

DESCRIPTION OF SOME ECTOPARASITIC ISOPODS
(CRUSTACEA) ON RED SEA FISHES

BY

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ABSTRACT

Samples of seven species of marine fish from the gulf of Suez area that adjoining the Red sea were examined for gill isopod ectoparasites over a period of 30 months from 1997 to 1999 belongs to the families [Scaridae, Plectorhynchidae, Nemipteridae, Lutjanidae, Lethrinidae, Hemirhamphidae and Serranidae]. Three little known species of isopods were comprehensively described for the first time with light and scanning electron microscopy, including a *Parniza* larva [family :Gnathiidae] *Irona nonadies* and *Anilocra leptosoma* [family:Cymothoidae].

INTRODUCTION

Parasitic crustaceans on fish are numerous as species and abundant as individuals, they show the most interesting array of morphological adaptations, whereas, the structural diversification of the crustacean parasites is extensive and their effects on the host fishes are correspondingly varied. In addition to the academic interest they hold, numerous parasitic crustaceans are of substantial economic importance, especially as some crustaceans induce mortality of the host under certain conditions (Kabata,1970). Naylor (1972), introduced keys and notes for species identification of the British isopods and Brusca (1978) studied the systematic and biology of some Cymothoid from the Eastern pacific fish.

Bruce (1986) recorded the genus *Pleopodias* for the first time from Australia and he described twelve Australian species of *Anilocra* and 9 species of *Mothocya* to bring the number of the described species of Cymothoidae around Australia to 45 species including

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The body weight, the total length and the sex of each fish were recorded. Gills, skin, fins, anus, eye and nose carefully examined for evidence of external crustacean parasites. The operculum was removed to expose the gill cavity, the arches were transferred to a petri-dish, containing tap water and examined under a dissecting microscope. The location and the number of parasites found on each individual gill were recorded.

The isopod specimens, removed from the infected gills, were identified under light microscopy. They were fixed in neutral buffered formaldehyde at room temperature, the Gnathides cleared and in lactophenol. While the large specimens drawn as whole mount and then the mouth part dissected then cleared in lactophenol. for examination. Drawings were made with the aid of a camera Lucida using a differential interference contrast Leitz Wetzlar microscope. Relevant measurements were recorded through a calibrated eyepiece graticule.

Measurements and morphological characters of the isopods were compared with published description and type species in the Natural History Museum in London (UK) and the identification was confirmed by Professor J. P. Trilles (University of Montpellier 11, France). Some parasites, including those attached to the gill were prepared for scanning electron microscopy (SEM) by fixation in 3% glutaraldehyde for 2 hours and transferred to 0.1M phosphate buffer (pH 7.2). Specimens were then rinsed in fresh buffer, followed by distilled water (3x5 min changes) and transferred to an ultrasonic cell disrupter to sonicate. Samples were dehydrated through ascending series of ethanol, transferred to acetone; critical pointed dried and mounted on aluminium stubs. Specimens were finally coated with gold and viewed under a Hitachi S-1300 scanning electron microscope.

RESULTS AND DISCUSSION

Parasite list:

Class: Malacostraca Latreille, 1806

Order: Isopoda Latreille, 1817

1- Infraorder: Gnathiidae Leach, 1814

Family: Gnathiidae Harger, 1880

Praniza larvae

2- Infraorder: Flabellifera Sars, 1882 Triassic- Recent

Family: Cymothoidae Leach, 1818

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The mandibles closely applied to and partly enclosed by the labrum, robust, curved, styleform appendage which swollen at their base. Each bears twelve teeth on its distal inner margin. Two teeth small, pointed, and situated at the tip of the mandible, ten are larger triangular and backwardly directed. The palp, molar process lying below the mandible and slightly enclosed by them on their outer surface the paragnaths. Each lobe bears a groove in its ventral surface and terminates distally in a sharp point without teeth, the lobes united at their base (Plate 2 a), (Fig. 2 a & b).

Maxillules lie ventral at the paragnaths. They are style-form and swollen at their base, but more slender than the mandibles, less strongly toothed and lie free of the labrum. Distally each maxillule bears nine teeth on its inner surface. Maxilla are to be found only with difficulty they small, blunt structure without teeth (Plate 2c; Fig.2 f&g).

Maxillipeds appendages of the first peraeonal somite, large and cylindrical, with an elongate basis which gives rise to a reduced endite and enlarged palp of three articles. The first article of the palp produced distally as an acute point with nine ventral teeth, its inner margin bears numerous small hairs and a single seta, while the outer margin has a small protuberance which does not appear to be a tooth.

The second article of the palp produced distally as a blunt projection with two teeth and a setae on its outer margin. The tip of this article tends to fold over the tip of the first. The third article shorter than the second terminates in a short spine. Behind which lie six setae (Plate d&e; Fig. h&I). The gnathopods appendages of the second peraeonal somite and have seven articles arranged in an "S" configuration. The dactylus of each strongly hooked (Plate 2f; Fig. 2 J&k).

The ventral mouth rigid on its dorsal surface. Bordered anteriorly by the labrum, and lie between the mandibles and above the paragnaths.

The pleon comprises five somites, covered dorsolaterally by overlapping plates. Ventrally lie pleopods with plumose setae which used in respiration and swimming. The uropods like pleopods bear plumose setae (Plate 3 a&b; Fig1 f).

Remarks; Larval stage parasitic and quite different in the bodyform from the adult. Mouth parts greatly modified for blood feeding, include pairs of mandibles, paragnaths, maxillules and maxillae, covered antero-dorsally by a hexagonal labrum and posterior ventrally by the maxillipedes and gnathopods.

Irona nanoides Stebbing, 1905

The specimens, were specific only to *Nemipterus japonicus* fish. Female having its pouch enormously distended with young ones, was slightly distorted so as to make the outline of the left side very convex, the middle of the back raised considerably above the lateral parts of the segments, body is 2.8 cm long the head has a short very broad front (Plate 4 a&b; Fig. 3 a,b&c).

The eyes wide apart and not very large, the first pair antenna rather stout, especially as to the first three of the eight joints 2.2 mm. The second pair of antenna composed of 7 segments slighter, sub-equal in length 1.8 mm. on long mostly the first and the second antenna equal in length in these specimens. The upper lip has a four-lobed margin (Plate 4 a; Fig. 3 a&b).

The mandibles have a stout first joint to the palp, the second much thinner and a little shorter. Also the third shorter and thinner than the second and armed with few spines 1.2mm. The trunk thins out in advance of the palp, apparently carrying a quasi-moal not very remote from the pointed cutting plate, 0.8 mm. (Plate 5b; Fig. 4 g). The slender first maxilla 1.2 mm tipped with four spinules 0.2 mm (Plate 5 e; Fig. 4 h).

The second maxilla 1.5 mm long. It appears to have a membranous apical margin accompanied by process carrying small hooked spines with $L = 0.1$ mm. they 2+4 (Plate 5 e; Fig. 4 e&f). The maxilliped has the composite second and third joints long and broad, (1 & 0.5mm) followed by joint which about equal in length and breadth, narrowed at the rounded apex, to which attached the narrow terminated bearing bent hooks at its summit and one such hook on its side (Plate 5 b,c&d; Fig. 4 d).

The preopods similar in appearance and structure, the hinder pairs having some superiority of size (Plate 6 a; Fig. 5 a&b). The coxal plates all as long as respective segment preopods with carina on basis dactylus short extending to middle of carpus.

First pereopod long, pereopods 2-7 progressively decreases in length. Pereopod 1 basis with smoothly curved anterolateral carina; ischium about 0.7mm as long as basis; dactylus curving smoothly, pereopod 7 ischium 0.82 mm as long as basic, merus extending progressively in width, pereopod 7 merus deeply cleft (Plate 6 d&e; Fig. 5 a-d).

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Broad pouch made up of pairs of alternatively overlapping oositegites arising from sternites 2, 3, 4 and 5. Pleopods all lamellar, all exopods approximately circular, and larger than endopod. Endopodes of Pleopod 1 subrectangular, endopods of pleopods 2-5 with distal caoex becoming increasingly acute (Plate 6 f; Fig.5 e-i).

The coupling spines of the short peduncles small. Uropods not extending beyond posterior of pleotelson, they short, with sub-equal oval branches, little longer than the stout peduncle, of which the inner apex not produced (Plate 6 f, Fig. 5 i).

Remarks; It is characterised by its weakly vaulted body shape, cephalon posterior margin not trilobed, a usually wide pleon, antennule shorter than antenna and all pleopods lamellar and the broad pouch made up of pairs of alternatively overlapping oositegites arising from sternites 2, 3, 4 and 5.

Anilocra leptosoma Bleeker 1856

Collected from the gills of *Herklotsichthys quadrimaculatus*, *Scarus sp.* (Parrotfish). Body 4.5 times longer than wide (Plate 7 a&b; Fig. 6 a&b). Dorsal surface smoothly domed, coxae just visible in dorsal view. Rostrum broad with large eyes, about half the width of the cephalon (Fig. 6 c). Coxae narrow. Pleonite 1 longest, postolateral margins weakly produced; pleonites 2-4 subequal in length, posterolateral margins rounded; pleonite 5 with dorsal posterolateral margin acute, weakly produced. Pleotelson with lateral margins straight, upturned; posterior margin bisinuate, with broad caudomedial lobe, provided with short marginal setae. Antennule extended slightly beyond midpoint of eye, with eight articles; in some of the specimens article 3 with anterior margin strongly produced but the juveniles without or slightly produced (Fig. 6 e). Antenna with 9 articles, extending to middle of pereonite 2 (Fig. 6 f).

Maxilla with 2 spines each on medial and lateral lobes respectively (Plate 9 e&f; Fig. 6 h&i). Mandible palp with 13 brush-tipped setae on distal margin of article three. Maxilliped article 3 with 3 terminal spines (Plate 9 a&b; Fig. 6 e). Pereopod 1 with large nodule on dactylus anterior margin, posterior margin with single nodule; pereopods 2-4 with prominent nodule on anterior margin, and 2 nodules on posterior margin of dactylus. Pleopod ramie slender, elongated (exopod of Pleopod 1 is 2.5 times longer than wide; Pleopod 2 is 2.3 times longer than wide; pleopods 3 and 4 are 2.5 times longer than wide) endopod of all pleopods shorter than exopod. Pleopods 3-5 with endopod proximomedial lobe prominent; pleopods 3 and 4 endopods each with small lobes; endopod of Pleopod 5 highly folded. Uropod ramie subequal in length, extending beyond posterior of pleotelson;

distomedial margin of both ramie with setae; exopod medial margin convex, lateral margin straight, apex rounded; endopod apex broadly rounded (Plate 8&10 Fig. 7).

Remarks; Cephalon usually narrows anteriorly to triangular apex folded down (ventrally) between bases of first antennae; the article three of the antennule is moderately produced; pereopods gradually increasing in length posteriorly; lateral margin of the uropodrami straight apex narrowly rounded.

ACKNOWLEDGEMENTS

I am most grateful to Professor J. P. Trilles (University of Montpellier 11, France) for confirming the identification of the parasitic isopods and providing me with the valuable references.

The willing help and unlimited attention of the technical staff of the Electron Microscope Unit (Royal Holloway, University of London) were a great advantage to this work.

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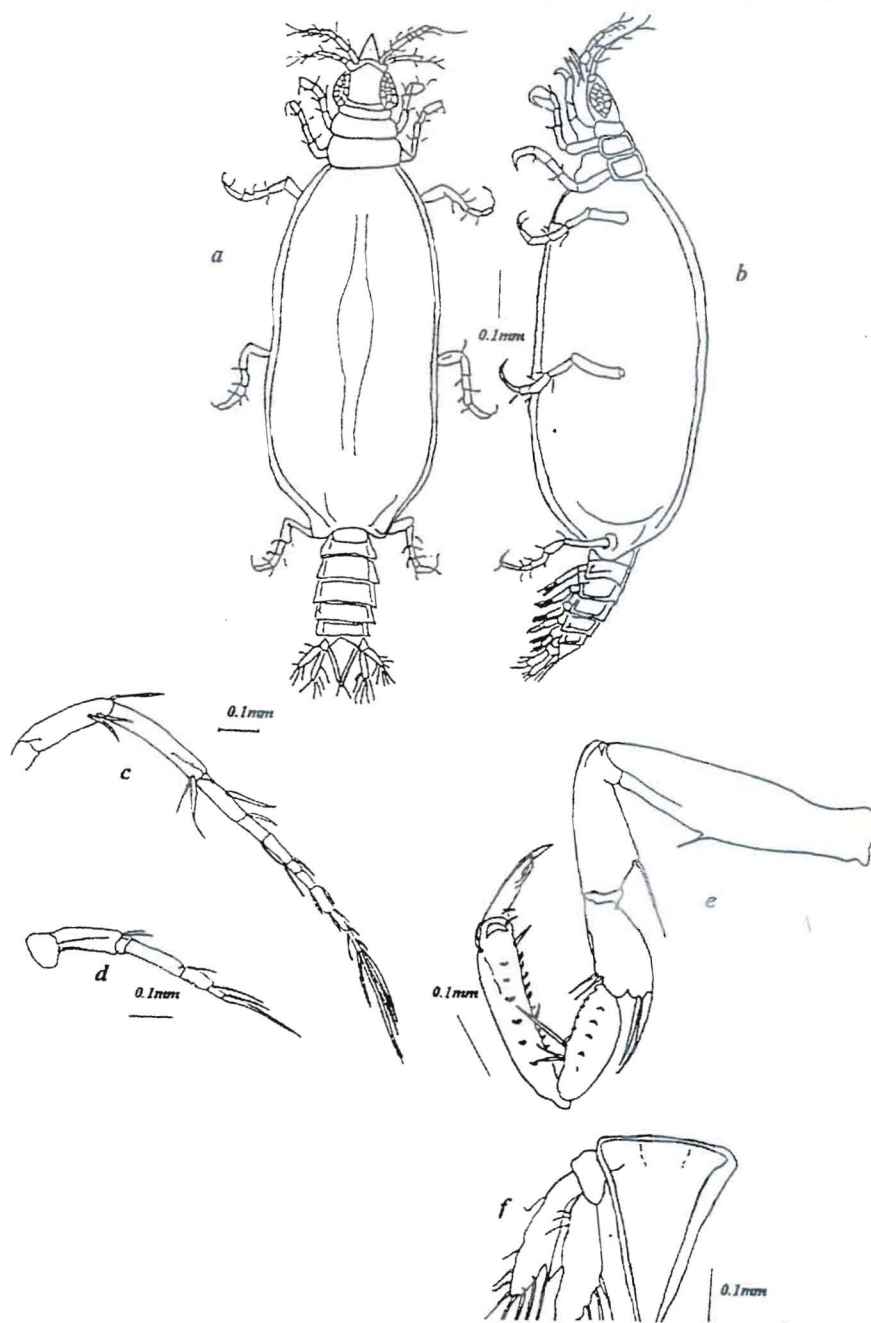


Fig (1) Praniza larva. Camera lucida drawings. a) Praniza larva dorsal. b) Praniza larva lateral. c) First antenna. d) Second antenna. e) Pereopod. f) Uropod and telson.

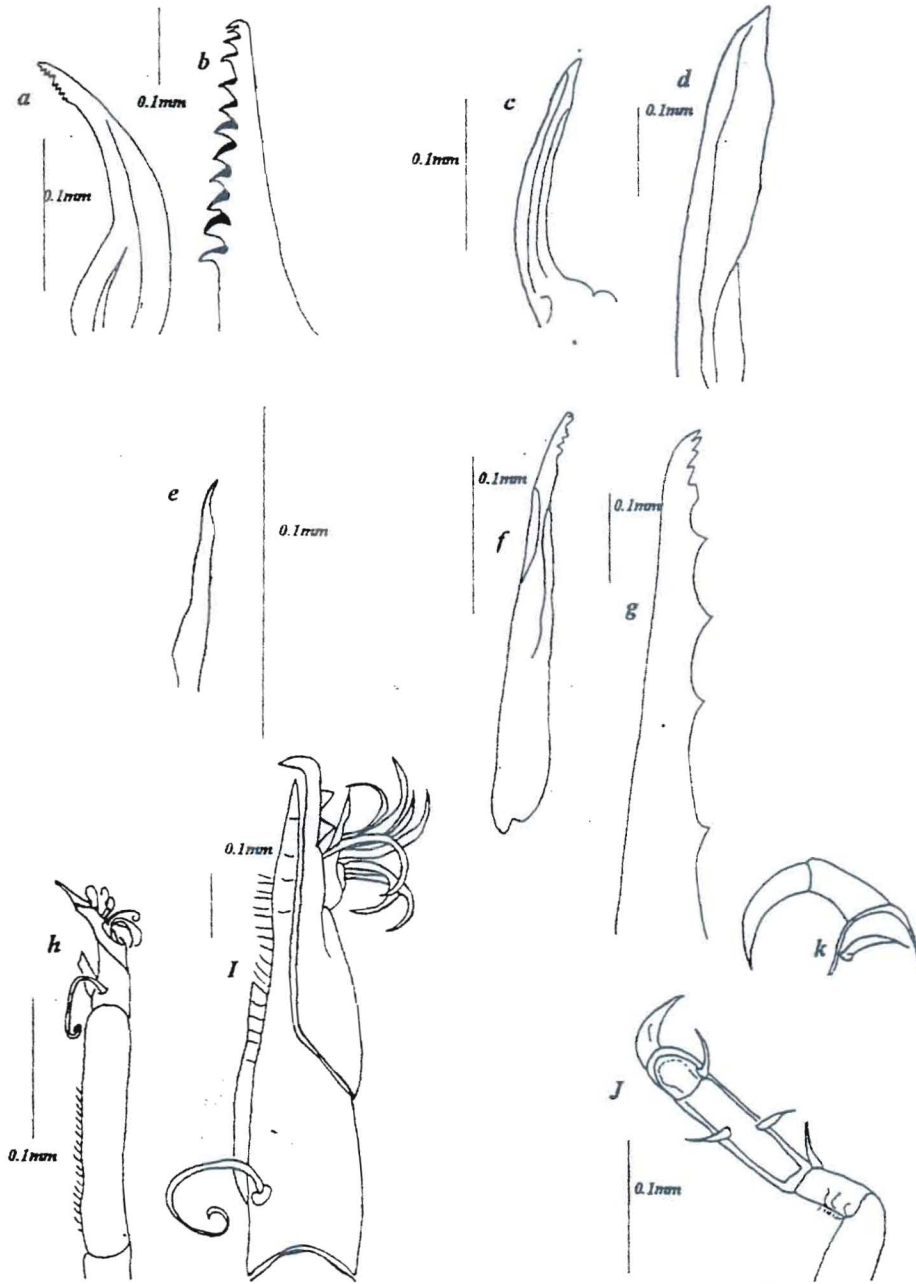


Fig (2)Praniza larva mouthparts. Camera lucida drawings. a) Mandible .b) Mandible teeth. c) Paragnatha. d) Paragnatha blade. e) Maxilla. f) Maxillule. g) Serreted segment of maxillule. h) Maxilliped. I) Terminal segment of maxilliped. J) Gnathopod. k) Terminal claw of Gnathopod.

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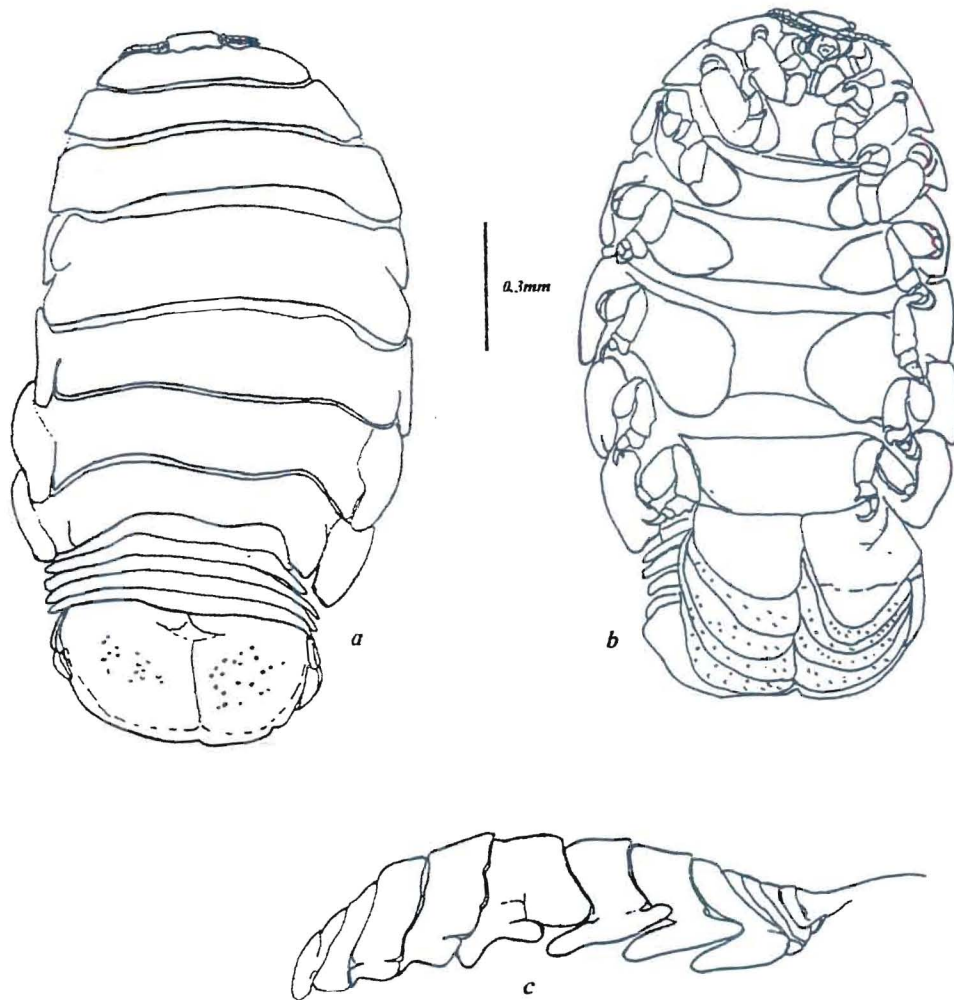


Fig (3) *Irona nanodies*: Camera lucida drawings. a) *Irona nanodies* dorsal
b) *Irona nanodies* ventral. c) *Irona nanodies* lateral

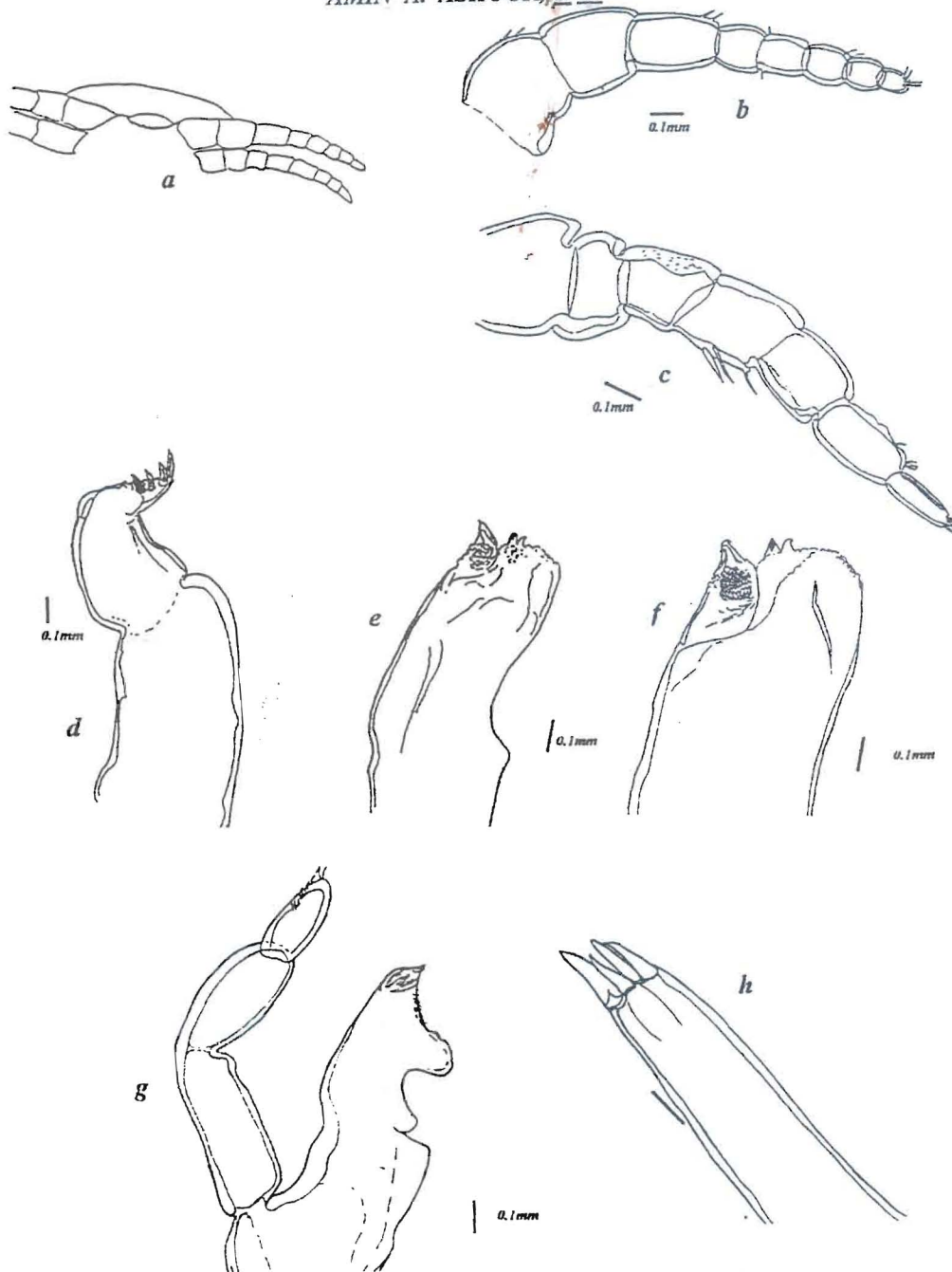


Fig (4) *Iirona nanodites*. Camera lucida drawings. a) Frons. b) First antenna c) Second antenna. d) Maxilliped. e) Maxilla. f) Terminal article of maxilla g) Mandible. h) Terminal article of maxillule

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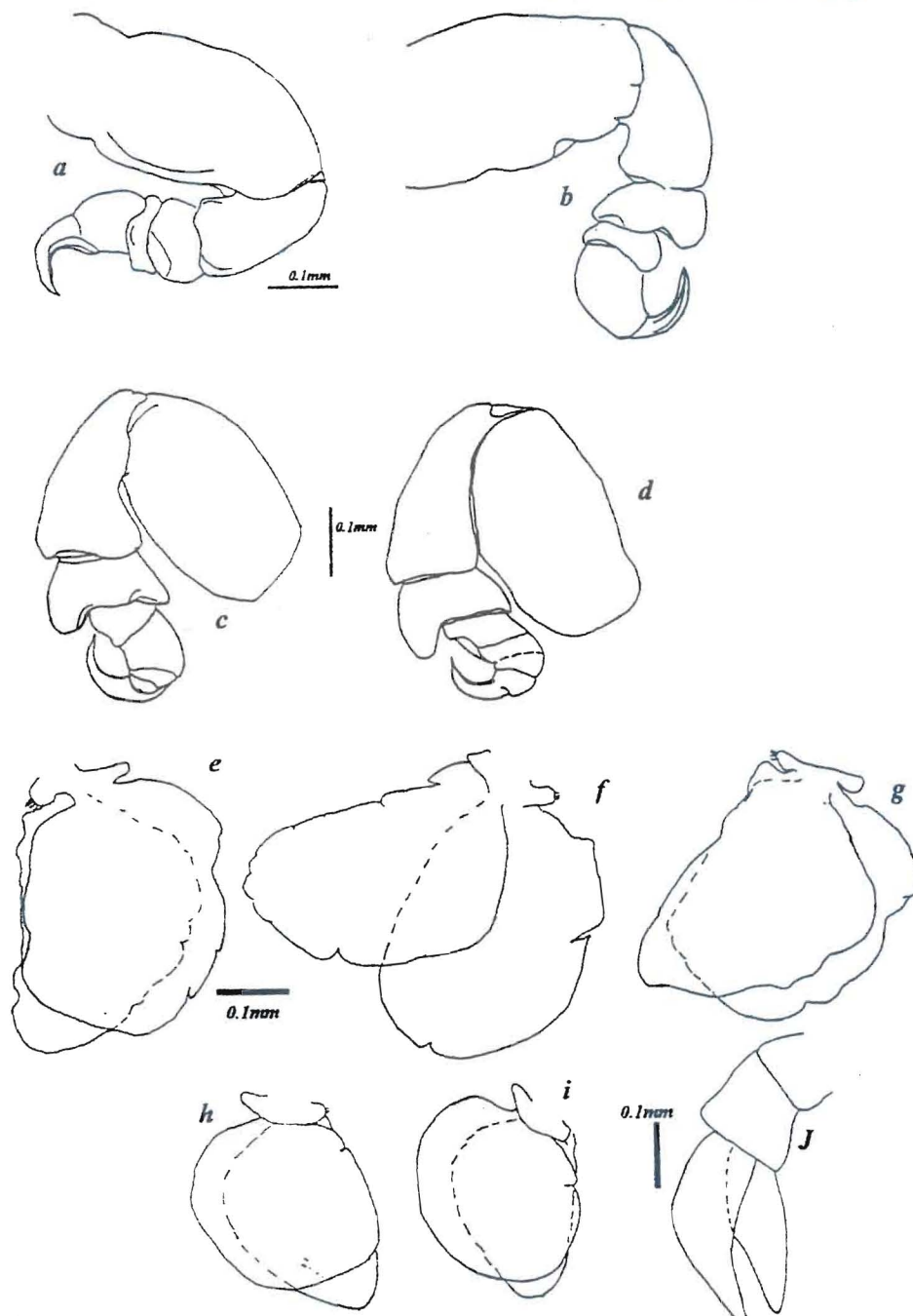


Fig (5) *Irona nanodies*. Camera lucida drawings. a) First pereopod. b) Second pereopod. c) Sixth pereopod. d) Seventh pereopod. e) First pleopod. f) Second pleopod. g) Third pleopod. h) Fourth pleopod. i) Fifth pleopod

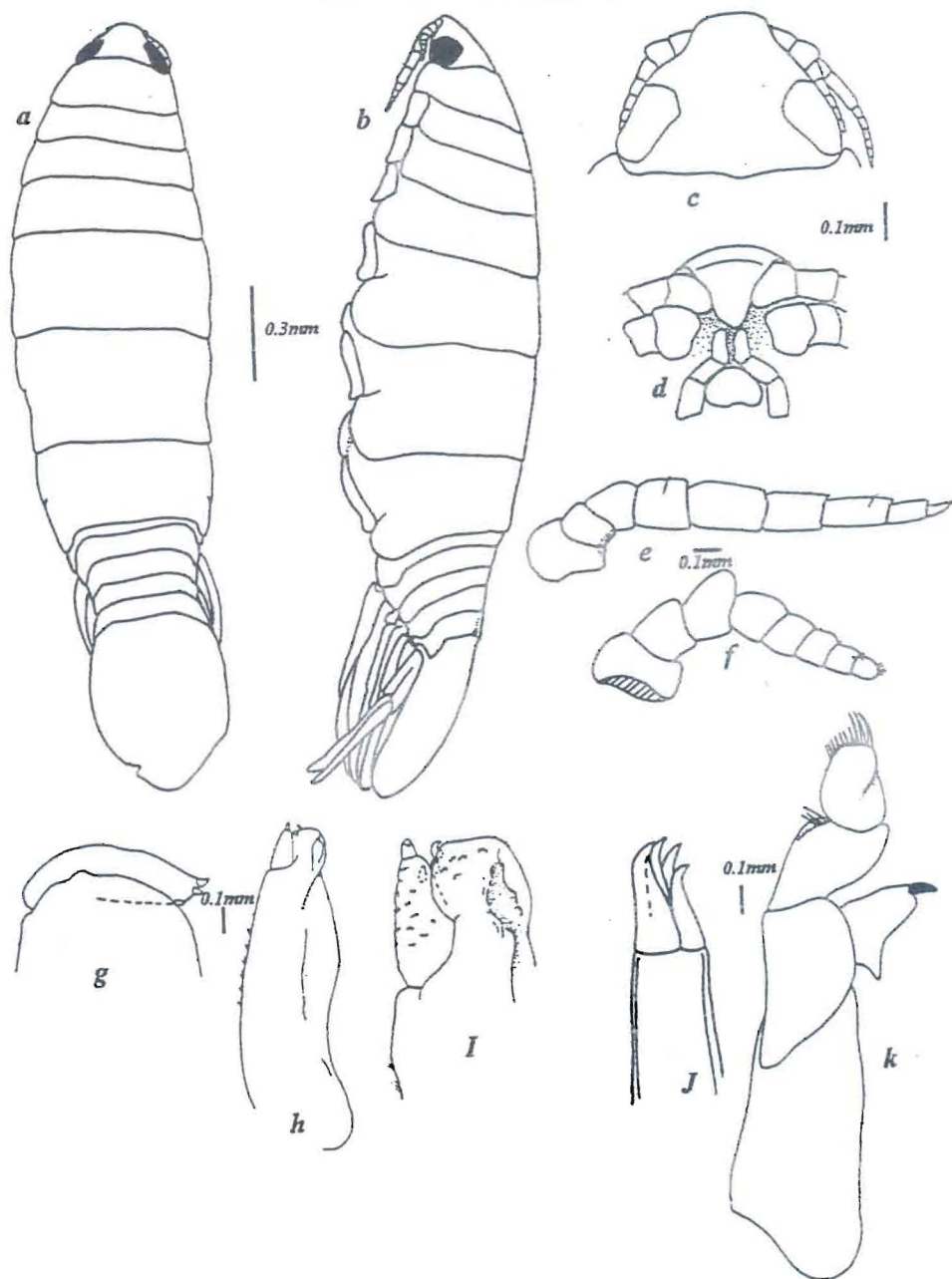


Fig (6) *Anilocra leptosoma*. Camera lucida drawings. a) *Anilocra leptosoma* dorsal. b) *Anilocra leptosoma* lateral. c) Cephalon. d) Frons
 e) First antenna. f) Second antenna. g) Maxilliped article three. h) Maxilla
 I) Maxilla apex. J) Maxillule apex. k) Mandible.

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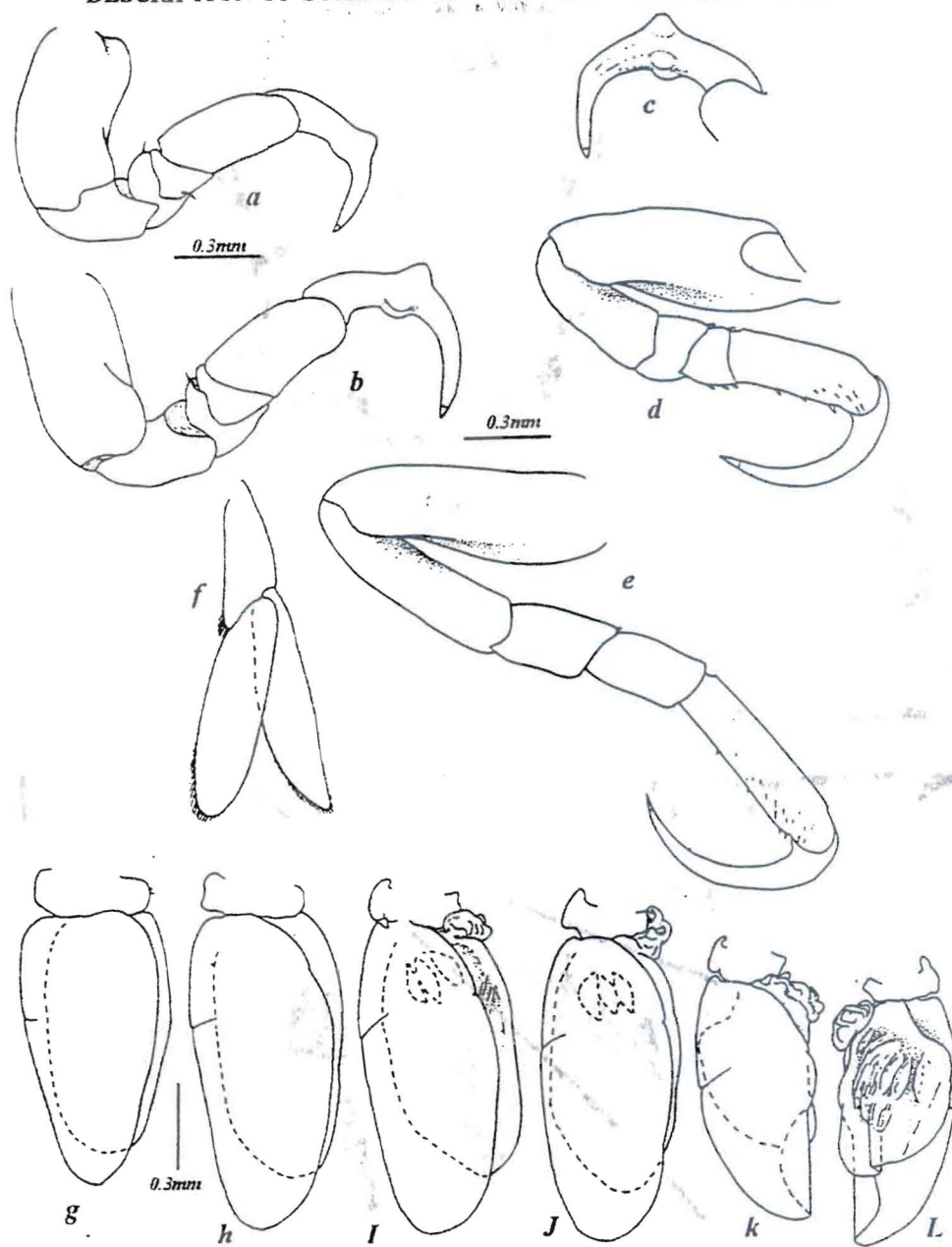


Fig (7) *Anilocra leptosoma*). Camera lucida drawings. a) Pereopod 1. b) Pereopod 2. c) Pereopod 4 dactylus. d) Pereopod 6. e) Pereopod 7. f) Uropod. g-L) Pleopods from 1 to 5 respectively

Plate (1)

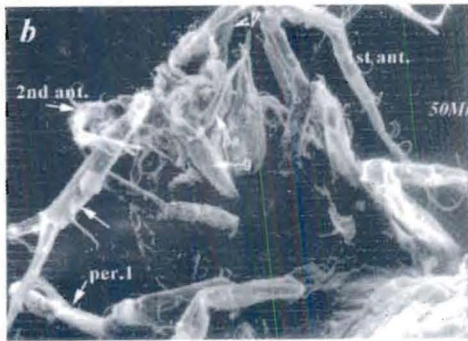
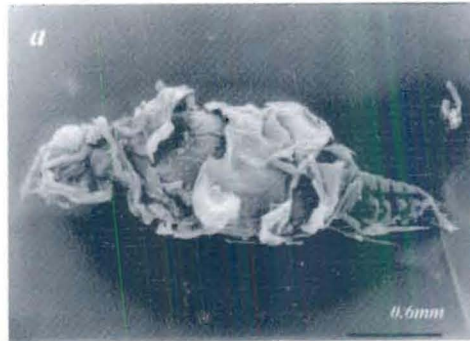


Plate (2)

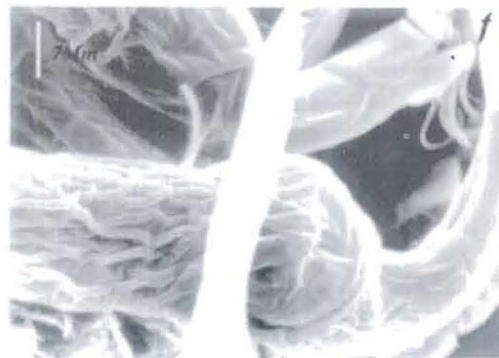
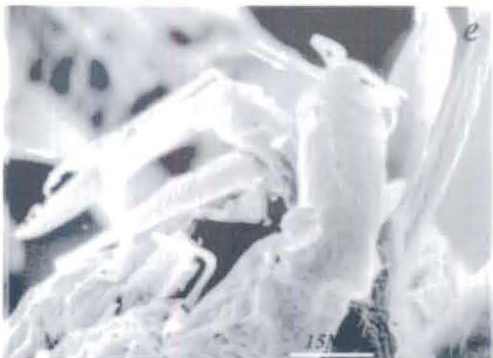
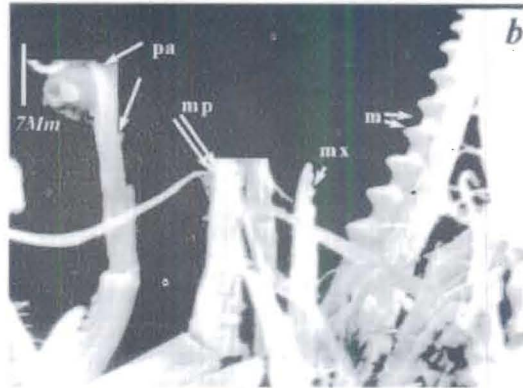
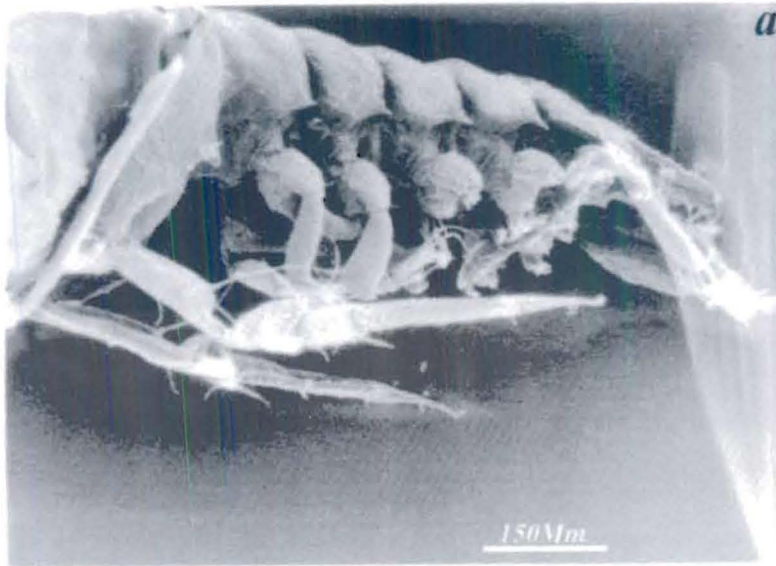


Plate (3)



DESCRIPTION OF SOME ECTOPARASITIC ISOPODS (CRUSTACEA)

Plate (4)

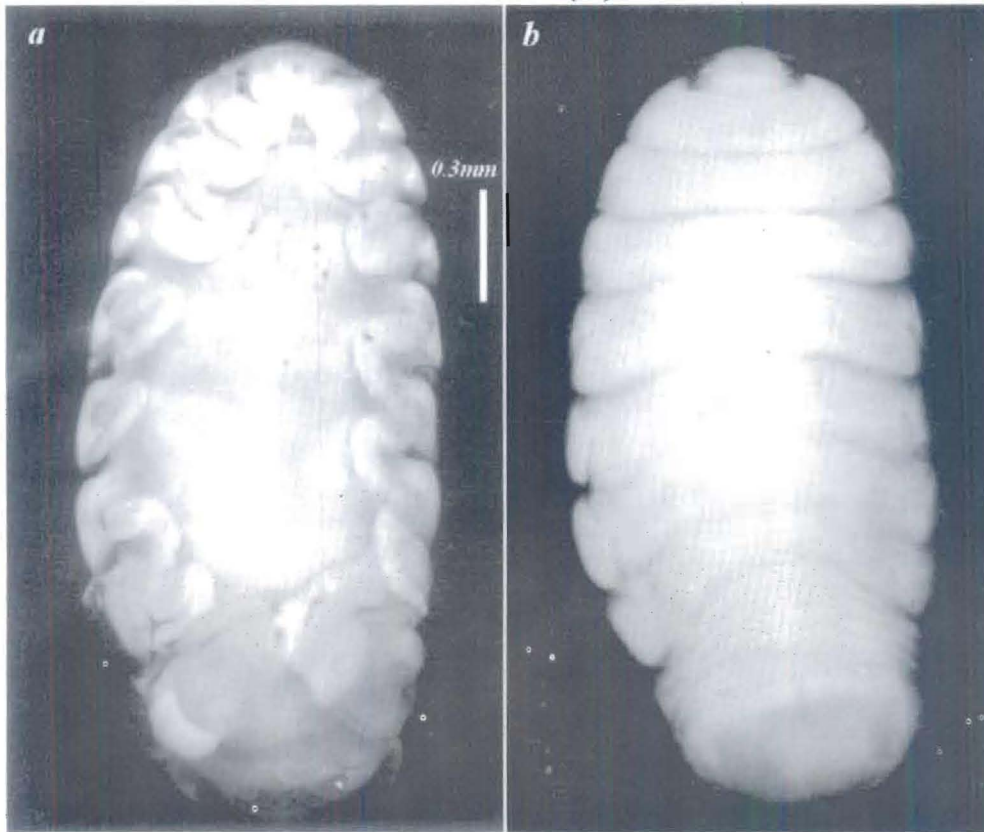


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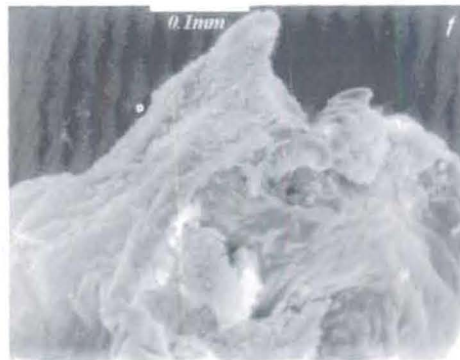
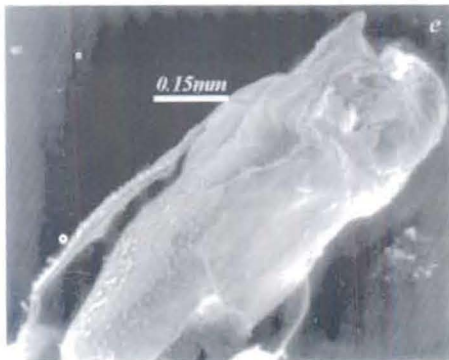
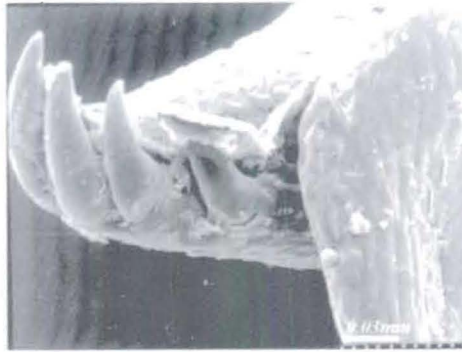
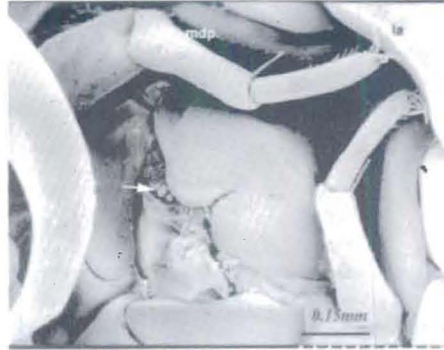


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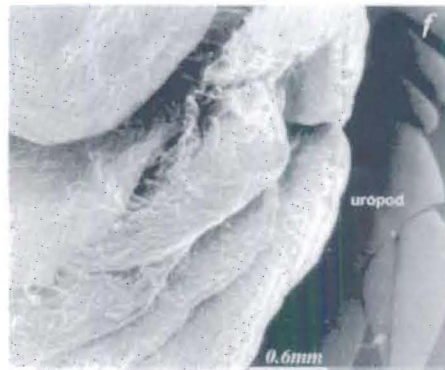


Plate (7)



Plate (8)

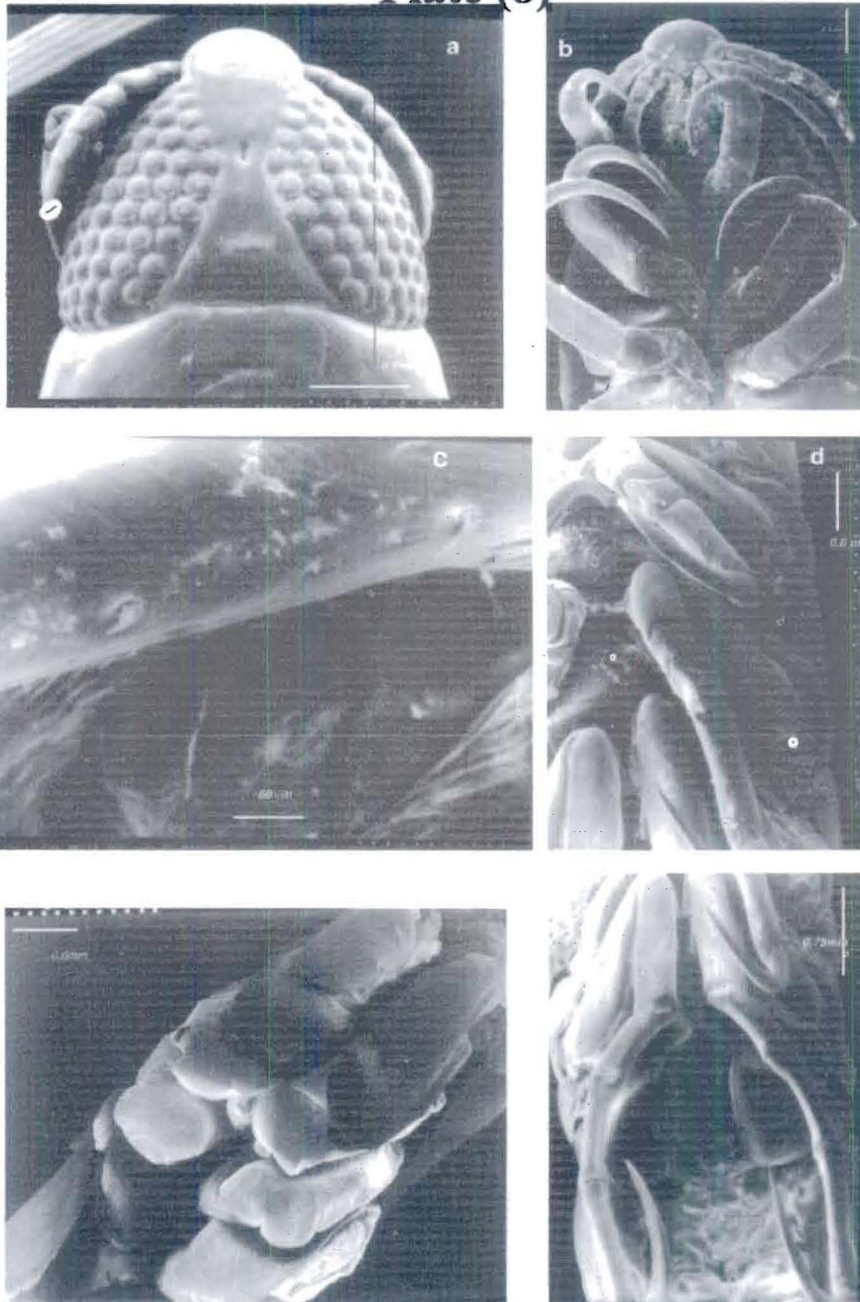


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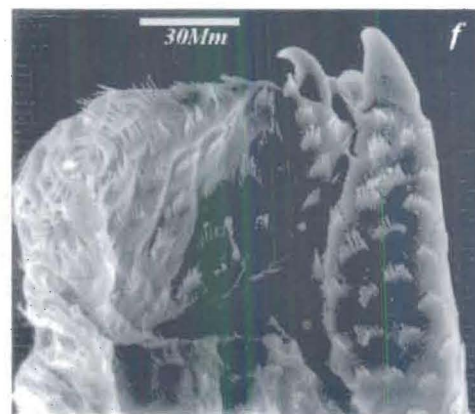
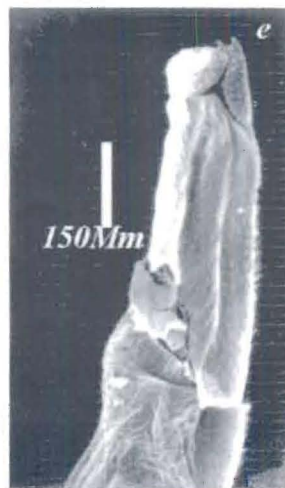
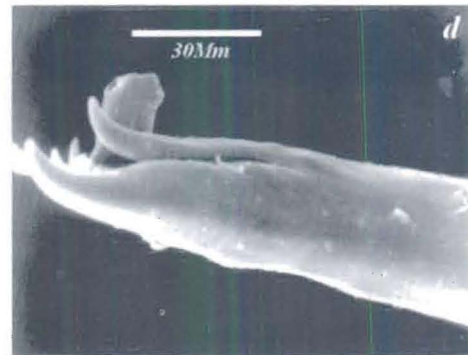
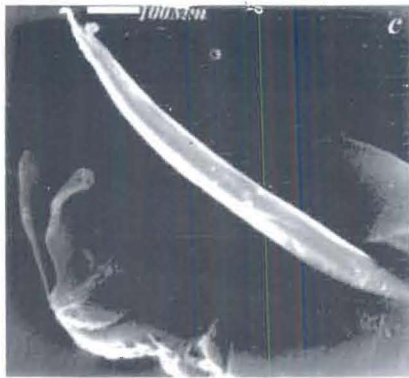
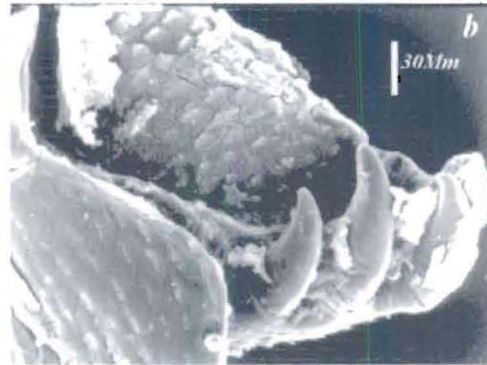


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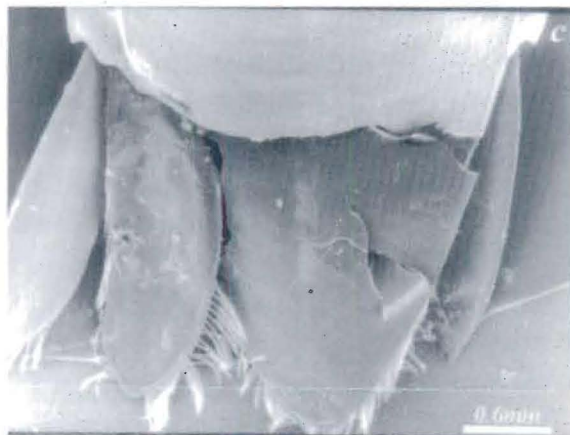
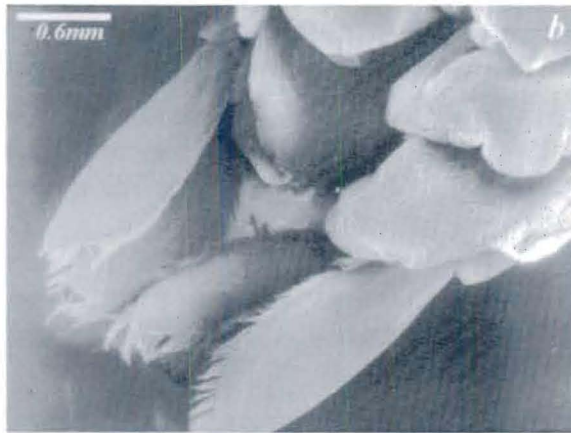


PLATE (1) SEM of praniza larva. a) Praniza larva lateral view b) Cephalothorax ventral, First antenna (1st ant.) second antenna (2nd ant.), Paragnatha (pa), gnathopod (g.) and pereopod one (per. 1) c) Second antenna (arrow) First preopod (double arrows) d) Pectinate scales and ciliate setae of pereopod.

PLATE (2) SEM Praniza larva mouthpart. a) Labium b) Mouth part, paragnatha (pa), maxilliped (mp), maxillule (mx), and mandible (m). c) Maxillule, mandible and paragnatha. d) Maxilliped. e) Terminal segment of the maxilliped. f) Gnathopod claw.

PLATE (3) SEM Praniza larva a) Pleon comprises five somites, carrying pleopods and uropods b) Pleopods with plumose setae.

PLATE (4) SEM of *Irona nanodites* a) Photomicrograph of *Irona nanodites* ventral. b) Photomicrograph of *Irona nanodites* dorsal.

PLATE (5) SEM of *Irona nanodites*. a) First and second antenna b) Labium and maxilliped teeth (arrow) c) Three segmented maxilliped d) The bent hooks of maxilliped e) Maxilla f) Terminal article of the maxilla.

PLATE (6) SEM of *Irona nanodites*. a) The tip of the first maxilla with four spinules. b) Mandible. c) Ciliated setae on the mandible side. d) Second pereopod. e) Seventh pereopod. f) Pleopod and uropod.

PLATE (7) *Anilocra leptosoma*. a) Photomicrograph of *Anilocra leptosoma* dorso-lateral. b) Photomicrograph of *Anilocra leptosoma* ventro-lateral.

PLATE (8) SEM of *Anilocra leptosoma*. a) Cephalon. b) Frons. c) Spines on ventral side of pereopod. d) Pereopod 4&5. e) Pleopod. f) Pereopod seven.

PLATE (9) SEM of *Anilocra leptosoma*. a) Maxilliped. b) Maxilliped article 3. c) Maxillule. d) Maxillule apex. e) Maxilla. f) Maxilla apex

PLATE (10) SEM of *Anilocra leptosoma*. a) Mandible. b) Telson ventral. c) Telson and uropod dorsal

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