

THE OCCURRENCE OF *CYMOTHOA LIANNAE*, A NEW SPECIES OF
CYMOTHOID ISOPOD FROM BRAZIL, WITH A COMPARATIVE
STUDY OF ITS POST-MARSUPIAL DEVELOPMENT

BY

SILVIA M. SARTOR and ANA MARIA S. PIRES

Instituto Oceanografico, Universidade de São Paulo, São Paulo, Brazil

RÉSUMÉ

Ce travail est le resultat d'une étude critique des stades de développement de *Cymothoa liannae* (Isopoda, Cymothoidae), espèce nouvelle ici décrite.

Ce nouveaux cymothoadien a été trouve sur la côte sud-ouest du Brésil, du Paraná jusqu'au Rio Grande do Sul. Une clé d'identification pour les espèces trouvées au Brésil est aussi présentée.

INTRODUCTION

In 1975 a program was conducted for studying the demersal fishes of the southern Brazilian continental shelf. As a large amount of isopod fish-symbionts had been found in the samples, one of us (S. M. Sartor) began to study the biology of these animals. The material was collected between Cabo de São Tomé, Rio de Janeiro (22°27'S) and Torres, Rio Grande do Sul (29°21'S) by the R/V "Prof. W. Besnard".

Five genera of Cymothoidae were found, totaling twelve species. The most abundant isopod showed to be a new *Cymothoa* species, which is described herein. This species had been found only in *Chloroscombrus chrysurus* (Linnaeus, 1766), and its placement in the host was constant: females were always found on the fish tongue and males only in branchial chamber of the fish.

The genus *Cymothoa* is poorly known not only in the Brazilian coast but also within the family Cymothoidae. After Brusca (1981) only two or three species of *Cymothoa* were described in this century. Regarding the Brazilian coast, there is only the study of Schioedte & Meinert (1884) describing the species found in Rio de Janeiro and Maranhão, and that of Sartor (1986) dealing with the distribution of fishes and cymothoids on the southern Brazilian coast. Since then, nothing was added to the knowledge of the group.

Four species of *Cymothoa* have been previously reported from the southern Atlantic coast: *C. excisa* Perty, 1830; *C. brasiliensis* Schioedte & Meinert, 1884; *C. gerris* Schioedte & Meinert, 1884 and *C. januarii* Schioedte & Meinert, 1884. Now *C. liannae* sp. n. is added to the list.

The present paper describes comparatively the developmental phases of *C. liannae* and furnishes also a key for identification of the species known from the Brazilian coast.

It is the first time that a species of the genus *Cymothoa* has all stages of its post-marsupial development described in detail, and this fact enlarges the knowledge of the genus both from a biological and taxonomic point of view, since it helps the identification of *Cymothoa liannae* sp. n. regardless of the developmental stage.

This paper is part of a M.S. dissertation of one of us (S.M.S.) for which more than 700 specimens of *C. liannae* sp. n. were studied. Unfortunately, the major part of the specimens was lost and few remained to be designated as type material. The types are deposited in Museu de Zoologia, Universidade de São Paulo (MZSP) and in a reference collection housed at Instituto Oceanográfico, Universidade de São Paulo (IOUSP).

This is Publication no. 642 of Instituto Oceanográfico USP.

***Cymothoa liannae* sp. n. (figs. 1-6)**

Material examined. — Brazil; São Paulo (23°50'S 45°40'W) to Santa Catarina (27°35'S 47°51'W), dredged from 18 to 51 m depth, 20 February to 5 March, 10-23 May, and 19-27 September 1975, FAUNEC project coll. Estado do Paraná (25°40'S 48°16'W), holotype preovigerous female, 21 mm. MZSP (cat. no. 8700), 31 paratypes juveniles, 2 males, 1 female in MZSP (Cat. no. 8701), paratypes juveniles, 1 male, 1 female in IOUSP (Cat. no. 208).

Etymology. — The species is named after Lia and Anne, the two daughters of the first author.

Description. — Juvenile 1 or manca stage (fig. 1) 1.95-2.50 mm in length (mean = 2.19), 0.70-1.00 mm in width (mean = 0.86); body elongate, nearly 2.5 times longer than wide, white-yellowish. Head little immersed in pereon, subtriangular, all margins round, nearly 1.2 times wider than long; eyes oval, laterally placed, with numerous ommatidia. Antenna 1 with 8 articles, apex reaching pereonite I, articles 5 to 8 with aesthetascs. Antenna 2 long, apex reaching pereonite VI, 12 to 14-articulated, some articles setose. Mandibular palp elongate, 3-articulated, apical article bearing 4 or 5 elongate setae apically placed, second article with one seta at inner distal corner. Maxilla 1 with 4 apical hooks. Maxilla 2 with 2 lobes, each of them bearing 2 apical, recurved spines. Maxillipedal palp biarticulated, apical article with 3 recurved spines. Pereon with 6 pereonites; pereonite I longest, pereonite VI narrowest; coxal plates present on pereonites II to VI. Pereopods I to VI alike, VII absent; inner margin of dactylus serrate on pereopods I to III, smooth on the other pereopods. Pleon with 5 pleonites; pleonites 1 to 4 similar in length, 5th a little longer, decreasing gradually in width from first to last. Pleopods 1 to 5 with endopod as long as and nearly half as wide as exopod; 5th pair surpassing telsonic apex; both articles with long plumose setae placed at distal margin; protopodite with 4 short setae on inner lateral margin. Uropod surpassing

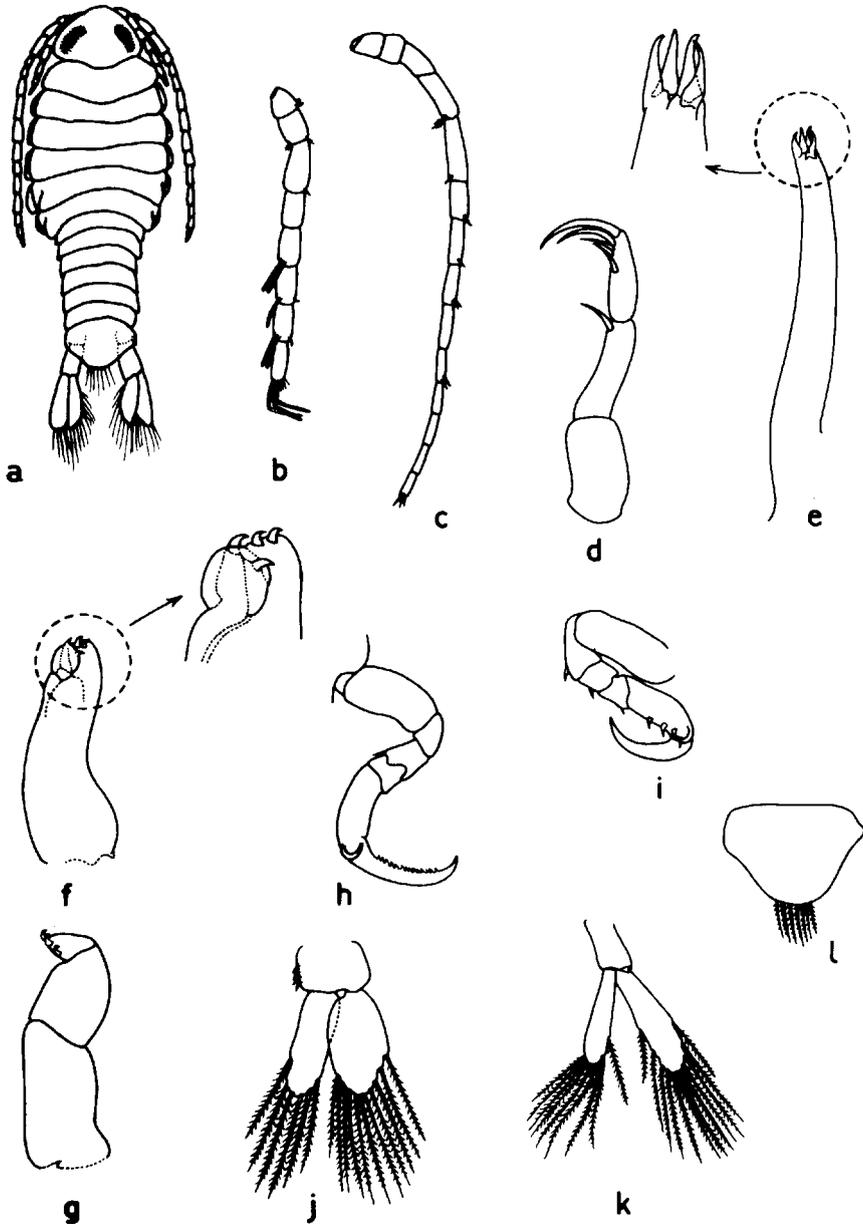


Fig. 1. *Cymothoa liannae* sp. n., juvenile 1, 2.2 mm long. a, dorsal view; b, antenna 1; c, antenna 2; d, mandible; e, maxilla 1 and apex of the same; f, maxilla 2 and apex of the same; g, maxilliped; h, pereopod I; i, pereopod III; j, pleopod 1; k, uropod; l, telson.

distal margin of telson, endopod about 1.2 times longer and 1.5 times wider than exopod. Telson pentagonal, apex broadly rounded, 6 to 9 plumose setae distally placed.

Juvenile 2 (fig. 2) 2.25 to 3.90 mm in length (mean = 2.84), 0.90 to 1.50 mm in width (mean = 1.09). Eyes, antenna 1, maxilla 1 and maxilla 2 similar to those of juvenile 1. Antenna 2 short, almost equal in length to antenna 1, with 8 to 10 articles, some of them bearing a few setae. Mandible with 1 seta on second article of palp; maxillipedal palp with distal margin having 6 spines. Pereonite VII present, shorter and narrower than the others; coxal plates visible dorsally on pereonites II to VII. Pereopods I to III with dactylus smooth, pereopod III small, having 5 or 6 articles. Pleopods 1 to 5 without natatory

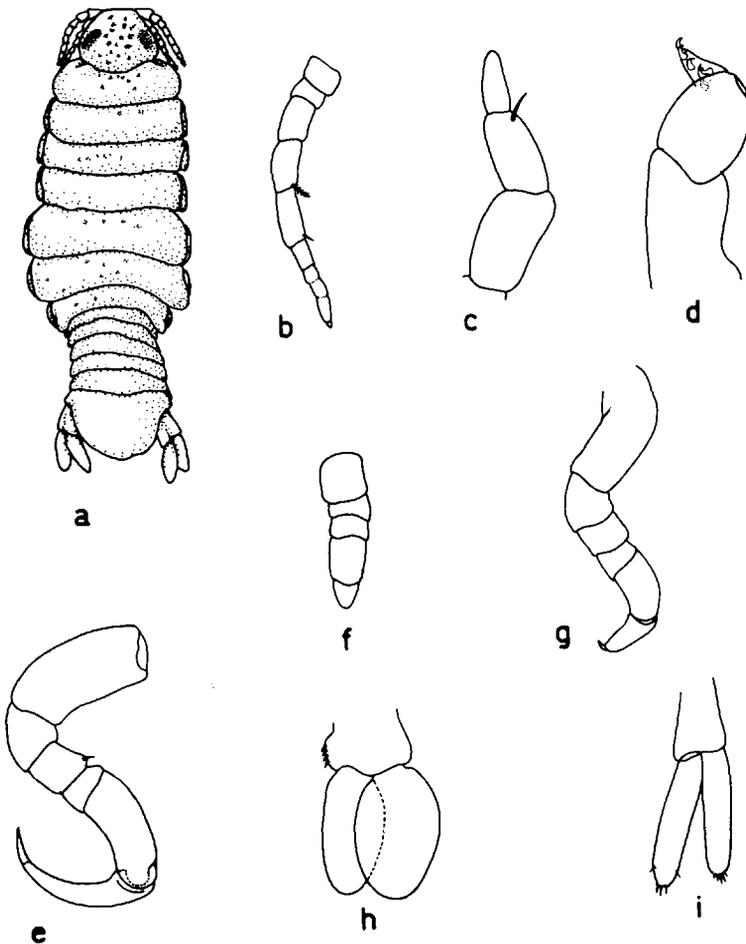


Fig. 2. *Cymothoa liannae* sp. n., juvenile 2. a-e, g-i, 2.80 mm long; f, 2.3 mm long. a, dorsal view; b, antenna 2; c, mandible; d, maxilliped; e, pereopod I; f, pereopod VII; g, pereopod VII; h, pleopod 1; i, uropod.

setae, 5th pair as long as telson. Uropod with reduced setae apically placed. Telson bare.

Immature male (fig. 3), 3.00-6.50 mm in length (mean = 4.38), 1.00-2.90 mm in width (mean = 1.66), white, some specimens with scattered dark chromatophores dorsally placed. Head with anterior margin broadly rounded, eyes well developed. Antenna 1 with setae and aesthetasc reduced or absent. Antenna 2 with 8 or 9 articles, similar in length to antenna 1 but narrower. Mandibular palp bare. Maxilla 1 and maxilla 2 as in juvenile 1. Maxilliped

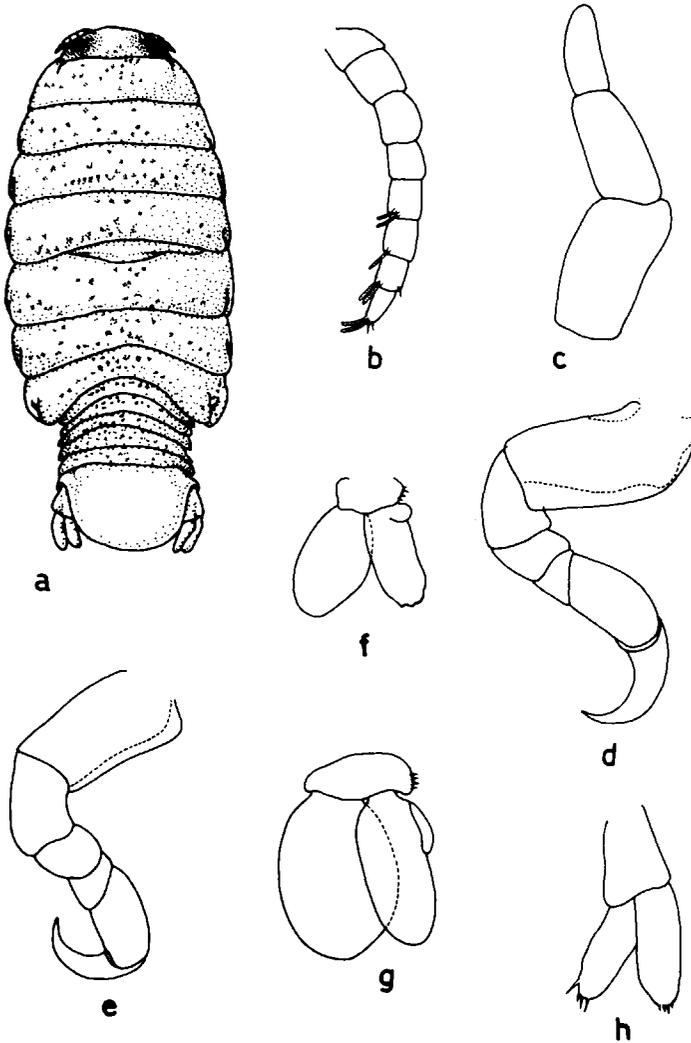


Fig. 3. *Cymothoa liannae* sp. n., immature males, a-e, g-h, 5.50 mm long; f, 4.5 mm long. a, dorsal view; b, antenna 1; c, mandible; d, pereopod I; e, pereopod VII; f, pleopod 2; g, pleopod 2; h, uropod.

as in juvenile 2. Two penes present midventrally on longer specimens (from 4.5 to 6.5 mm). Pereopod I without spines; pereopods IV and VII having a carina ventrally placed on basis; carina of pereopod VII shorter than the others. Pleon elongate, nearly 1.6 times narrower than pereon. Pleopod 2 with a rudiment of appendix masculina on endopod (figs. 3f, g). The two rami of uropod similar in size, with residual setae, extending a little beyond telsonic apex.

Adult male (fig. 4) 5.50-14.00 mm in length (mean = 10.06), 2.70-6.50 mm in width (mean = 4.62). Body slightly convex in dorsal view, mainly on head, dark brown chromatophores generally spread out dorsally. Eyes small but yet visible (fig. 4). Antenna 1 with 8 articles slightly longer and broader than antenna 2, without aesthetascs. Antenna 2 with 8 or 9 articles, more frequently 8. Mandibular palp similar to that of immature male. Maxilla 1 and maxilla 2 like in juvenile 1. Maxillipedal palp with 6 or 7 spines on distal margin. Pereonite I longest, pereonite VII shortest. Pereopod VII fully developed and stronger than preceding leg; carina large and conspicuous on bases of all pereopods. Penis wide, well developed. Pleon with pleopods 1 to 5 similar in shape and size, with endopod a little shorter than exopod, protopodite with few setae; pleopod 2 with appendix masculina slightly surpassing distal margin of endopod. Uropod shorter than telson, rami bare.

Preovigerous female (fig. 5) 13.00-27.50 mm in length (mean = 19.10), 6.00-12.00 mm in width (mean = 8.40). Body somewhat laterally compressed, with dark brown chromatophores dorsally placed. Head a quarter wider than long, frontal margin convex, all angles round, eyes vestigial or absent. Antenna 1 with 8 articles; antenna 2 8-articulated, nearly 1/4 shorter and narrower than antenna 1; mandibular palp like that of immature male; maxillas 1 and 2 as in juvenile 1; maxillipedal palp nearly 0.75 times the maxillipedal length, apex with 6 and 7 spines. Pereonite I longest, others decreasing gradually in length as follows: IV, II, III, V, VI and VII; pereonites I, II, III frequently narrower than others; posterolateral corners of all pereonites rounded; pereonites IV to VII directed backwards, lateral margins of pereonite VII reaching 3rd pleonite; coxal plates present on pereonites II to VII, usually visible in dorsal view. Pereopods IV to VII with carina short, less developed than in adult male. Oostegites arising from the coxae of pereopods I to V, increasing in size from first to fifth pair, covered by the body cuticle. Penis absent. Pleon enlarging backwards; pleonite 1 laterally covered by 7th pereonite; pleopods 1 to 5 alike: protopodite with accessory lamella, endopod slightly shorter than exopod; pleopod 2 having short appendix masculina on endopod. Pleotelson width almost half the pleon length, posterior margin broadly convex. Uropodal rami narrow, reaching nearly the 2/3rd of pleotelson length, endopod shorter than exopod.

Ovigerous female (fig. 6) similar to preovigerous female except for: maxilliped with broader base; oostegites fully developed, free; appendix masculina

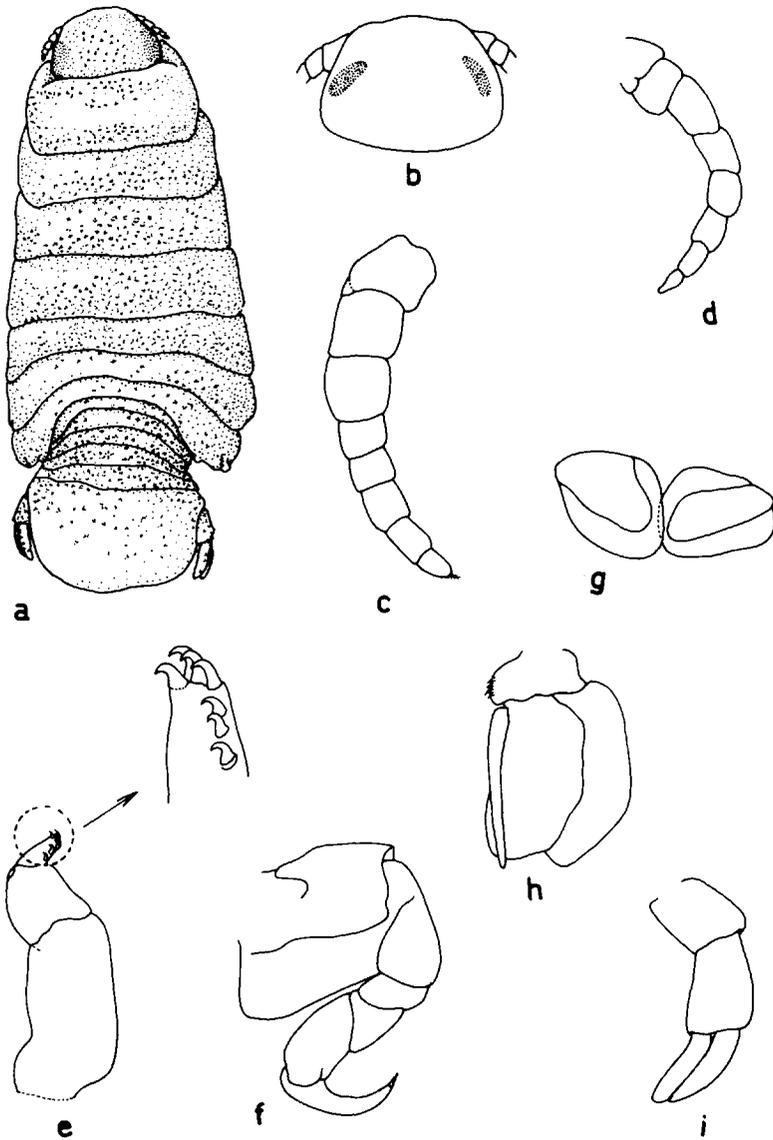


Fig. 4. *Cymothoa liannae* sp. n., adult male, 10.0 mm long. a, dorsal view; b, head with eyes; c, antenna 1; d, antenna 2; e, maxilliped and apex of the same; f, pereopod VII; g, penis; h, pleopod 2; i, uropod.

absent or reduced in smaller animals. After this stage the manca are released from the marsupium which becomes flaccid (post-marsupial females).

Remarks. — The usual number of parasites found per fish is 2 or 3, 8 being the highest number of isopods found per host. When there were only 2 parasites on a host, it was verified that one was a female, placed in the mouth,

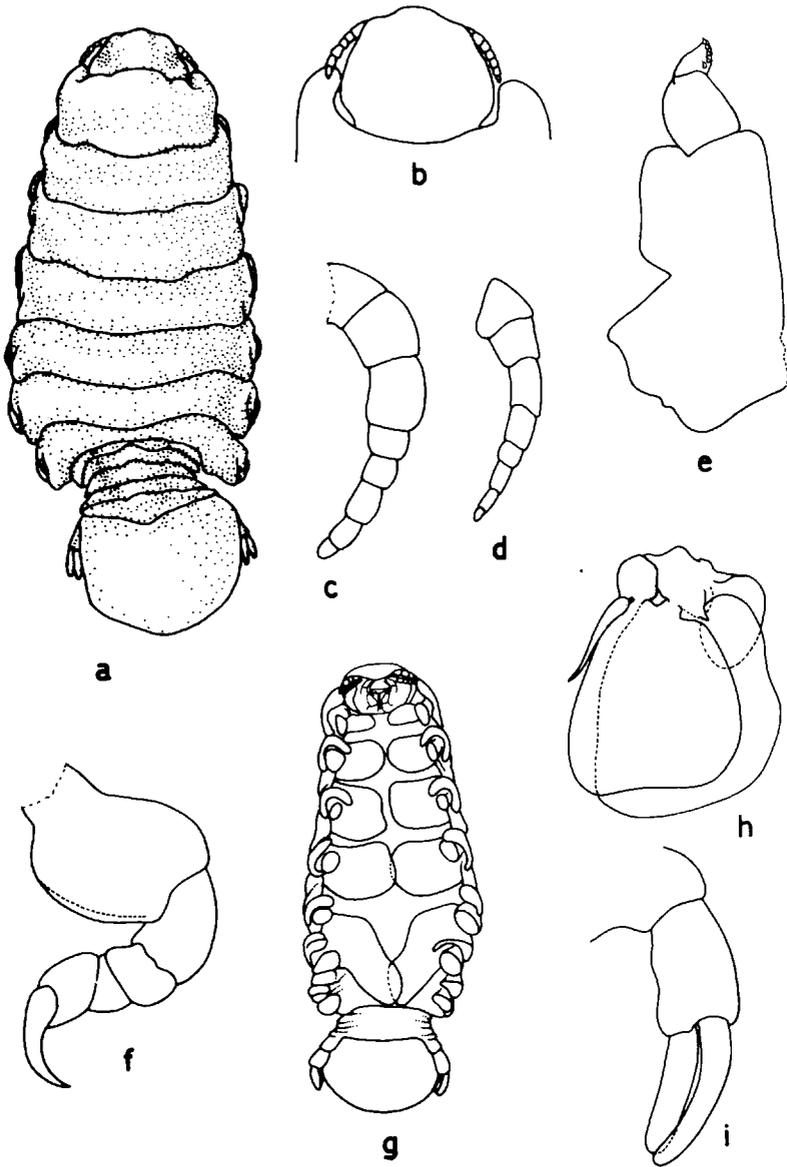


Fig. 5. *Cymothoa liannae* sp. n., holotype pre-ovigerous female, 21 mm long. a, dorsal view; b, head without eyes; c, antenna 1; d, antenna 2; e, maxilliped; f, pereopod VII; g, ventral view; h, pleopod 2; i, uropod.

and the other was a male, located in the branchial cavity. Additional parasites were ever juveniles. No multiple infestation (i.e., two males or two females) was found.

The margins of the pleopods are generally smooth, but some specimens can present crenulated margins.

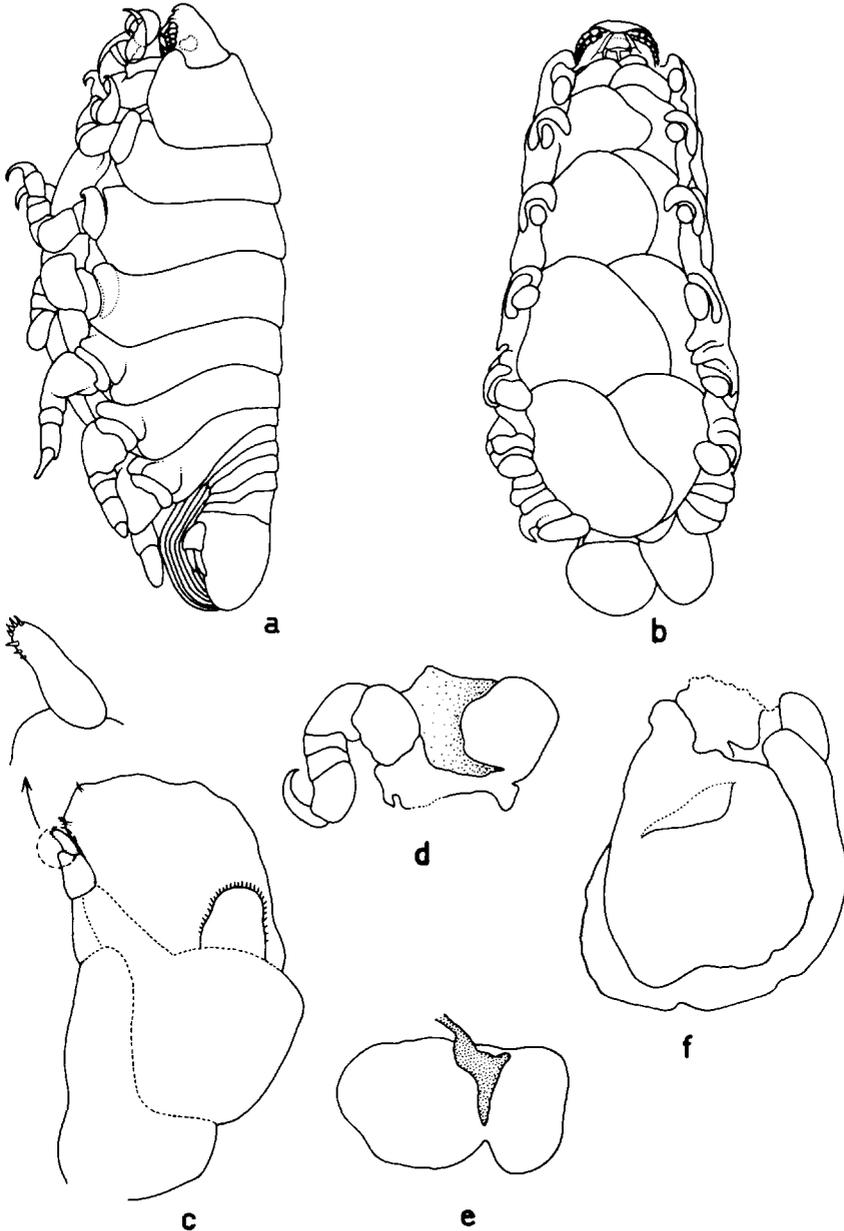


Fig. 6. *Cymothoa liannae* sp. n., ovigerous female, 22.0 mm long. a, lateral view; b, ventral view; c, maxilliped and apex of maxillipedal palp; d, pereopod I with oostegites; e, oostegite 1; f, pleopod 2.

Regarding the marsupial structure, right pairs of oostegites always cover left pairs, excepting the first one where the inverse occurs. Oostegite 1 is medially bent upwards, covering the maxillipeds (fig. 6d).

In most part of *Cymothoa* species females have 9 articles in the antennal flagellum. The presence of 8 flagellar articles easily distinguishes *C. liannae* sp. n. from the other species.

Key to the species of *Cymothoa* known from the Brazilian coast, based on adult females

1. Pereonite I with antero-lateral margin of coxal plate surpassing the eye 2
- Pereonite I with antero-lateral margin of coxal plate not surpassing the eye 3
2. Telson narrower than pereonite I, triangular with a narrowly rounded apex
..... *Cymothoa gerris* Schioedte & Meinert, 1884
- Telson wider than pereonite I, subrectangular with a broadly rounded apex
..... *C. januarii* Schioedte & Meinert, 1884
3. Head very small, less than half the pereonite I width, anterior margin deeply excavate
..... *C. excisa* Perty, 1830
- Head small, more than half the pereonite I width, anterior margin broadly rounded 4
4. Flagellum of antenna 1 with 8 articles, telson nearly 1.4 times shorter than wide, apex rounded, entire *C. liannae* sp. n.
- Flagellum of antenna 1 with 9 articles, telson twice shorter than wide, apex broadly rounded, slightly bilobed *C. brasiliensis* Schioedte & Mcindert, 1884

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