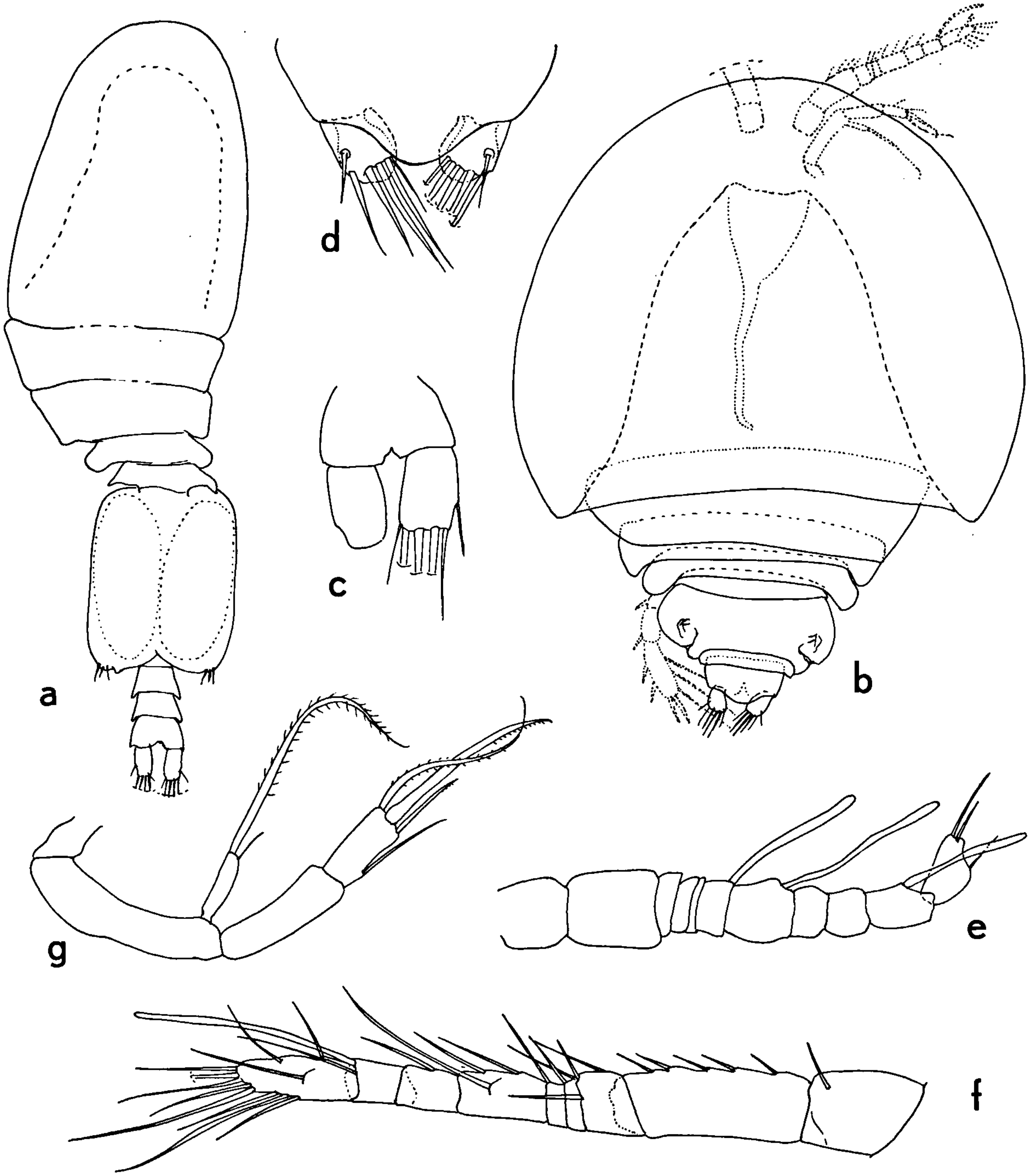

Fig. 4. *Hammatimyzon zibrowii* n. sp.: a, male, dorsal (scale AB); b, female, dorsal (AB); c, caudal rami, ♂ (AD); d, caudal rami, ♀ (AD); e, first antenna, ♂ (most elements omitted) (AD); f, first antenna, ♀ (not all elements represented) (AD); g, second antenna, ♀ (AD).

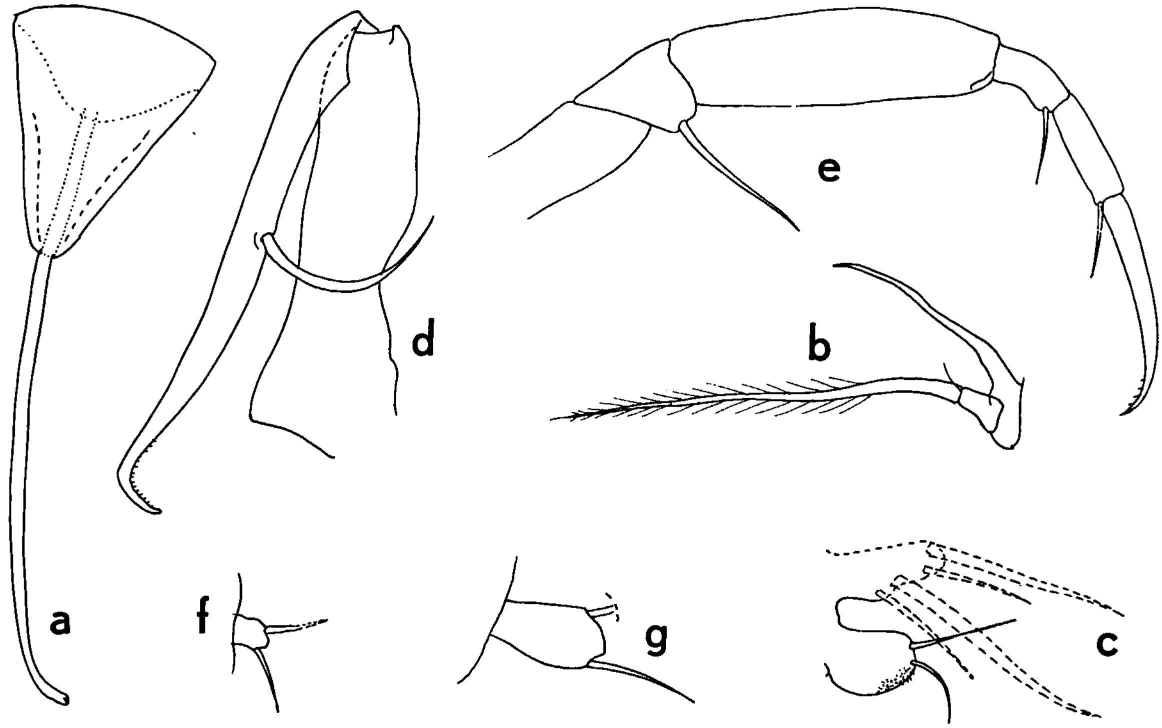

Fig. 5. *Hammatimyzon zibrowii* n. sp.: a, proboscis, ♀ (scale AC); b, mandible, ♀ (AD); c, first maxilla, ♀ (AD); d, second maxilla, ♀ (AD); e, maxilliped, ♀ (AD); f, fifth leg, ♀ (AD); g, fifth leg, ♂ (AE). (Dashed parts reconstructed after several specimens).

The body (fig. 4b) is ovate, shield-like; the cephalosome forms more than half of the body. Siphon (fig. 5a) with a tubiform distal part, reaching not quite the posterior border of the cephalosome. The lateral and frontal margins of the cephalosome are bent underneath the body, as to leave only a relatively small medioventral area uncovered where the antennae and mouthparts are crowded.

The first metasomite (carying P2) lacks pleurae; its lateral margins are straight and taper backward. The second and third metasomites have small, rounded pleurae. The first urosomite (carrying P5) is very narrow. The genital somite has a lateral notch, just behind the genital apertures. The latter are marked by a couple of sclerites and 2 small spines. The third urosomite is very narrow, almost invisible, especially when, through telescoping articulation, it is sunk in the genital somite. The anal somite is well-developed and has a large anal lobe, covering the implantation of the caudal rami (fig. 4d).

The length of the legs 1 to 4 is noteworthy: they prop out from under the body, the exopodite of P4 reaching to the end of the caudal rami (fig. 4b).

The finer details of setation (such as the exact number of elements on the first antenna or the degree of plumosity of the setae on the legs) is subject to reservation, since the material has been preserved dry and does not permit elucidation of such details.

The first antenna (fig. 4f) is 9-segmented, with a very elongate 2nd segment. Segment 8 carries a distal aesthete.

The second antenna (fig. 4g) has a thin exopodite, about half as long as the first endopodite segment, distally armed with 1 robust, very long seta and 1 short setule. The endopodite is 2-segmented; segment 1 is unarmed, segment 2 bears

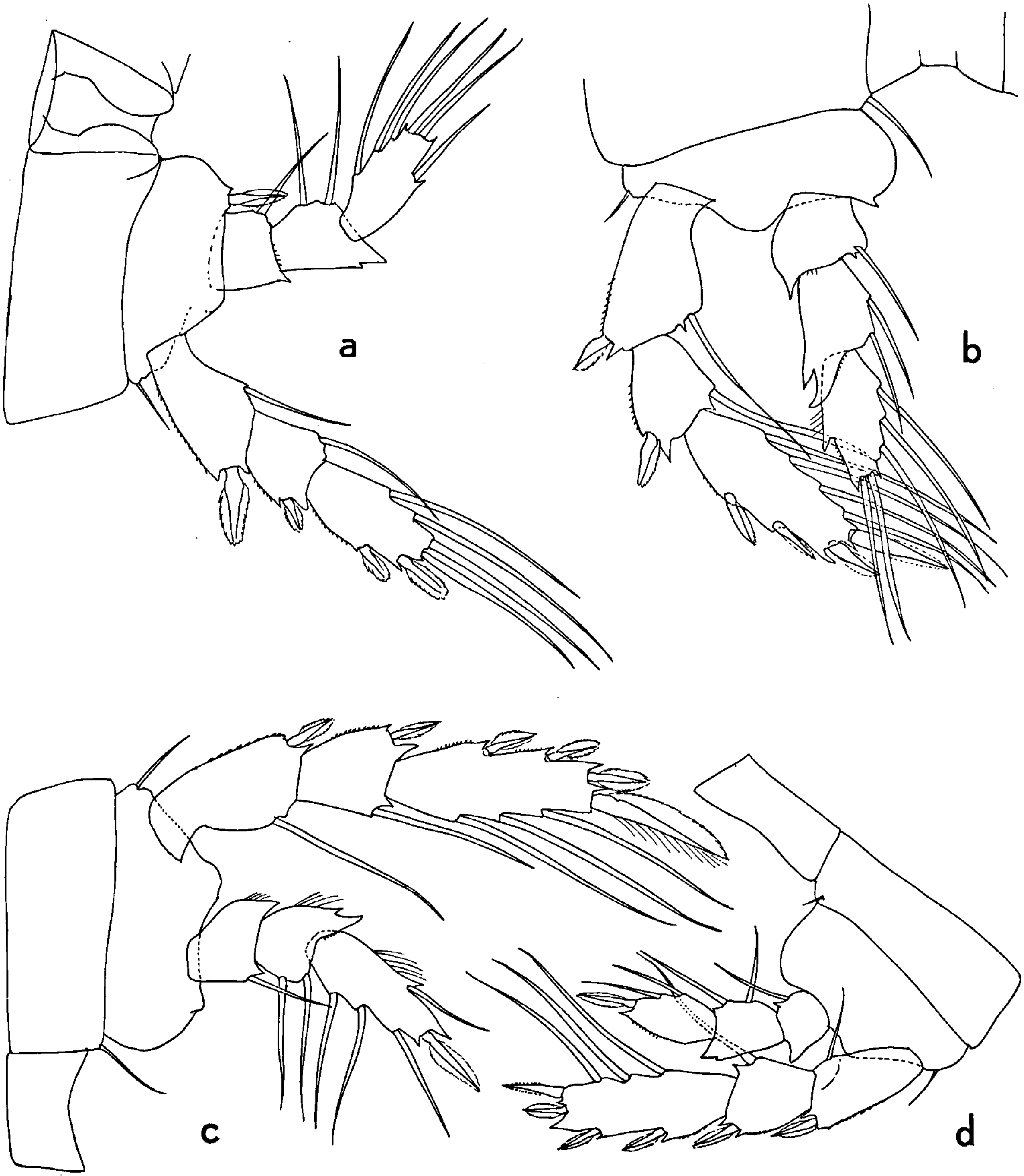

Fig. 6. *Hammatimyzon zibrowii* n. sp., ♀: a, first leg; b, second leg; c, third leg; d, fourth leg (all scale AD).

1 subbasal, medial seta and 3 distal elements, the central one of which is claw-like.

The mandible (fig. 5b) has a rather short stylet (masticatory part) and a 1-segmented palp, armed with 1 short setule and 1 thick, long, plumose seta.

The first maxilla (fig. 5c) is badly preserved; its outer lobe bears 2 setae, its inner lobe 4 setae, one of which very thick.

The second maxilla (fig. 5d) is characterized by a very slender basal segment and a long claw.

The maxilliped (fig. 5e) is also very slender. The third segment ("hand") is unarmed.

The legs 1 to 4 (figs. 6 a-d) are biramous, each ramus being 3-segmented. The exopodites are longer than the endopodites. The second endopodite segment bears a lateral process, strongly bicuspidate in P2 and P3, less strongly so in P1 and P4. All legs have intercoxal plates, that of P1 being longer than wide, the others wider than long. Lateral basipodite setule present in all legs; leg 1 moreover with a medial basipodite spine. Medial coxopodite seta absent in P1, vestigial in P4, present in P2 and P3. The chaetotaxis formula of the biramous legs is a follows:

	coxopodite	basipodite	exopodite	endopodite
P1	0-0	1-I	I-1; I-1; II-2-2	0-1; 0-2; 1-2-4
P2	0-1	1-0	I-1; I-1; III-I-4	0-1; 0-2; 1-2-3
P3	0-1	1-0	I-1; I-1; III-I-3	0-1; 0-2; 1-I-3
P4	0-(1)	1-0	I-1; I-1; III-I-3	0-1; 0-2; 0-I-2

The fifth leg (fig. 5f) is a small, 1-segmented, subrectangular lobe (length 13 µm, width 10 µm), with 2 distal setae.

The caudal ramus (fig. 4d) is 28 µm long and has a largest diameter of 23 µm. The lateral seta is implanted on the dorsal surface of the ramus; there are 4 distal and 1 medial setae, all implanted in a single row, subterminally.

Male: The single available male is heavily damaged, so a complete description proved to be impossible. Its total length is about 0.76 mm. The body (fig. 4a) is elongate cyclopiform, the pleurae are not prolonged.

The first antenna (fig. 4e) is 10-segmented. The penultimate segment bears an aesthete at some distance from the distal end; additional aesthetes are present, at least on segments 5 and 6, but several more are expected which were not discernible due to the poor state of preservation.

The second antenna and mouthparts appear to be similar to those of the female. The maxilliped does not show sexual dimorphism.

The legs 1 to 4 are biramous, each ramus being 3-segmented. The endopodites are weaker than the exopodites. The fifth leg (fig. 5g) is a 1-segmented structure, 22 µm long, 13 µm wide, thus slightly more elongated than in the female. Sixth legs represented by 3 setae on the posterolateral corner of the genital somite.

There are 3 postgenital somites. The anal somite lacks a conspicuous anal operculum. The caudal rami (fig. 4c) are slightly longer than the anal somite, 31 µm long and 23 µm wide. Most distal setae are damaged.

Remarks. — Easily distinguishable from *H. dimorphum* by the lack of pleurae on metasomite 1 of the female, and by the longer caudal rami of the male. The appendages show several slight, but clear differences as well: the greater elongation of the 2nd segment of A1 in *H. zibrowii*, the much greater slenderness of the 2nd maxilla and maxilliped in *H. zibrowii*, the greater elongation of P5 ♂ in *H. zibrowii*, the greater development of the spiniform process on the 2nd exopodite segment of P1-P4 and on the 1st endopodite segment in P2-P4 of *H. dimorphum*, etc.

At first, I was in doubt whether the absence of pleurae on metasomite 1 of the female of *H. zibrowii* would not be a character of sufficient value to warrant the creation of a new genus for it, but the close correspondence between the morphology of the appendages of *H. dimorphum* and *H. zibrowii* convinced me that they belong in the same genus.

Cecidomyzon n. gen.

Family: Asterocheridae.
Diagnostic features: Vide supra.
Type-species: *Cecidomyzon conoporae* n. sp.
Other species: So far, the genus is monospecific.
Derivatio nominis: *Cecidomyzon*, from the Greek words κηκίς (= gall-nut) and μυζειν (= to suck); *conoporae*, alluding to the coral host genus, *Conopora*.

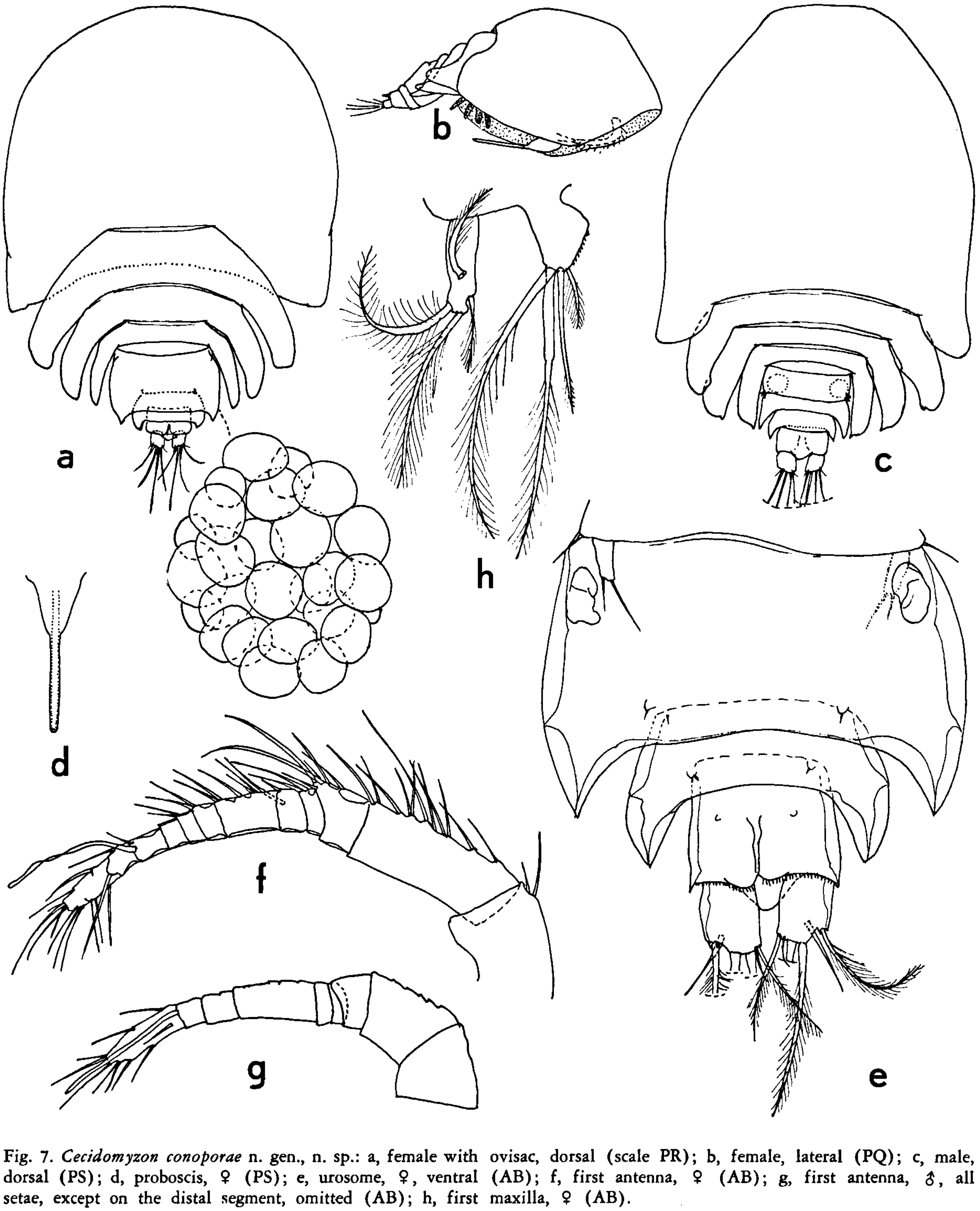

Fig. 7. *Cecidomyzon conoporae* n. gen., n. sp.: a, female with ovisac, dorsal (scale PR); b, female, lateral (PQ); c, male, dorsal (PS); d, proboscis, ♀ (PS); e, urosome, ♀, ventral (AB); f, first antenna, ♀ (AB); g, first antenna, ♂, all setae, except on the distal segment, omitted (AB); h, first maxilla, ♀ (AB).

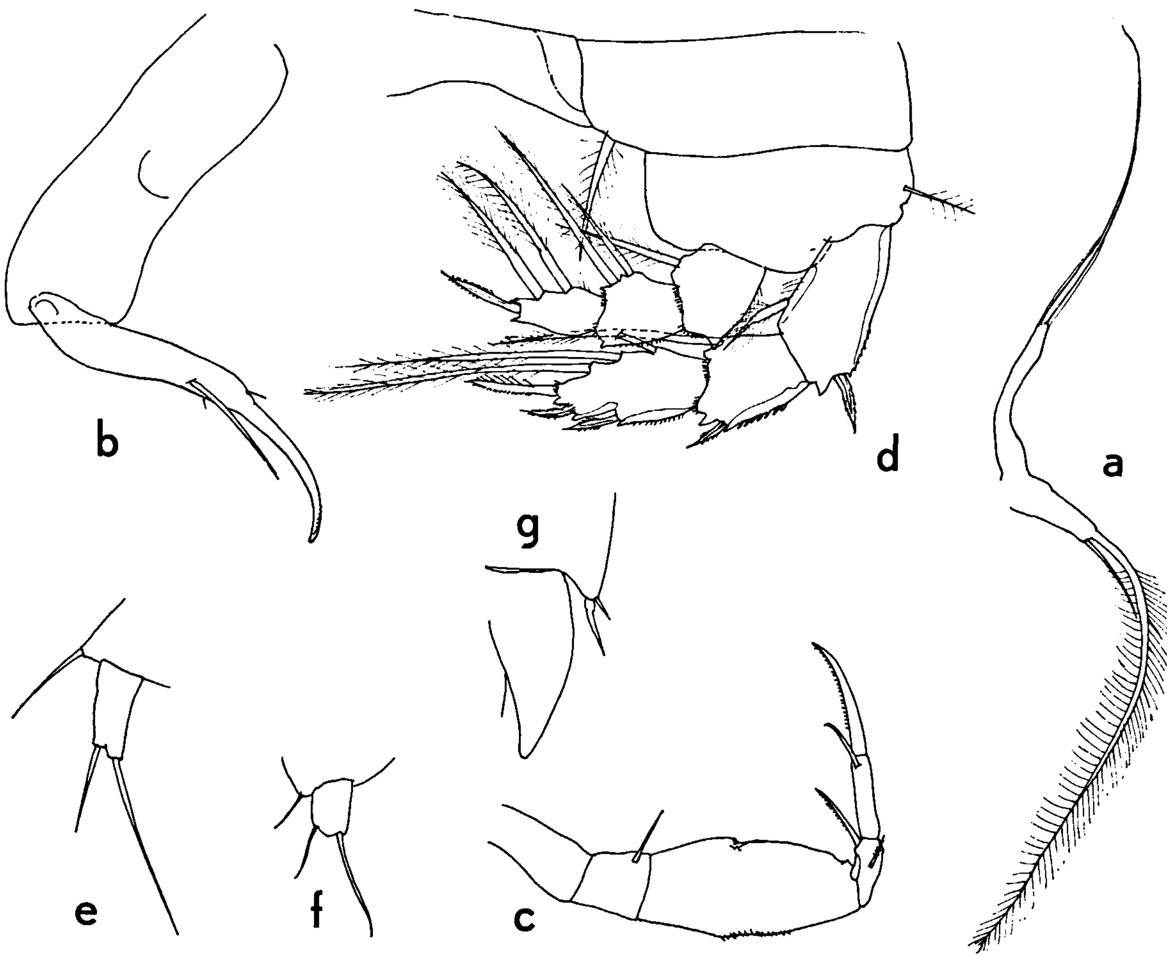

Fig. 8. *Cecidomyzon conoporae* n. gen., n. sp.: a, mandible, ♀ (scale AB); b, second maxilla, ♀ (AB); c, maxilliped, ♀ (AB); d, fourth leg, ♀ (AC); e, fifth leg, ♀ (AC); f, fifth leg, ♂ (AC); g, sixth leg, ♂ (AC).

Cecidomyzon conoporae n. sp. Figs. 7-9.

Material. — One ♀ (holotype), one ♂ (allotype), one ♀ (paratype). In galls of *Conopora laevis* (Studer, 1878). New Zealand Oceanographic Institute, sta. A 910, between New Zealand and the Chatham Islands, 43°04'S 178°39'W, depth 349 m, 13 September 1963 (ZMA coll. no. Co. 102.655).

One ♂ (damaged), presumably this species, in gall of same host. "Challenger" sta. 170, Kermadec Islands, 29°55'S 178°14'W, depth 951 m, 14 July 1874 (ZMA coll. no. Co. 102.669).

Description, based on material from NZOI sta. A 910. — Length (excluding furcal setae) 1416 μm and 943 μm for the female and male, respectively. Greatest diameter of cephalosome 1108 μm (♀) and 646 μm (♂).

Female: Body (fig. 7a) wide, cephalosome slightly longer than the remaining body somites. Cephalosome swollen (fig. 7b). Span between the pleurae of metasomite 1 almost as large as the cephalosome; pleurae of metasomites 2 and 3 well-developed but gradually less wide. First urosomite without pleurae. Genital somite (fig. 7e) with regularly curved (not indented) lateral margins; posterolateral corners produced. Third urosomite narrower than the genital somite; posterolateral corners produced. Anal somite narrower again; posterior margin spinulated; anal operculum rounded, well developed. Caudal ramus (fig. 7e) longer than wide (66 × 46 μm). Longest furcal setae as long as the urosome.

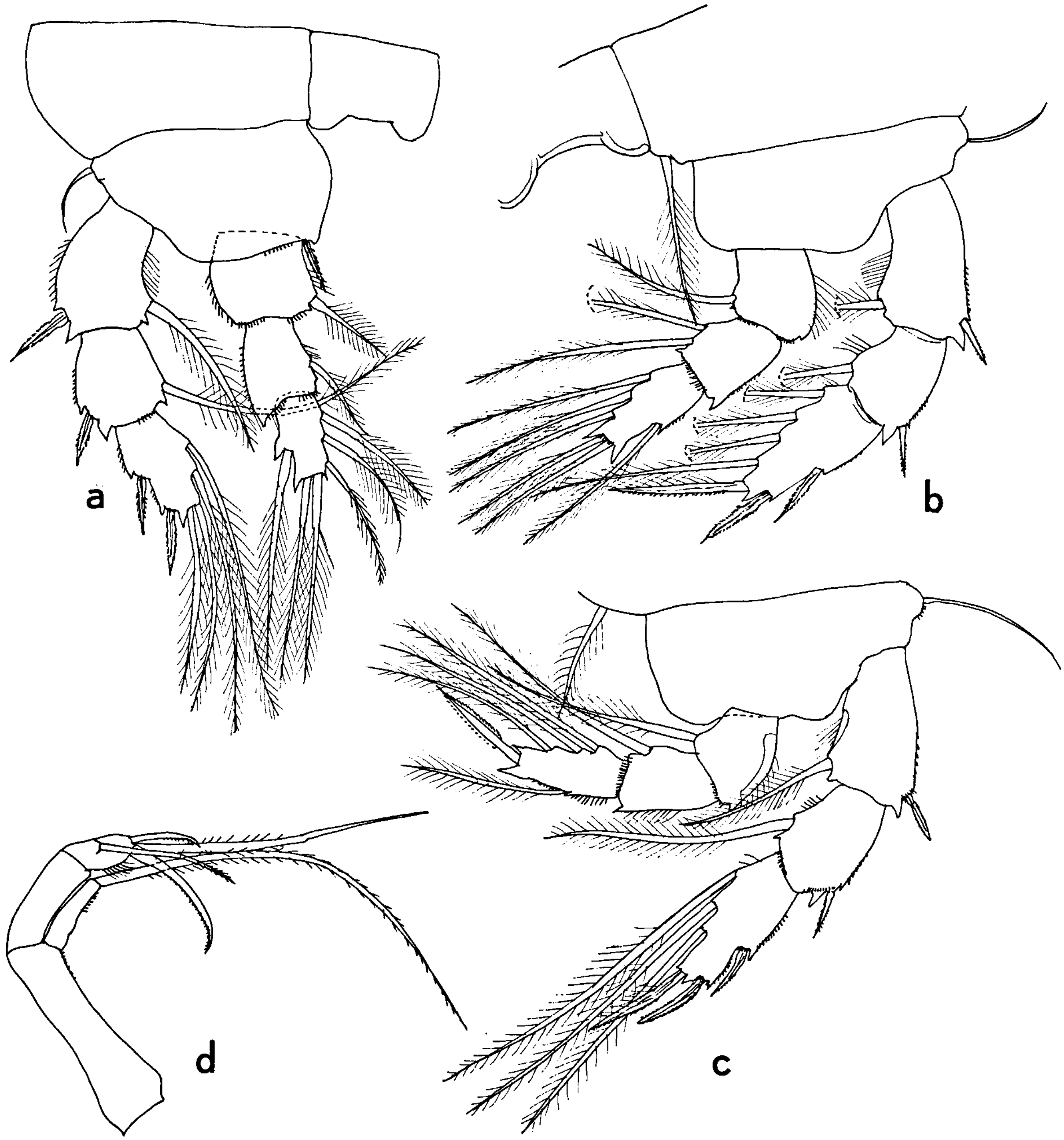

Fig. 9. *Cecidomyzon conoporae* n. gen., n. sp.: a, first leg, ♀ (scale AC); b, second leg, ♀ (AC); c, third leg, ♀ (AC); d, second antenna, ♀ (AB).

Ovisacs oval (fig. 7a), eggs small, numerous.

The first antenna (fig. 7f) is 12-segmented; the setation of the segments is approximately as follows: 2, 11, 6, 2, 2, 5, 2, 2, 0, 1 + 1A, 2, 12. The aesthete, on the antepenultimate segment, is rather long and narrow. Some of the setae on segment 2 are plumose.

The second antenna (fig. 9d) has a very long, 1-segmented exopodite, which is almost as long as the first endopodite segment. Distally, the exopodite bears a long, barbed seta, which overreaches the endopodal elements. The second endopodite article bears 3 terminal elements (1 setiform, 2 claw-like) and 1 mediobasal seta.

The proboscis (fig. 7d) has a conical basal part and a rather short distal tubular part. The mandible (fig. 8a) has a slender, almost setiform, masticatory part and a 1-segmented palp, distally provided with 1 short seta and 1 exceedingly long, plumose seta.

The first maxilla (fig. 7h) has a slender, finger-shaped endopodite, armed with 4 plumose setae; and a club-shaped exopodite, also armed with 4 plumose setae.

The second maxilla (fig. 8b) has a slender, unarmed basal segment and a curved claw armed with 1 seta.

The maxilliped (fig. 8c) bears 1 seta on segment 2, 2 on segment 4, and 1 on segment 5.

The legs 1 to 4 are biramous (figs. 9a, b, c; 8d). The third exopodite segment of each leg bears 2 lateral spines of good length (on P4 some lateral spines are shortened). The medial basipodal spine of P1 is rather small. The second endopodite segment bears a simple, triangular laterodistal process. The fourth endopod is shorter than the exopod and has a reduced armature on its third segment.

The chaetotaxis formula of the leg is as follows:

	coxopodite	basipodite	exopodite	endopodite
P1	0-0	1-I	I-1; I-1; II-2-2	0-1; 0-1; 1-2-3
P2	0-1	1-0	I-1; I-1; II-I-4	0-1; 0-2; 1-2-3
P3	0-1	1-0	I-1; I-1; II-I-3	0-1; 0-1; 1-I-3
P4	0-1	1-0	I-1; I-1; II-I-3	0-1; 0-2; 0-I-2

The fifth leg has an elongate, rectangular free segment (fig. 8e) armed with 2 distal setae; an isolated seta is inserted laterally of the implantation of the free segment. Sixth legs absent.

Male (fig. 7c): Transformed like the female (cephalosome swollen, pleurae on metasomites 1 to 3 distinct). The genital somite is regularly rectangular; there are 3 postgenital somites.

Sexual dimorphism can be observed in the following appendages:

The first antenna (fig. 7g) is 9-segmented by fusion of the segments 6 + 7, 8 + 9 and 11 + 12 of the homologous female appendage. The aesthete consequently is on the penultimate segment.

The fifth leg (fig. 8f) is only slightly longer than wide. The posterolateral corners of the genital somite carry two spiniform elements, presumably the remnants of the sixth legs (fig. 8g).

Caudal ramus 50 × 41 μm.

Remarks. — The observations on the finer details of the morphology of the male are based on the dissections of a single, brittle specimen (preserved dry) only, and should be taken with some reservation. The male is not cyclopiform (as in *Hammatimyzon*) but resembles the female in degree of transformation, more in particular in the development of the pleurae.

Oedomyzon n. gen.

Family: Asterocheridae.
Diagnostic features: Vide supra.
Type-species: *Oedomyzon tripodum* n. sp.
Other species: So far, the genus is monospecific.
Derivatio nominis: *Oedomyzon*, from the Greek words οἴδημα (= swelling) and μυζειν (= to suck); *tripodum* from the Greek τρίπους =) with three legs), alluding to the presence of only three pairs of biramous legs.

Oedomyzon tripodum n. sp. Figs. 10-12.

Material. — One ♀ (holotype). In gall on *Conopora laevis* (Studer, 1878). "Terra Nova" sta. 90, New Zealand, Three Kings Islands, from Summit, Great King, S 10° W, 25 miles, depth 183 m, 27 July 1911 (ZMA coll no. Co. 102.671).

One ♀ (paratype), one ♂ (allotype). In gall of *Conopora laevis* (Studer, 1878) (= holotype of *Stylaster obliquus* Studer, 1878). "Gazelle" sta. 58/42, New Zealand, N.E. of Three Kings Islands, 34°09.9'S 172°35.'E, depth 165 m, 27 October 1875 (ZMA coll. no. Co. 102.672-673).

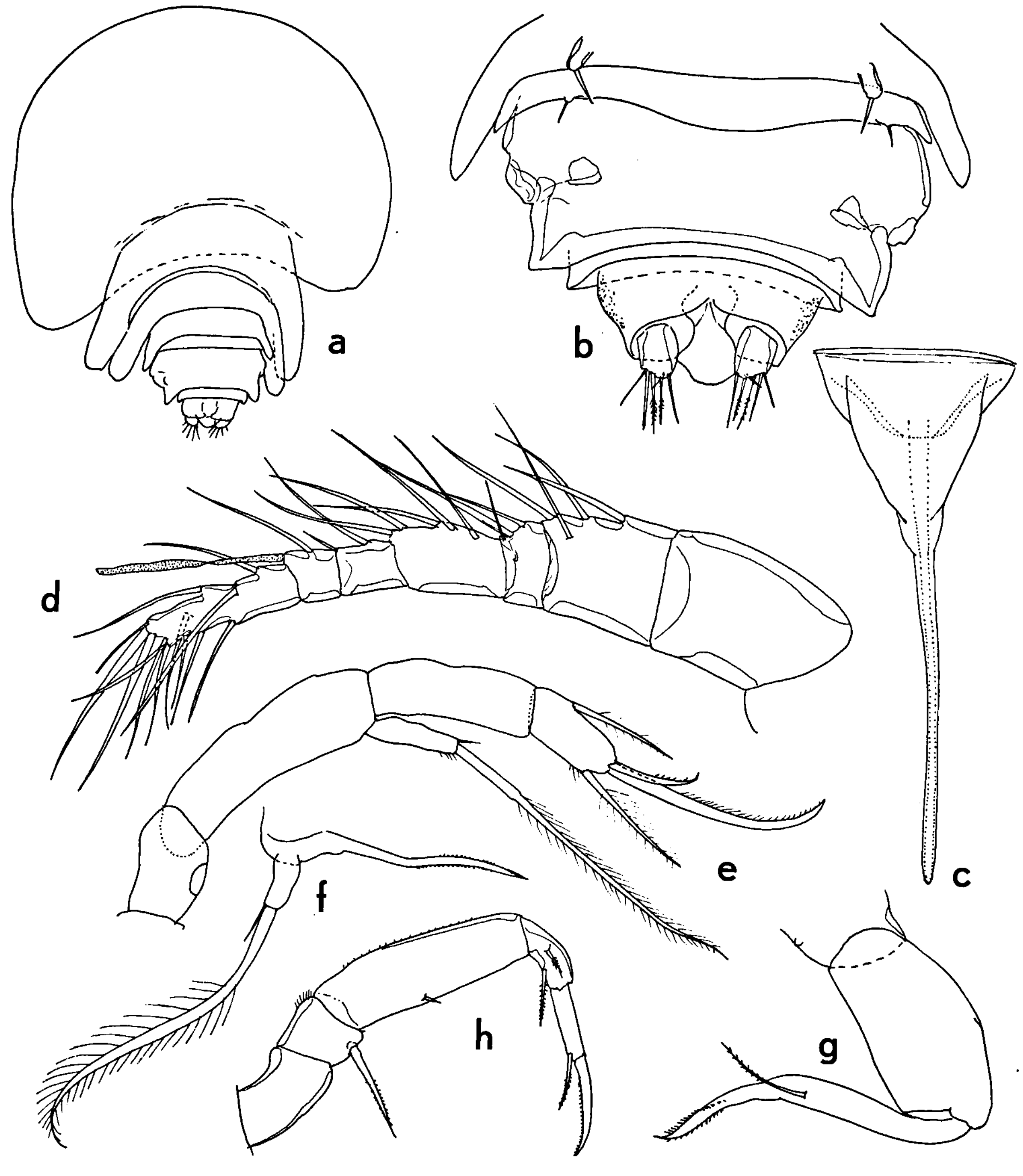

Fig. 10. *Oedomyzon tripodum* n. gen., n. sp., ♀, holotype: a, body, dorsal (scale PR); b, urosome, ventral (AB); c, proboscis (AB); d, first antenna (PS); e, second antenna (AC); f, mandible (AB); g, second maxilla (AB); h, maxilliped (AB).

D e s c r i p t i o n o f ♀ h o l o t y p e. — Greatest width of cephalosome 1400 μm, length of body (excluding furcal setae) 1438 μm.

The cephalosome is wider than long, shield-like, swollen. The pleurae of metasomites 1 and 2 are strongly developed, pointing backward, rounded distally. The pleurae of metasomite 3 are much narrower and shorter (fig. 10a). First urosomite with very small pleurae (fig. 10b); genital somite much wider than long, roughly rectangular in outline. Two postgenital somites, both much less wide than the genital somite. Anal operculum rounded, conspicuous.

The first antenna (fig. 10d) is 7-segmented; segment 1 is unarmed, the other segments bear approximately 4, 3, 5, 2, 1 + 1A, and 12 elements, respectively. The aesthete on the penultimate segment is narrow and not very long.

The second antenna (fig. 10e) has a slender exopodite (> half the first endopodite segment), distally armed with 1 very short and 1 very long, plumose element, the latter reaching about the end of the longest endopodite element. Distal endopodite segment with 1 medial, subbasal, seta; 2 terminal, claw-like elements; and 1 lateral, subterminal seta.

The proboscis (fig. 10c) is conical in its basal part, slender and narrowly tubular in its distal part.

The mandible (fig. 10f) consists of a stylet and a one-segmented palp, armed with 1 setule and 1 very long, plumose seta.

The first maxilla (fig. 11a) has a narrow outer lobe with 4 setae and a bulbous inner lobe armed with 4 setae.

The second maxilla (fig. 10g) has an unarmed basal portion and a sigmoid claw armed with 1 seta.

The maxilliped (fig. 10h) bears a long element on the inner margin of segment 2, a very short element on segment 3, 2 setae on segment 4, and 1 seta on segment 5.

The legs 1 to 3 are biramous (figs. 11b, c, d). Leg 1 has an inner basipodal spine, but lacks an inner coxopodal seta. A bicuspidate (P1-P2) or tricuspidate (P3) process is found on the disto-lateral corners of the second endopodite segment.

The chaetotaxis formula is as follows:

	coxopodite	basipodite	exopodite	endopodite
P1	0-0	1-I	I-1; I-1; II-4	0-1; 0-2; 1-2-3
P2	0-1	1-0	I-1; I-1; II-I-4	0-1; 0-1; 1-2-3
P3	0-1	1-0	I-1; I-1; II-I-4	0-1; 0-1; 1-I-3 (or 1-I-2)

The fourth leg is reduced to a small lobe (length 33 μm, width 12 μm) on each side of the posterior margin of metasomite 3 (fig. 11e). The lobe bears a single terminal spine of 31 μm long.

The fifth legs (fig. 11f) are reduced to a single setule on the posterior margin of the first urosomite (fig. 10b). Sixth legs absent.

The caudal rami (fig. 10b) are slightly longer than wide (40 × 34 μm). The rami are inserted far apart. The 4 distal setae are reduced in length (a bit longer than the length of the ramus).

N o t e s o n t h e ♀ p a r a t y p e (figs. 12a, d, e, f). — Length of body 1419 μm, greatest width of cephalosome 1335 μm. Numerous loose eggs were found in the gall together with this female; the diameter of these eggs ranges from 207 to 241 μm.

The process on segment 2 of the endopodite of the third leg is bicuspidate in this specimen and the fourth leg bears 2 elements (1 spine, 1 seta).

D e s c r i p t i o n o f t h e ♂ a l l o t y p e. — Length of body 798 μm, greatest width of cephalosome 405 μm. The body (fig. 12b) is more or less cyclopiform, with a shield-shaped cephalosome. Metasomites 1 and 2 have distinct, pointed pleurae; the pleurae of metasomite 3 are small. Genital somite large, only slightly narrower than the cephalosome. Two post-genital somites. Caudal rami (fig. 12c) longer than wide, armed with 6 well-developed setae, of which the two longest are plumose.

The first antenna is 7-segmented as in the female; aesthete present on penultimate segment, no extra aesthetes; articulation line between segments 2 and 3 obscure.

No sexual dimorphism in the maxilliped.

The right P4 is as in the female paratype, the left P4 is armed with 3 setae. The fifth leg is as in the female. The sixth leg (fig. 12g), located on the posterior margin of the genital somite, is provided with 3 setae.

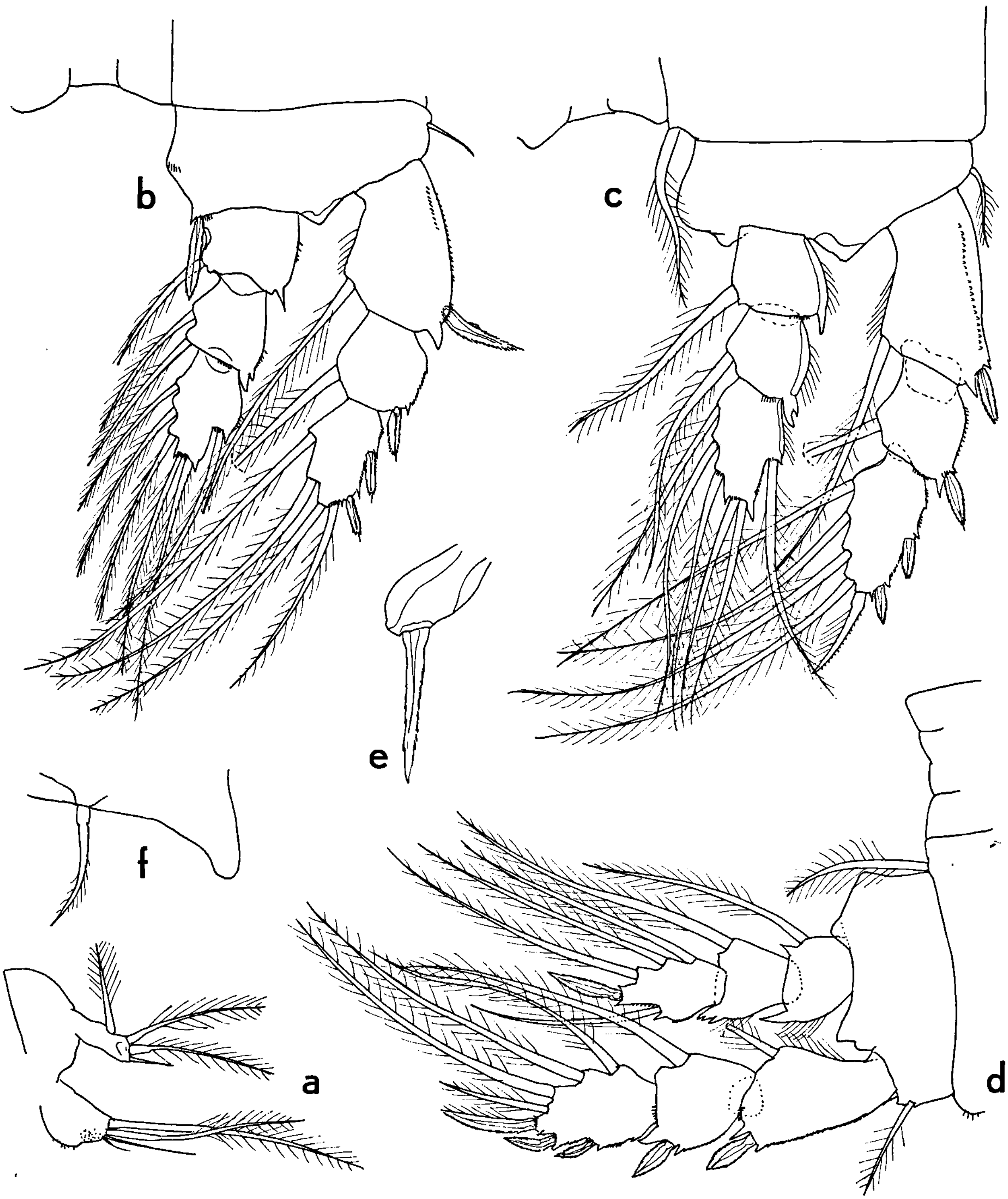

Fig. 11. *Oedomyzon tripodum* n. gen., n. sp., ♀, holotype: a, first maxilla (scale AB); b, first leg (AC); c, second leg (AC); d, third leg (AC); e, fourth leg (AE); f, fifth leg (AE).

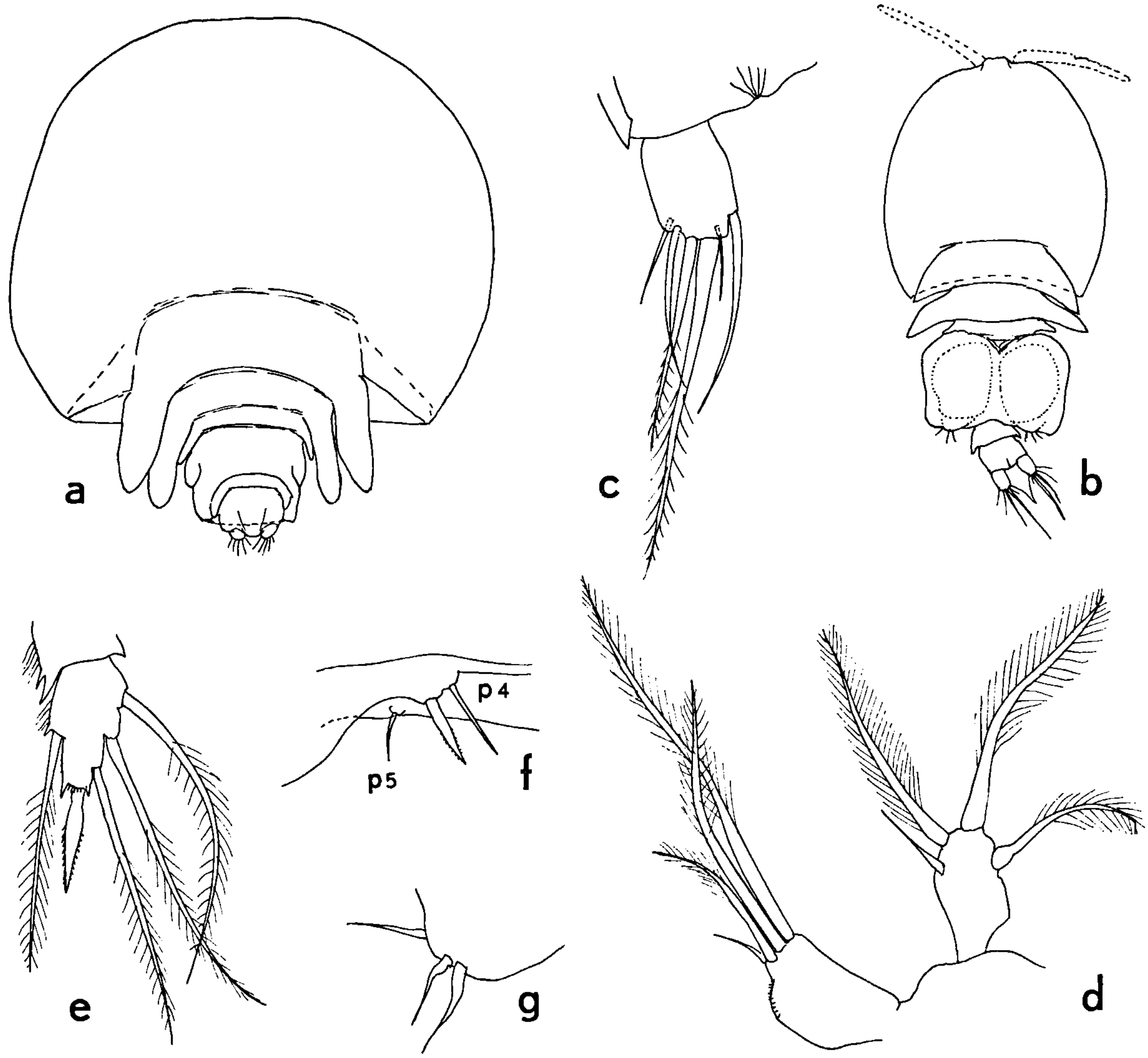

Fig. 12. *Oedomyzon tripodum* n. gen., n. sp. (from "Gazelle" sta. 58/42): a, female, dorsal (scale PR); b, male, dorsal (PS); c, right caudal ramus, ♂, ventral (AD); d, first maxilla, ♀ (AC); e, distal part of endopodite of third leg, ♀ (AC); e, distal part of endopodite of third leg, ♀ (AC); f, fourth and fifth legs, ♀, ventral (AC); g, sixth leg, ♂ (AD).

Remarks. — The reduction of the fourth leg to a bud is apparently coupled with a reduction in size of the somite carrying this leg, as is demonstrated by the short pleurae of metasomite 3. The fifth leg is also rudimentary. These two characters set *Oedomyzon* apart from *Hammatimyzon* and *Cecidomyzon*, but are shared by *Cystomyzon*. The latter shows, however, also reductions in the segmentation of legs 1 to 3.

The armature of the rudimentary fourth leg is apparently variable: 1, 2 and 3 elements have been observed.

Cystomyzon n. gen.

Family: Asterocheridae.

Diagnostic features: Vide supra.

Type-species: *Cystomyzon dimerum* n. sp.

Other species: *Cystomyzon* sp.

Derivatio nominis: *Cystomyzon*, from the Greek words κύστις (= cyst) and μυζειν (= to suck); *dimerum* from the Greek words δίς (= twice) and μέρος (= part), alluding to the two-segmented nature of the endopodites of legs 1 to 3.

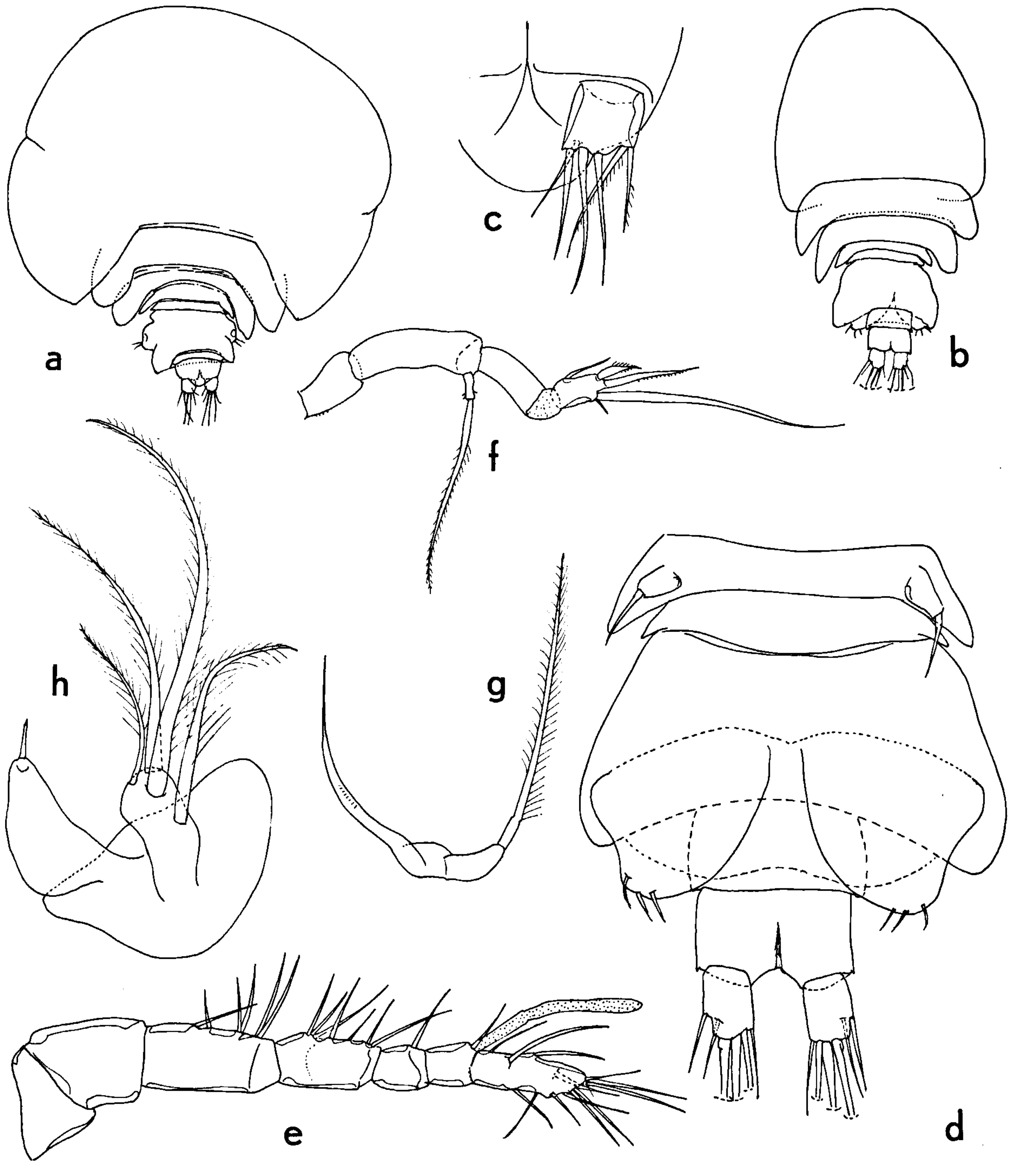

Fig. 13. *Cystomyzon dimerum* n. gen., n. sp.: a, female, dorsal (scale PR); b, male, dorsal (PS); c, anal somite and furcal ramus, ♀, ventral (AC); d, urosome, ♂, ventral (AC); e, first antenna, ♀ (AC); f, second antenna, ♀ (AB); g, mandible, ♀ (AB); h, first maxilla, ♀ (AC).

Cystomyzon dimerum n. sp. Figs. 13-15.

Material. — One ♀ (holotype), one ♂ (allotype), twenty-three ♀♀, seven ♂♂, five nauplii and twenty-one copepodids (paratypes). In galls of *Stylaster papuensis* Zibrowius, 1981. Papua-New Guinea, Louisiade Archipelago, Tagula Island, Snake Pass, depth to 40 m. R. H. Chesher coll., 1979 (ZMA coll. no. Co. 102.662).

Description, based on material from Tagula Island, Papua. — Length (excluding furcal setae) and greatest width of cephalosome of four females: 1090 × 1045 μm, 1115 × 1059 μm, 1146 × 1125 μm, and 1276 × 1246 μm; the same measurements of four males are 729 × 444 μm, 745 × 439 μm, 753 × 402 μm, and 757 × 403 μm. Eggs found in the galls have a diameter of 248-276 μm. A nauplius from a gall is 316 μm long and 187 μm wide.

Female: Body (fig. 13a) wide, cephalosome swollen. Pleurae of metasomites 1 and 2 distinct, but less wide than the cephalosome; pleurae of metasomite 3 present, but much less wide and much shorter than those of metasomite 2. First urosomite practically without pleurae.

Genital segment bipartite, the anterior part (with the genital apertures and two setae) is separated by a distinct notch from the posterior part. The latter envelopes the narrow third urosomite completely. Anal operculum semicircular, covering a great part of the caudal rami (fig. 13c).

The first antenna (fig. 13e) is 7-segmented; segments 1 and 2 are unarmed, the other segments bear approximately 6, 7, 1, 1 + 1A, and 14 elements, respectively. The aesthete on segment 6 is not very long.

The second antenna (fig. 13f) has a short, thin exopodite, less developed than in the preceding three genera, distally armed with a long, plumose seta that overreaches the endopodite. Between endopodite segments 1 and 2, there is a membranous zone, clearly visible in some specimens, contracted in others; segment 1 is unarmed; segment 2 bears 1 medial seta, 1 shorter and 1 longer distal spiniform elements, and 1 very short and 1 very long setiform subdistal elements.

The mandible (fig. 13g) has a slightly curved masticatory stylet and a 1-segmented palp, armed with a long, plumose distal seta.

The first maxilla (fig. 13h) has an outer lobe armed with a single, short distal element; the inner lobe bears 4 long plumose setae.

The second maxilla (fig. 15b) has a heavy basal part, devoid of armature, and a curved distal claw armed with 1 seta.

The maxilliped (fig. 15c) resembles those of the other genera; segment 3 is not very slender.

The first leg (fig. 14a) is biramous, each ramus being 2-segmented; strong spiniform projections are present on the distolateral corners of exopodite segment 1, and endopodite segments 1 and 2.

The 2nd (fig. 14c) and 3rd (fig. 14e) legs have 3-segmented exopodites and 2-segmented endopodites. Strong spiniform projections occur on the 1st and 2nd exopodite segments, and 1st endopodite segment. The lateral exopodite spines are reduced in length. Legs 1 to 3 with intercoxal plate, leg 1 with medial basipodal spine, leg 2 with medial coxopodal seta.

The chaetotaxis formula is as follows:

	coxopodite	basipodite	exopodite	endopodite
P1	0-0	1-I	I-1 (or I-0); III-5	0-I; 1-2-3
P2	0-1	1-0	I-1; I-1; II-I-4 (or III-I-4)	0-1; 1-2-3
P3	0-0	1-0	I-1; I-1; II-I-3	0-1; 1-I-3

The fourth leg is reduced to a small lobe (fig. 15e) on each side of the 3rd metasomite, armed with 2 setae; no intercoxal plate.

Fifth legs absent.

The caudal rami (fig. 13c) are slightly longer than wide (48 × 41 μm); they are inserted far apart; the caudal setae are implanted in three groups: 1 mediodorsal seta, 3 terminal setae, whereas the 4th terminal seta and the lateral seta are implanted close to each other.

Male: Almost not transformed (fig. 13b), but with distinct pleurae on metasomites 1 and 2. Genital somite enlarged, ventrally provided with large "genital lobes" (= transformed P6), armed with 3 setae. Number of postgenital somites two, as in the female. Caudal rami (fig. 13d) more elongate than in the female, length 38 μm, width 28 μm. Furcal setae in all males examined broken. No anal operculum.

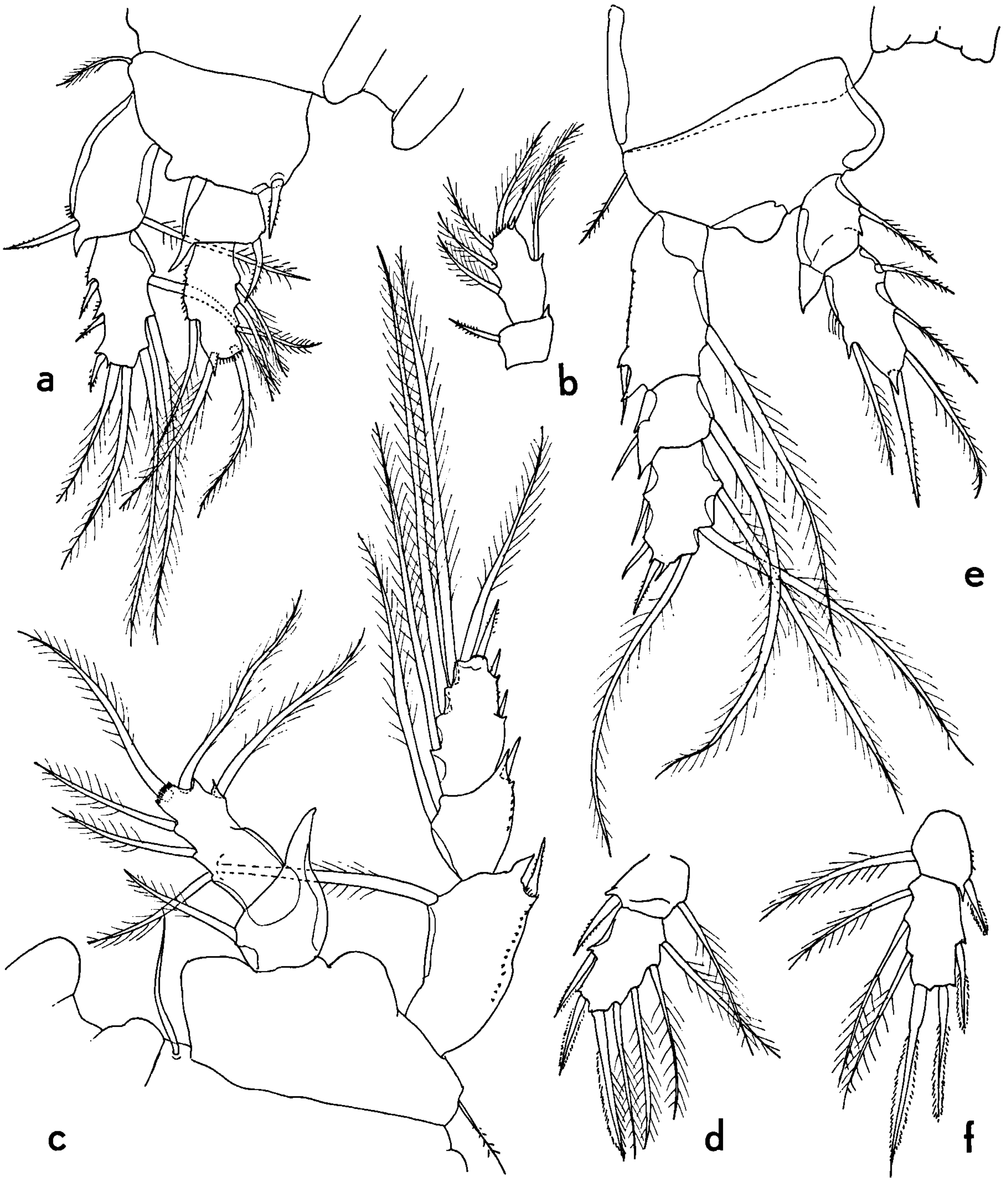

Fig. 14. *Cystomyzon dimerum* n. gen., n. sp.: a, first leg, ♀; b, endopodite of first leg, ♂; c, second leg, ♀; d, exopodite of second leg, ♂; e, third leg, ♀; f, exopodite of third leg, ♂ (all scale AC).

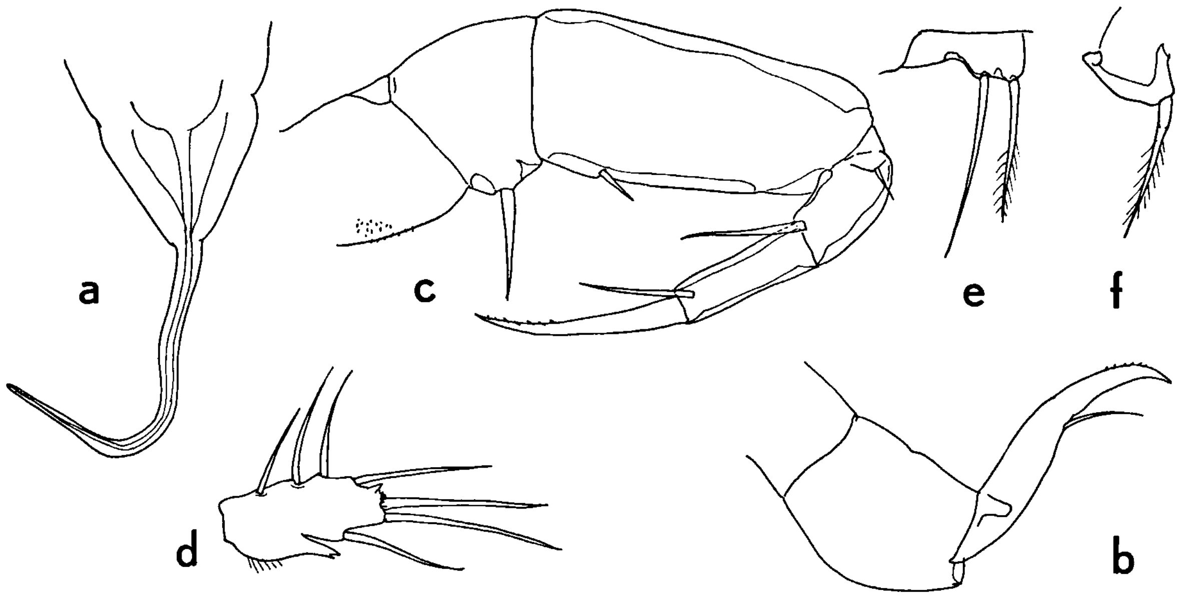

Fig. 15. *Cystomyzon dimerum* n. gen., n. sp.: a, proboscis, ♀ (scale AB); b, second maxilla, ♀ (AB); c, maxilliped, ♀ (AC); d, aberrant second endopodite segment of second leg, ♀ (AC); e, fourth leg, ♀ (AD); f, fourth leg, ♂ (AD).

Anterior antenna with the same number of segments as in the female; aesthete on the penultimate segment, no extra aesthetes. Posterior antenna and mouthparts as in the female.

First leg: exopodite rather similar to that in the female, but with slightly longer lateral spines on the second segment; endopodite segment 1 with shorter distolateral spiniform process.

Second leg: endopodite similar to that of the female; exopodite (fig. 14d) with much longer lateral spines, but with shorter setae and devoid of spiniform projection on segment 2.

Third leg: endopodite similar to that of the female; exopodite (fig. 14f) with much longer lateral spines in particular on segment 3, whereas all setae and the spiniform process on segment 2 are shorter.

Fourth leg (fig. 15f) consisting of a single lobe (not articulated?) bearing one distal seta. Fifth leg absent as in the female.

Remarks. — One of the specimens dissected has an abnormal second endopodite segment in P2 ♀ (fig. 15d). Most specimens are slightly asymmetric in that the left and the right pleurae are not exactly mirror-images of each other. This asymmetry is no doubt due to the gallicolous life of the specimens.

This genus is characterized against all others so far recorded from Stylasterine galls in the 2-segmented nature of both rami of P1 and of the endopodite of P2 and P3.

Cystomyzon sp. Fig. 16.

Material. — One ♀. From gall in *Conopora laevis* (Studer, 1878 (= holotype of *Stylaster obliquus* Studer, 1878). "Gazelle" sta. 58/42, New Zealand, N.E. of Three Kings Islands, 34°09.9'S 172°35.8'E, depth 165 m, 27 October 1875 (ZMA coll. no. Co. 102.670).

Remarks. — This specimen is unfortunately in a poor state of preservation: it was extracted from a coral which possibly has been dry for some time, is shrunken, and its appendages are partly broken off.

The reduced nature of the exopodite of the second antenna, the presence of only three pairs of biramous legs, and the segmentation of these legs (all endopodites 2-segmented, exopodite of P1 also 2-segmented, exopodites of P2 and P3 3-segmented), clearly indicate that the present specimen belongs in the genus *Cystomyzon*. This is in so far remarkable, since another gallicolous

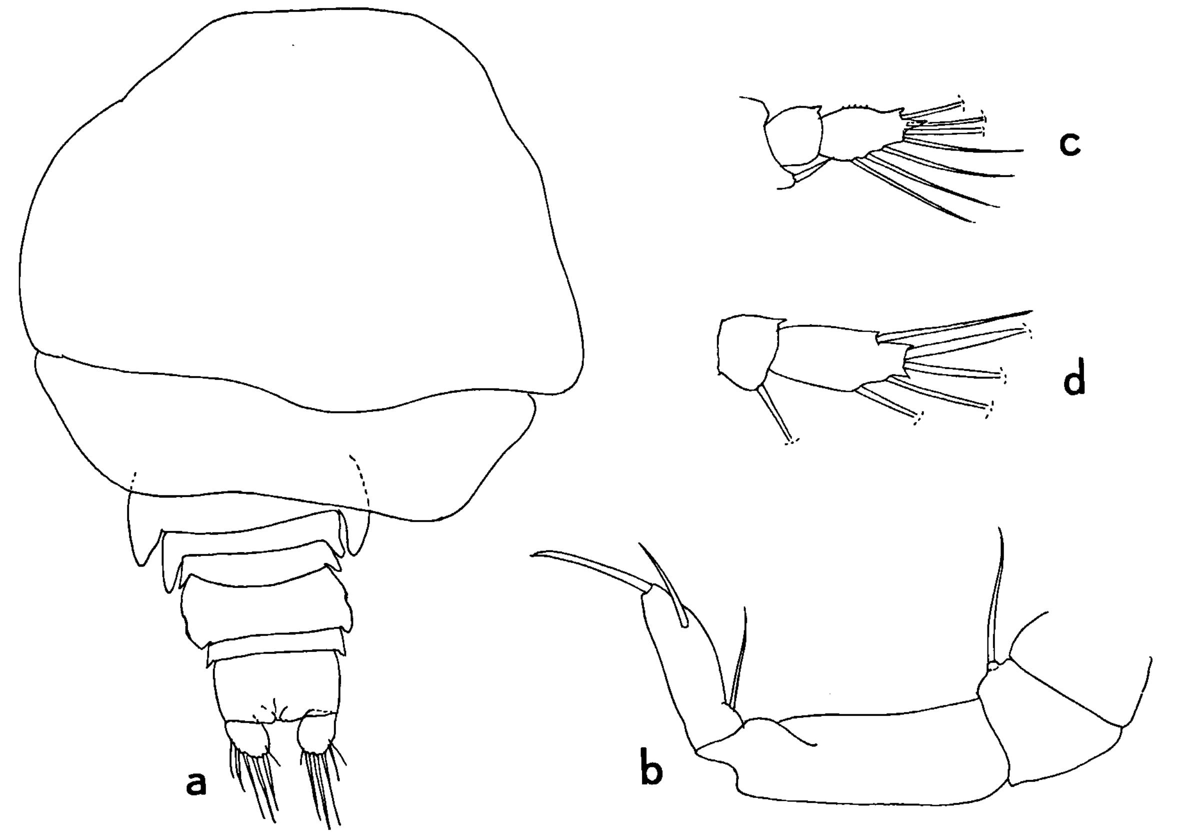

Fig. 16. *Cystomyzon* sp., ♀: a, body, dorsal (scale AB); b, second antenna (AD); c, endopodite of first leg (AC); d, endopodite of second leg (AC).

copepod from the same host, *Conopora laevis*, and the same locality, Three Kings Islands, proved to belong to a different genus and species (*Oedomyzon tripodum*, vide supra).

The present specimen certainly represents a species different from *Cystomyzon dimerum*, described above, but due to the brittle condition of the single specimen available, it cannot be described completely. I refrained therefore from naming it. At least the following differences from *C. dimerum* are visible: (1) an anal lobe, prominent in *C. dimerum*, is entirely absent (fig. 16a); (2) backward protruding pleurae lack on the cephalosomite and first metasomite of the present material (fig. 16a); (3) strong distolateral beaks lack on the first endopodite segment of P1 to P3 of the present material (figs. 16 c-d); (4) the exopodite of the second antenna is shorter than in *C. dimerum* (fig. 16b) and the distal armature of the endopodite is less complex.

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